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# Evaton West - F Housing Project, Erf 5085, Extension 4

## Draft Basic Assessment Report

Version - 01

11 February 2021



Phumaf Holdings (Pty) Ltd

GCS Project Number: 19-0921

Client Reference: Evaton West - Project F

GDARD Ref No: 002/20-21/E0032






## Evaton West -F Housing Project Erf 5085, Extension 4

### Draft Basic Assessment Report

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Environmental and social data, as well as Environmental Impact Assessment, provided in this report is based on information supplied by specialists in their respective fields, as well as existing information pertaining to the area in question (including previous site investigation data and information from the Department of Environmental Affairs' Online Screening Tool). It has been assumed that the information provided to GCS to perform the outcomes of this report is correct.

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GCS's opinions, conclusions and recommendations are based upon information that existed at the time of the start of the production of this document.

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## EXECUTIVE SUMMARY

GCS Water and Environmental Consultants (Pty) Ltd (GCS) was appointed by Phumaf Holdings (Pty) Ltd (Phumaf) to conduct the Environmental Authorisation (EA) process for the proposed Evaton West Project F stand (Erf 5085, Extension 4), Emfuleni Local Municipality (ELM), in Gauteng. This application for EA is being undertaken on behalf of the Gauteng Department of Human Settlements (DHS) and, as such, will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) as the competent authority.

## NEED AND DESIRABILITY

The site falls within the Urban Development Zone of the Gauteng Provincial Environmental Management Framework (GPEMF) (Gauteng Department of Agriculture and Rural Development, 2014). Zone 1 is intended to streamline urban development activities and to promote development infill, densification and concentration of urban development within the urban development zones as defined in the Gauteng SDF (GSDF), to establish a more effective and efficient city region that will minimise urban sprawl into rural areas.

## SITE DESCRIPTION

The site is currently predominantly vacant, with residential land use surrounding the site and vacant land to the south-west. See site photographs in Figures 4- 8. The site forms part of the proclaimed township of Evaton West Extension 4 (General Plan 6767/1997) (Metroplan Town Planners and Urban Designers, 2020) in the southern parts of Gauteng Province in the Sedibeng District Municipality.

## DEVELOPMENT COMPONENTS

The detailed site layout plans and civil engineering service plans are included in Appendix C and E. Additional services (roads, stormwater, water and sewer) would need to be installed to accommodate the proposed development. Two alternative development concepts have been proposed. Option 1 provides higher density residential development in line with the residential market study that identified the demand for 450 social housing dwelling units. An estimated 460 dwelling units (du) can be provided translating into a density of roughly 120 du/ha. Option 2 provides for medium density housing consisting of a mix of residential typologies at a density of 60 du/ha as prescribed by the 2030 Gauteng Spatial Development Framework (SDF). Option 2 includes a mix of walk-ups (approx 155 units, the resultant net density of 120 du/ha) and single residential units abutting the existing residential settlements to the south (45 dwelling units, a minimum size of 250 m<sup>2</sup>, the resultant density of just over 30 du/ha). Option 2 provides a total of 200 dwelling units with a resultant density of 53 du/ha. Both options have the same proposed development footprint, although Option 1 proposes a density four times higher than that of Option 2. As such, Option 2 is deemed a more preferable layout, in line with urban densification and infill policies. However, the higher density

residential development would require approval from the local municipality in terms of the applicable rezoning planning process. Option 2 may be preferable as it provides single residential units along the southern periphery of the development, compatible with the adjacent residential developments.

## LISTED ACTIVITIES

Listed activities in terms of the 2014 NEMA EIA regulations, as amended:

Notice	Activity	Description of related activity	Applicability
Listing Notice 1	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation..	The proposed site is approx. 3.8 hectares (ha). The extent of the proposed footprint is 3.1 ha. .  BASIC ASSESSMENT
Listing Notice 3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres...	The new internal roads will range from 5 m to 7 m. As the site falls within the Soweto Highveld Grassland Threatened Ecosystem (Vulnerable), this activity is thus applicable.  BASIC ASSESSMENT

## SPECIALIST STUDIES

A specialist Phase 1 Heritage Impact Assessment and Desktop Palaeonolotigcal Study were commissioned. The results indicate that there are no cultural heritage features on the site and the likelihood of fossil finds is low.

## PUBLIC PARTICIPATION PROCESS

The comment period will be run from Friday, 12 February to Monday, 15 March 2021. Project flyers will be distributed with the assistance of the ward councillor and a ward committee representative. Three site notice detailing information about the project and the BA Process, as well as invitation to register as I&APs, will be placed at three strategic locations on Friday, 12 February 2021. A newspaper advertisement for the registration and participation of I&APs was placed in the Vaal Weekblad and will be distributed as part of the notification of the project and availability of draft BAR. To date, there has been a high level of participation from ward counillior and ward committee with the anticipation of the project documents being made available for comment.

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## ENVIRONMENTAL IMPACT STATEMENT

The following impacts associated with the proposed project are considered Medium (Negative) significance (post-mitigation):

### Construction phase:

- Increase in soil erosion and sedimentation associated with earthworks for the establishment of foundations for housing units and associated access road and service infrastructure and grading of roads;
- GHG emissions during the construction activities associated with vehicle, plant and machinery emissions, waste management, and increased carbon footprint through the use of electricity, fuel, and generation of waste;
- Visual impact and loss of sense of place associated with the establishment of the construction camp/s, stockpiling, storage of equipment and machinery, and the storage of reflective materials;
- Increase in ambient noise levels associated with movement and operation of construction-related heavy machinery, vehicles and workers;

### Operational phase:

- Increase in hardened catchment surfaces, and an associated increase in surface runoff which will largely be released into the environment, and associated erosion and sedimentation;
- Potential increased water turbidity due to sediment inputs and/or erosion, which is linked to the alteration of hydrological and geomorphological processes (erosion and sediment);
- Potential for contaminated surface runoff/stormwater flows from roads and for improper sewage infrastructure (spillages) and solid waste management (i.e. dumping into natural areas);
- Risk of alien plant encroachment into areas disturbed post-construction;
- Loss of Soweto Highveld Grassland vegetation through direct physical destruction and/or modification of terrestrial habitat and invasive alien plant invasion;
- Visual impact and loss of sense of place associated with the establishment of the housing development; and
- Additional strain on existing services, including water, sewage, waste collection, and roads.

The following impacts associated with the proposed project are considered of **Positive** significance:

### Construction phase:

- Control and Reduction of illegal dumping associated with removal of waste from the development footprint, and access control to the Works area; and
- Job creation and economic growth associated with 750 new employment opportunities in the construction phase of the project.

**Operational phase:**

- Job creation and associated local economic growth, associated with the creation of 468 employment opportunities during the operational phase of the project; and
- Improved quality of life associated with the provision of formal housing, electrification and provision of sewage and water infrastructure.

**ENVIRONMENTAL MANAGEMENT PROGRAMME**

An Environmental Management Programme (EMPr) related to the construction and operational phases of the proposed housing development is included as Appendix I.

**CONCLUSIONS**

The EAP is confident that all major impacts associated with the proposed housing development have been adequately described and mitigated. Given the generally medium-low impacts associated with the proposed housing development and the implementation of the proposed mitigation measures including those in the detailed EMPr (Appendix I), the EAP is confident that the project can proceed without significant impact on the receiving environment.

**YOUR OPPORTUNITY TO PARTICIPATE**

This Draft Basic Assessment Report will be made available to all registered I&APs for public review and comment from **12 February 2021** (comment period ending **15 March 2021**). I&AP's will be notified of the availability and will be sent an electronic copy on request. Copies will also be available for download from the GCS website: [www.gcs-sa.biz](http://www.gcs-sa.biz).

Any comments on the Draft Basic Assessment Report must be submitted in writing or email (including any additional supporting material) on or before **15 March 2021** directly to Lehlogonolo Mashego, Environmental Assessment Practitioner, by means of the following:

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## ACRONYMS AND ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CC	Closed Corporation
CoJ	City of Johannesburg
CR	Critically Endangered
CRR	Comments and Responses Report
DBAR	Draft Basic Assessment Report
DEFF	Department of Environment, Forestry and Fisheries
DHS	Department of Human Settlements
du	Dwelling units
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 (Act No. 73 of 1989)
ECO	Environment Control Officer
EIA	Environmental Impact Assessment
ELM	Emfuleni Local Municipality
EMPr	Environmental Management Programme report
EN	Endangered
ESA	Ecological Support Area
GCS	GCS Water and Environmental Consultants (Pty) Ltd
GDARD	Gauteng Department of Agriculture and Rural Development
GHG	Greenhouse gas
GN	Government Notice

GPEMF	Gauteng Provincial Environmental Management Framework
GPS	Global Positioning System
GSDF	Gauteng Spatial Development Framework
ha	Hectares
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
km	kilometres
kVa	Kilovolt-amps
L	Litres
m	Metres
m <sup>3</sup>	Cubic metres
mamsl	Metres above mean sea level
mm	Millimetres
NEMA	National Environmental Management Act
NEM: BA	National Environmental Management: Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act
NWA	National Water Act
OHSA	Occupational Health and Safety Act
PHRA	Provincial Heritage Resources Agency
PM	Project Manager
PPP	Public Participation Process
RLRP	Rapid Land Release Programme
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standard

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SAPS	South African Police Services
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEIA	Scoping and Environmental Impact Assessment
SP	Significance Points
SPLUMA	Spatial Planning and Land Use Management Act
SWMP	Stormwater Management Plan
TOP/TOPS	Threatened or Protected / Species
VU	Vulnerable

## 1 INTRODUCTION

### 1.1 Background and Overview

GCS Water and Environmental Consultants (Pty) Ltd (GCS) was appointed by Phumaf Holdings (Pty) Ltd (Phumaf) to conduct the Environmental Authorisation (EA) process for the proposed Evaton West Project F stand (Erf 5085, Extension 4), Emfuleni Local Municipality (ELM), in Gauteng. See Figure 1, 2 and 3.

This application for EA is being undertaken on behalf of the Gauteng Department of Human Settlements (DHS) and, as such, will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) as the competent authority.

The proposed housing development forms part of the Gauteng Rapid Land Release Programme (RLRP) of the Gauteng DHS, which aims to fast track the release of serviced stands from state-owned land to qualifying beneficiaries, to address housing, economic, social and agricultural needs in the province. In addition to availing land for housing, the programme also seeks to make available land for other commercial uses including urban agriculture. Several stands in Gauteng were identified as potential development sites (Metroplan Town Planners and Urban Designers, 2020).

Owing to the nature and scale of the project, an Application for EA is required. The Application for EA has been undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). This report has been prepared per the 2014 Environmental Impact Assessment (EIA) Regulations, as amended.

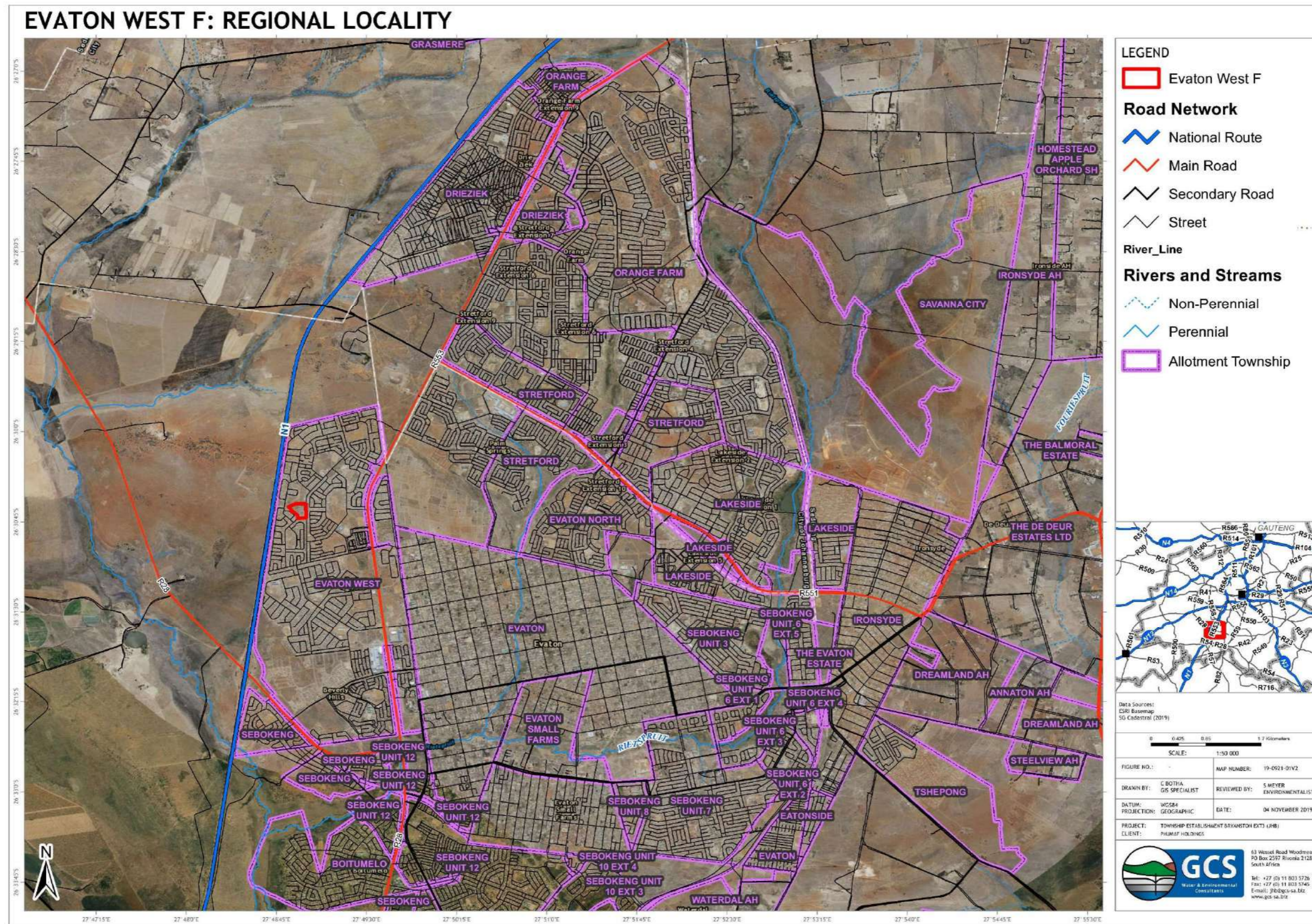


Figure 1: Regional Locality Map

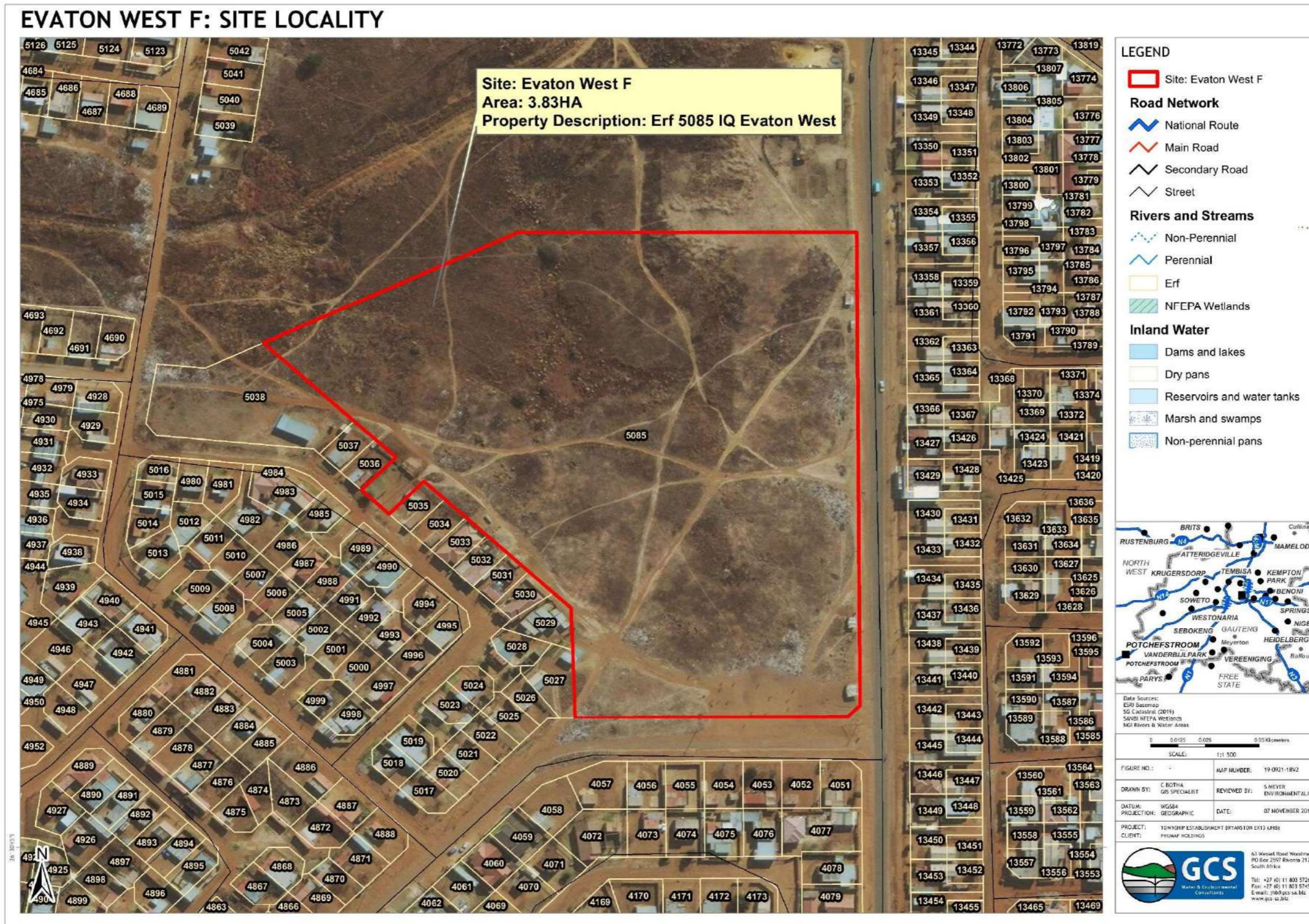


Figure 2: Site Locality Map



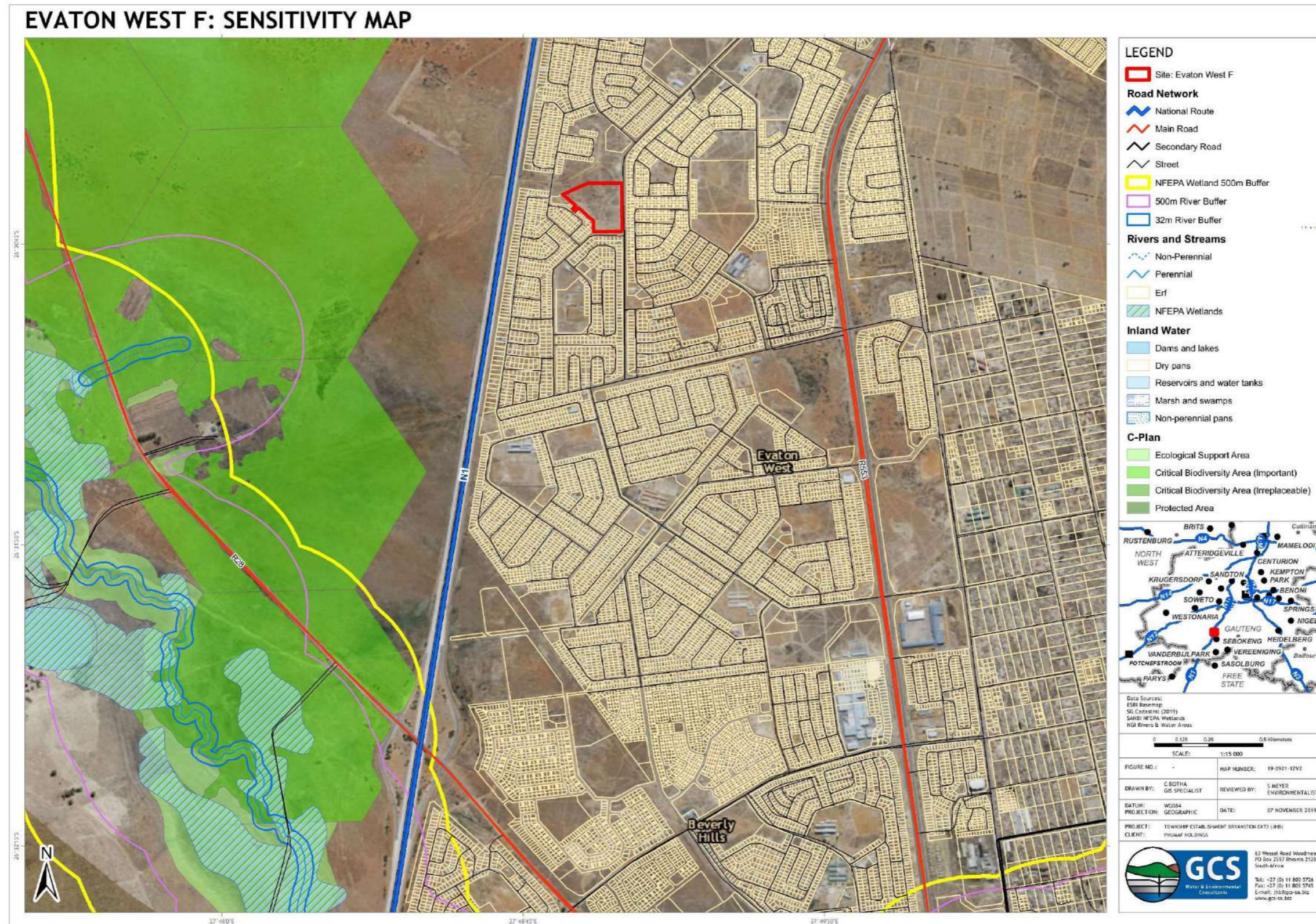


Figure 3: Site Sensitivity Map

## 1.2 Details of Applicant and Environmental Assessment Practitioner (EAP)

The details of the applicant are provided in Table 1.

**Table 1: Contact details for applicant**

ITEM	DETAILS
Company Name	Gauteng DHS
Company Representative	Daniel Molokomme
Contact Persons	Daniel Molokomme
Telephone No.	+27 (0)11 085 2593
Facsimile No.	+27 (0)11 355 6211
E-mail Address	<a href="mailto:Daniel.Molokomme@gauteng.gov.za">Daniel.Molokomme@gauteng.gov.za</a>
Postal Address	Private Bag X79, Marshalltown, 2001

The contact details of the EAP are provided in Table 2 and the EAP's CV is attached as Appendix A.

**Table 2: Contact details for EAP**

ITEM	DETAILS
Company Name	GCS Water and Environmental Consultants (Pty) Ltd
Company Representative	Gerda Bothma
Telephone No.	+27 (0)11 803 5726
Facsimile No.	+27 (0)11 803 5745
E-mail Address	<a href="mailto:Gerdab@gcs-sa.biz">Gerdab@gcs-sa.biz</a>
Postal Address	PO Box 2597, Rivonia, 2128

## 2 Project Description

### 2.1 Site description

#### 2.1.1 Existing and Adjacent Land Uses

The site is currently predominantly vacant, with residential land use surrounding the site and vacant land to the south-west. See site photographs in Figures 4-8. The site forms part of the proclaimed township of Evaton West Extension 4 (General Plan 6767/1997) (Metroplan Town Planners and Urban Designers, 2020) in the southern parts of Gauteng Province in the Sedibeng District Municipality. The surrounding townships include Sebokeng, Orange Farm, Boipatong, Sharpeville, Boitumelo, Polokong, Golder Gardens and Palm Springs. The site is traversed by numerous pedestrian tracks. The site is largely vacant, with some small structures on its

periphery. There is illegal dumping on the south-eastern corner and the site is used as a 'shortcut' by pedestrians. The site is within a densely built-up area, which is mostly residential in character.



Figure 4. General site conditions - Northern Border.



Figure 5. General site conditions - Eastern border.



Figure 6. General site conditions - Western border.



Figure 7. General site conditions - Southern border.



Figure 8. Boulders in the study area.

There are schools, both primary and secondary, to the south, and other social facilities, such as two churches to the north. Some of the sites earmarked for social facilities are currently still vacant.

Open spaces adjacent to the site are reportedly not maintained and detract from the amenity of the neighbourhood rather than acting as an asset. One such open space is directly north of the site. A stormwater canal is located approx. 60 m north of the northern boundary of the site.

Approximately 400 m to the east of the site is a portion of land that is currently invaded.

The site is located between the N1 located approx. 200 m west of the site and Golden Highway (R553) located approx. 800 m east of the site and Moshoeshoe Street to the east, which provides it with high levels of regional accessibility. The Golden Highway and Moshoeshoe Road to the east are a bus and minibus taxi routes. The closest taxi rank is along Adams Road in Evaton Proper approximately 9.5 km from the site. The Golden Highway is also designated as an SPTN Route with a proposed bus station and minibus taxi rank within the Evaton Regional Node.

The site is located within the urban edge, according to the 2030 Gauteng Spatial Development Frameworks (SDFs) (Figure 9), within the Orange Farm - Sebokeng 'urban cluster' (Metroplan Town Planners and Urban Designers, 2020).

There are no servitudes that affect the site.

### *2.1.2 Historical Land Uses*

Aerial imagery from Google Earth suggests that land use has remained mostly unchanged in the last 16 years, since 2004. The site appears to have been impacted by pedestrian movement and illegal dumping of waste.



Figure 9: Site in relation to the 2030 Gauteng SDF

### 2.1.3 GPS Coordinates

The Global Positioning System (GPS) coordinates of the proposed housing development are provided in Table 3 with a corresponding map of GPS points in Figure 10. The approximate mid-point of the proposed area to be developed is at 26° 30'39.33"S 27° 48'56.73"E.

**Table 3: GPS coordinates**

Point	Latitude	Longitude
Point 1	26° 30'37.61"S	27° 48'50.85"E
Point 2	26° 30'35.97"S	27° 48'54.46"E
Point 3	26° 30'36.31"S	27° 48'59.85"E
Point 4	26° 30'43.05"S	27° 48'59.85"E
Point 5	26° 30'43.05"S	27° 48'55.47"E
Point 6	26° 30'41.83"S	27° 48'55.99"E
Point 7	26° 30'39.94"S	27° 48'52.63"E



**Figure 10: Map indicating GPS points**

### 2.1.4 Civil Aviation Sensitivity

The site is located within an area designated as “Low” in terms of sensitivity for civil aviation (Figure 11), based on the Department of Environment, Forestry and Fisheries (DEFF) online screening tool (Appendix G) (Department of Environment, Forestry and Fisheries, 2017). However, it seems that this sensitivity rating applies to commercial-scale wind energy installations. In addition, based on the site investigation, the sensitivity is considered “Low” as the proposed housing development is a logical extension of the existing settlements, and poses a low risk to aircraft. In both Option 1 and 2, the buildings will range from two- to three-storeys.



Figure 11: Civil Aviation Sensitivity Map (from DEFF online screening tool, accessed 10 November 2020)

## 2.2 Land Ownership

The identified property is owned by Department of Human Settlements (DHS) - Gauteng Provincial Government.

## 2.3 Zoning

The Evaton West Project F site (Erf 5085, Extension 4), located in Emfuleni Local Municipality (ELM), was identified for the development of a housing project (Figure 1-3). The site is 3.8 hectares (ha), is currently zoned as “community facilities” and is adjacent to existing residential settlements.

According to the Emfuleni SDF 2017-2025, 2017 Erf 5085 Evaton West Ext 4 is designated as Urban Residential. In terms of Land Use Management, the site falls within a 'Medium Density Residential Zone' (Zone 2). The objective of a medium-density residential zone is defined as: 'to encourage residential densities that allow affordable housing development and support road-based public transport. A maximum residential density of 60 units per ha is allowed within Zone 2. Such densities typically allow for the development of a range of affordable housing typologies within this zone.

Residential-supporting land uses to be accommodated within Zone 2 include educational facilities and medical facilities. Zone 2 also allows for the establishment of micro-enterprises to support and promote SMMEs within this zone. Consent for the establishment of micro-enterprises is strictly managed by the micro-enterprises management system'.

If the site is fully developed at 60 dwelling units (du) per ha, the approximate yield will be 230 units (Metroplan Town Planners and Urban Designers, 2020).

The Evaton West SDF also designates the site as Medium Density Residential, similar to the areas to the east and the south. To the north is the City of Johannesburg (CoJ) Consolidation Zone and to the south is the Evaton Node. To the west of the N1 is an area designated as Agriculture and Conservation Plan.

An application has been submitted to rezone and subdivide the site into Residential 1 erven of approximately 180 m<sup>2</sup>. The existing application will have to be withdrawn should an alternative development model be proposed.

It is proposed to develop 450 housing units on the site (Metroplan Town Planners and Urban Designers, 2020).

## **2.4 Description of Proposed Activity**

This section outlines the components of the proposed housing development including services infrastructure. Detailed site layout plans and civil engineering service plans are included in Appendix C and D. Additional services (roads, stormwater, water and sewer) would need to be installed to accommodate the proposed development.

### **2.4.1 Social Housing Walk-Up Unit Top Structures**

Based on a residential market study (Metroplan Town Planners and Urban Designers, 2020), the site is considered suitable for the development of social housing, specifically 3 to 4 storey walk-up units, with unit sizes of between 30 m<sup>2</sup> - 60 m<sup>2</sup>.

Two alternative development concepts have been proposed (see detailed layout plans in Appendix E:



**OPTION 1** (Figure 12): higher density residential development in line with the residential market study that identified the demand for 450 social housing dwelling units. The bulk of the site (3.2ha) would be earmarked for two to three-storey residential walkups. Three storey buildings at the eastern entrance to create a gateway to the development. The remainder of the buildings are two-storeys in height. The access road is diverted to form a circle in the centre of the site. A communal open space will be provided in this circle. A social facility, such as a community hall or creche is proposed within the public open space. An estimated 460 dwelling units can be provided translating into a density of roughly 120 du/ha.



**Figure 12: Option 1: Proposed Layout**

**OPTION 2:** (Figure 13) Medium density housing consisting of a mix of residential typologies at a density of 60 du/ha as prescribed by the SDF. A mix of walk-up flats and single residential erven with a minimum size of 250 m<sup>2</sup> was applied. The bulk of the site (3.2 ha) would be utilised for residential development. The northern and central portions of the site are earmarked for two to three-storey walk-ups. These are placed at the main entrance road at points of highest accessibility. The walk-ups are located on 1.86ha and approximately 155 units can be achieved with a resultant net density of 120 du/ha.

The southern periphery of the site is earmarked for single residential erven. These are placed adjacent to the abutting residential properties to form a buffer between the walk-up flats and the surrounding low-density development. A total of 45 dwelling units with a minimum size of 250 m<sup>2</sup> can be achieved. This takes up 1.37 ha of the site with a resultant density of just over 30 du/ha.



**Figure 13: Option 2: Proposed Layout**

Overall, under Option 2, a total of 200 dwelling units can be provided with a resultant density of 53 du/ha.

A central open space with a small social facility such as a creche or community hall is placed between the single residential erven and the walk-up flats in a position that is accessible to future residents.

#### **2.4.2 Internal Roads (Conceptual)**

A traffic impact assessment was deemed necessary to determine any additional capacity required on the roads (Metroplan Town Planners and Urban Designers, 2020). The ELM Roads and Stormwater Department is responsible for the provision and maintenance of roads and stormwater infrastructure in its area of jurisdiction.

Two access points are proposed for Option 1: one from the west where the site abuts the western road and one from the eastern road roughly in the middle of the site. This forms an internal east-west link through the site (Figure 14).

For Option 2, two access points are proposed (Figure 15): one from the west where the site abuts the western road and one from the eastern road roughly in the middle of the site. This forms an internal east-west link through the site. A ring road provides access to the southern portion of the site.

The Civil Engineering Report compiled by Phumaf (7 July 2020) (Appendix C) states that a new road network system, parking, and stormwater pipe systems will be constructed within the

proposed site connecting to the existing roads and stormwater infrastructure discharging to the north. The internal road will have a total length of approximately 0.755 km including the proposed parking and walkways within the proposed development. There are no bus and taxi bays planned for the development.

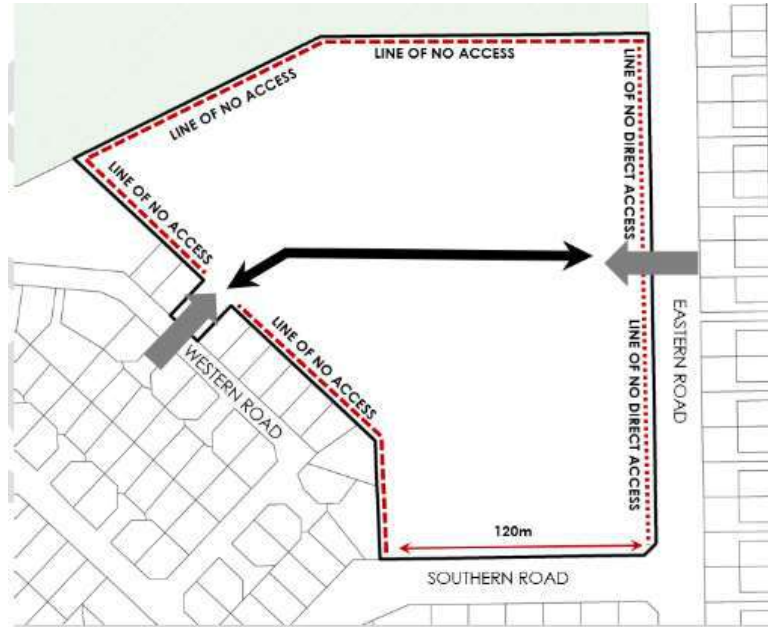


Figure 14: Option 1: Proposed Road Access Points

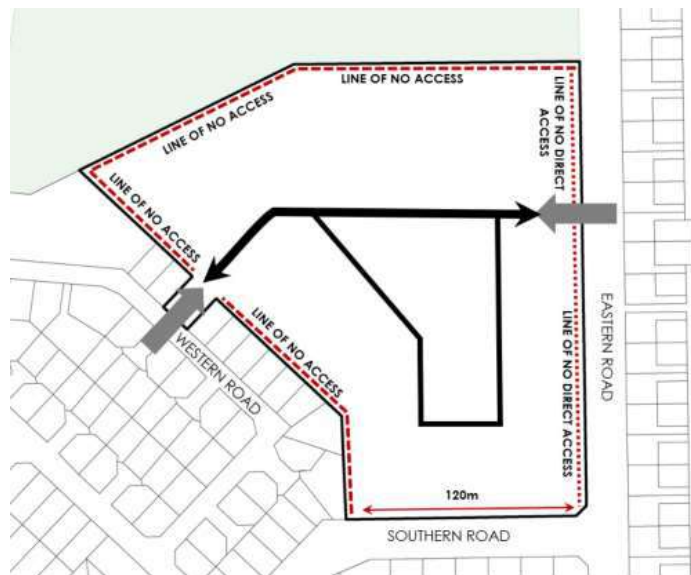


Figure 15: Option 2: Proposed Road Access Points

According to the Civil Engineering Services report (Appendix C), the Evaton West - Project F development will gain access to east from the existing unnamed Street, which connects to Moleli Street/Pilansburg Road to the south of the proposed site. Moleli Street/Pilansburg road connects to Golden highway (R553) which is located to the far eastern direction and is approximately 0.85 km from the proposed site. Road widths would vary from 5 - 7m according to the ELM design standards for local streets in residential areas.

There is 3 formal taxi rank in Evaton 2 (Two) along Adams Road approximately 9.5 km away and one in Sebokeng along Vilakazi street which is 9.3km away from Evaton West - Project F. There are no Public transport lay-bys on roads located along these routes There are no formal pedestrian sidewalks located along the development boundary. According to the National Household Travel Survey (NHTS), 1.5km is the ideal limit that one should expect a pedestrian to walk to a public transport facility.

#### *2.4.3 Sewage Infrastructure (Conceptual)*

The Civil Engineering Services Report compiled by Phumaf (7 July 2020) (Appendix C) reports that the proposed development falls under the ELM (Metsi-A-Lekoa) Water jurisdiction. Information obtained from Emfuleni Spatial Development Framework 2017-2025 (ESDF), compiled on Behalf of the ELM by Urban Dynamics Gauteng, dated September 2017, Project SNM/2012 Civil Engineering Services Master Planning Volume 2 Sewage Disposal, first edition dated August 2013 and Southern Corridor Regional Implementation Plan indicates that the existing bulk sanitation network is old, and it is overworked due to the demand for sanitation services therefore new infrastructure needs to be constructed. There is reportedly insufficient capacity in the wastewater treatment works to accommodate the proposed development and densities (Metroplan Town Planners and Urban Designers, 2020). In terms of the Gauteng Spatial Master Plan, the site is located within an area classified as “treatment capacity exceeded, no spare capacity” (Gauteng Spatial Master Plan: GIS Portal, n.d.). An upgrade to the existing sewer network is necessary to accommodate the proposed development. The extent of such an upgrade will be determined during the design stages of the project.

Sewer design flow is estimated at approximately 80% of the water consumption plus 15% stormwater infiltration. New sewer reticulation design within the erf and in the road, reserves will be constructed for this proposed development. The proposed development layout plan/site development plan (SDP) is currently being prepared to establish the suitability and capacity of the services for the connection point. Additional Studies such as the GLS masterplan will be required to determine the capacity analysis of the existing pipes once an SDP has been completed and approved.

The pipes will be 160 mm diameter uPVC (Heavy Duty) Class 34 and the manholes will be 1 000mm to 1500mm diameter precast rings with concrete covers. The length of internal Sewer pipelines as per the current proposed draft layout for this project approximately 0,993km. The proposed designs were done according to the yield provided from the draft proposed layout.

#### *2.4.4 Stormwater Management (Conceptual)*

Stormwater drainage is an important consideration as the site drains northwards and eventually into the Rietspruit tributary. The design will impact on the quality and quantity of surface water reaching the Rietspruit tributary. No formal stormwater management system exists on the site. There is a stormwater channel 60 m north and west of the site, which drains under the N1 towards the Rietspruit tributary. In terms of the conceptual Stormwater Management Plan (SWMP) in the Civil Engineering Report compiled by Phumaf (7 July 2019), a new stormwater pipe system will be constructed within the proposed site discharging to nearby outlets and natural watercourses.

The minor stormwater system consists of a few sub-catchments. Stormwater is discharged from the development to the existing natural watercourses like rivers and streams by means of stormwater pipes. The minimum stormwater pipe size will be from 450 mm diameter within the erf and 600 mm on road reserves. The total pipe length is approximately 0.920 km.

The Rational Method was used to calculate the stormwater runoff for this site. The stormwater will be drained along the road reserve, mainly in open, unlined V-drain channels, with underground piped systems only where surface drainage is not possible or deemed to be impractical. Designs will be such that the 1:5-year minor storm and the 1:25 year major storm are accommodated in the canals and the road structure without overtopping.

From Figure 17, which shows a cross-section profile from the southern to the northern end of the site, it is clear that the site is predominately flat (around 1540 mamsl across the site). The existing stormwater canal is located to the north at an elevation of approx. 1542 mamsl, which means that the surface water flow would not naturally drain in this direction. Additional stormwater management infrastructure would be required to facilitate drainage towards the canal.

#### *2.4.5 Internal Water Reticulation Network (Conceptual)*

The proposed development falls under the ELM (Metsi-A-Lekoa) Water jurisdiction. Although the proposed housing development is planned to be serviced by the municipal water network, there is reportedly currently insufficient capacity in the existing reservoirs to accommodate

the proposed development and densities (Metroplan Town Planners and Urban Designers, 2020). In terms of the Gauteng Spatial Master Plan (Gauteng Spatial Master Plan: GIS Portal, n.d.), the site is located within an area where the water services capacity is not known. The Civil Engineering Services Report compiled by Phumaf (7 July 2020) (Appendix C) states that the infrastructure is old (between 60 -70 years) across the municipal area and there are no backlogs in the supply of water connections. New water bulk infrastructure will be required to accommodate the proposed development and other future developments.

Internal water reticulation network will be designed at the conceptual/ planning level in line with the ELM (Metsi-A-Lekoa) Design Criteria and Internal Services Standardsthe DHS, the CSRI 'Red Book' - The Neighbourhood Planning and Design Guide (2019) and relevant South African National Standards (SANS). The finalisation of the route and design will take place during the detailed design phase and is subject to all necessary approvals being obtained and any changes to the Settlement Plan which may occur.

The proposed layout plan/site development plan (SDP) is currently being prepared to establish the suitability and capacity of the services for the connection point. GLS Water Masterplan report will be required to determine the capacity analysis of the existing pipes once an SDP has been finalised and approved.

A proposed internal water reticulation network is shown in the Civil Engineering Services report (Appendix C). It must be noted that the total pipe length and the correct pipe sizes of the water services will, therefore, be confirmed through a preliminary and final design process when the proposed layout is completed and approved.

#### **2.4.6 Electrification**

A bulk electrical services report has been prepared by Phumaf (20 September 2019) based on 450 housing opportunities. Evaton West is supplied directly by Eskom. There is an existing Eskom substation which has sufficient bulk capacity to supply the project. The total bulk electricity requirements for the project is 1,613 kVA (housing units and street lighting) and is available from the existing network which is being currently run and maintained by Eskom. The works required to be executed to make the supply available under this Project will include the following:

- Design, manufacture, supply, supply, installation and commissioning of two 1,000kVA 11/0.4kV minisubstations, including associated RMUs and underground 11kV XLPE cable. The extra capacity in the minisubstations will cater for limited future expansion of the project; and
- All other works associated with tying into the Eskom 11 kV network in Evaton West.

The installation of street and area lighting will be done as part of the LV reticulation work package to the housing units. This will be carried out in line with Eskom specifications and standards.

### **3 LEGAL FRAMEWORK**

This chapter details applicable legal provisions and aims to provide a review of relevant national and provincial legislation and regulations, and policy documents, which apply to, or have implications for, the proposed Evaton West-Project F housing project.

#### **3.1 The Constitution of South Africa, 1996**

The legal reference source for environmental law in South Africa is found in the Constitution of the Republic of South Africa, 1996 (Act No.108 of 1996). All environmental aspects should be interpreted within the context of the Constitution. The Constitution has enhanced the status of the environment since environmental rights have been established (Section 24) and other rights created in the Bill of Rights which impact on environmental management.

#### **3.2 NEMA EIA regulations (2014) as amended**

The NEMA, 1998 (Act No. 107 of 1998) is South Africa's overarching framework for environmental legislation. Of particular importance is the requirement of 'duty of care' with regards to environmental remediation stipulated in Section 28 of NEMA:

*Duty of care and remediation of environmental damage: "(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 be reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment."*

Regulations promulgated under NEMA include the EIA Regulations (2014) published under Government Notice Regulation (GNR) 982, as amended 4 April 2017, and the associated Listing Notices Listing Notice 1, 2 and 3. Section 24(5) of NEMA stipulates that certain "listed activities" require environmental authorisation by way of either a Basic Assessment (BA) or a full Scoping and Environmental Impact Assessment (SEIA) as defined in the Listing Notices. Activities listed under Listing Notice 1 and 3 require a BA process to be undertaken while those listed under

Listing Notice 2 require a full Scoping and SEIA process. Table 6 provides an assessment of the applicable listed activities.

### *3.2.1 Assumptions in Review of Applicable Listed Activities*

The following assumptions underpin the list of applicable listed activities:

- The site is considered an urban area as the site is located within the urban edge (Figure 9) and adjacent to existing built up areas. As such, many of the listed activities relating to bulk services infrastructure and roads are not applicable;
- The listed activities have been based on available design information and an initial GIS assessment and were discussed with GDARD, the competent authority, at the pre-application consultation meeting held on 5 August 2020 (Appendix F);
- It is assumed that the project scope does not include bulk electricity generation facilities or transmission lines or wastewater treatment facilities;
- The overall footprint of the development will be 3.2 ha (for both Option 1 and 2); and
- The study area is assumed to not have been used previously for mining or heavy industrial activities.

### *3.2.2 Screening and Initial Site Sensitivity Verification*

Based on the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for EA (GN R320 of 20 March 2020) (the Protocols), the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and must comply with Appendix 6 of the EIA Regulations promulgated under sections 24(5) and 44 of the NEMA, where a specialist assessment is required.

An Initial Site Sensitivity Verification must be undertaken by an EAP or a registered specialist with expertise in the relevant environmental theme being considered. The Initial Site Sensitivity Verification must be undertaken through the use of:

- A desktop analysis, using satellite imagery; and
- A preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.

The outcome of the Initial Site Sensitivity Verification must be recorded in the form of a report that-

- Confirms or disputes the current use of the land and environmental sensitivity as



identified by the national web-based environmental screening tool;

- Contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
- Is submitted together with the relevant assessment report prepared following the requirements of the EIA Regulations.

The site has several sensitivities and associated reporting requirements, as shown in Table 4. The assessment was based on the property description, using the DEFF online screening tool (10 November 2020) (Appendix G).

**Table 4: Site Sensitivities (based on the property description) from DEFF online screening tool** Invalid source specified.

THEME	VERY HIGH	HIGH	MEDIUM	LOW
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Civil Aviation Theme				X
Plant Species Theme			X	
Defence Theme				X
Terrestrial Biodiversity Theme	X			

The results of the Initial Site Verification are indicated in Table 5.

**Table 5: Initial Site Verification**

THEME	INITIAL SITE VERIFICATION SENSITIVITY (VS DEFF STATUS)	MOTIVATION	REPORTING REQUIREMENTS <sup>1</sup>
Agriculture Theme	LOW (vs HIGH)	Only the southernmost section of the site is classified as "high". Given that the site is immediately adjacent to dense residential settlements, is used for pedestrian access, and falls within the GSDF urban development zone,	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of "very high" or "high" sensitivity for agricultural

<sup>1</sup> Based on the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for EA (GN R320 of 20 March 2020).

THEME	INITIAL SITE VERIFICATION SENSITIVITY (VS DEFF STATUS)	MOTIVATION	REPORTING REQUIREMENTS <sup>1</sup>
		<p>where crop production and animal production are not considered suitable, the site is rated “low”.</p> <p>Further limitations to agricultural production include soil disturbance and dumped urban waste.</p>	<p>resources must submit an Agricultural Agro- Ecosystem Specialist Assessment.</p> <p><b>It is motivated that given the context of the site and the “low” scoring from the initial site verification, that such a specialist study is not deemed necessary.</b></p>
Animal Species Theme	LOW (vs MEDIUM)	<p>Most of the site is classified as having “medium” sensitivity in terms of this theme. However, the site is located adjacent to the existing settlement with high levels of disturbance across much of the site.</p>	<p>Where Species of Conservation Concern (SCC) are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted. Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.</p> <p><b>It is motivated that given the context of the site and the “low” scoring from the initial site verification, that such a specialist study is not deemed necessary.</b></p>
Aquatic Biodiversity Theme	LOW (vs LOW)	<p>There are no watercourses or National Freshwater Ecosystem Priority Areas (NFEPA) wetlands on or adjacent to the site. Site is located adjacent to the existing settlement with high levels of disturbance across much of the site.</p>	<p>An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of “low sensitivity” for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement.</p> <p><b>It is motivated that given the context of the site and the “low” scoring from the initial site verification, that such a specialist study is not deemed necessary.</b></p>
Archaeological and Cultural Heritage Theme	None (not applicable)	<p>A Phase 1 Heritage Impact Assessment (HIA) was prepared by HCAC - Heritage Consultants (Appendix B-1), and no cultural heritage resources were identified on site.</p> <p>A desktop paleontological assessment (Appendix B-2) was undertaken for the site by Prof. Marion Bamford. The likelihood of fossil finds is deemed low.</p>	Not specified.

THEME	INITIAL SITE VERIFICATION SENSITIVITY (VS DEFF STATUS)	MOTIVATION	REPORTING REQUIREMENTS <sup>1</sup>
Civil Aviation Theme	LOW (vs LOW)	See Section 2.1.4 and Figure 11. The proposed housing development is a logical extension of the existing settlements and poses a low risk to aircraft. In both option 1 and 2, the buildings will range from two- to three-storeys.  Notably, it seems that the DEFF sensitivity rating applies to commercial-scale wind energy installations.	For "low" sensitivity, no further assessment requirements are identified.
Plant Species Theme	LOW (vs MEDIUM)	Site is located adjacent to the existing settlement with high levels of disturbance across much of the site.	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "low" sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Compliance Statement.  <b>It is motivated that given the context of the site and the "low" scoring from the initial site verification, that such a specialist study is not deemed necessary.</b>
Defence Theme	LOW (same)	Not applicable	For sites with low" sensitivity, no further assessment requirements are identified.
Terrestrial Biodiversity Theme	LQW (vs VERY HIGH)	Site is located adjacent to the existing settlement with high levels of disturbance across much of the site.	Where the information gathered from the site sensitivity verification differs from the designation of "very high" terrestrial biodiversity sensitivity on the screening tool and it is found to be of a "low" sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.  <b>It is motivated that given the context of the site and the "low" scoring from the initial site verification, that such a specialist study is not deemed necessary.</b>

The following site-specific characteristics derived from the DEFF online screening tool (10 November 2020) **Invalid source specified**. have informed the applicable listed activities:

- According to the Gauteng CPlan Version 3.3 (GDARD, 2011), there are no Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) on or adjacent to the site;

- The study area is classified as part of a Threatened Ecosystem (Soweto Highveld Grassland- Vulnerable); and
- The site is not located within 500m of NFEPA wetlands or watercourses.

### 3.2.3 Applicable Listed Activities

Based on the assessment provided in Table 6, the proposed housing development may require EA through a BA process, due to the development possibly triggering Activity 27 of Listing Notice 1 and Activity 4 of Listing Notice 3.

At a joint pre-application meeting held on 19 August 2020 with GDARD for Gauteng Rapid Land Release Programme (GRLRP) - Uitas Park - Extension 16 and Evaton West - for Projects F, G, H and I, the potential applicable listed activities were presented (Appendix F). The following specialist studies were recommended by GCS:

- Aquatic; Ecology and Wetland Assessment - after the pre-application meeting, GCS resolved to not undertake this study as the site is deemed highly disturbed;
- Heritage Impact Assessment (Appendix B-1); and
- Soils, land use, land capability Assessment - a specialist study was not deemed applicable after the pre-application meeting, as the site has been subject to high levels of disturbance over a period of more than 10 years, based on an analysis of aerial imagery.

**Table 6: Listed activities in terms of the 2014 NEMA EIA regulations, as amended**

NOTICE	ACTIVITY NO.	ACTIVITY	APPLICABILITY
1	27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—  (i) the undertaking of a linear activity; or  (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	<u>Applicable</u>  3.84 ha will potentially be cleared
3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres.  c. Gauteng  v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);	<u>Applicable</u> - Soweto Highveld Grassland = Vulnerable,  Not CBA/ESA,  Zoning = community facilities, which falls under “institution” according to the draft Emfuleni Land Use Scheme (March 2020).  Road widths would vary from 5 - 7m according to the ELM design standards for local streets in residential areas.

As such, a BA process is deemed applicable for the proposed housing development.

### **3.3 National Environmental Management: Biodiversity Act, 2004**

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA. This Act allows for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources and the establishment and functions of the South African National Biodiversity Institute (SANBI).

The national list of ecosystems that are threatened or in need of protection was published in GN 1002 of 9 December 2011. Ecosystems are classified as critically endangered (CR), endangered (EN), vulnerable (VU), or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. The site is located within a vulnerable threatened ecosystem (Soweto Highveld Grassland), based on the DEFF screening tool (10 November 2020) **Invalid source specified..**

In accordance with Section 57(1) of the NEMBA, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species (TOPS) without a permit.

### **3.4 National Water Act, 1998**

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is the fundamental law for managing South Africa's water resources. The NWA provides the legal basis upon which to develop tools such as the authorisation of water uses as defined in Chapter 4 of the NWA. Section 21 of the NWA lists water uses which can only be legitimately undertaken through the water use authorisation issued by the regional Department of Water and Sanitation (DWS). No watercourses or wetlands are located within the study area. A man-made stormwater canal is located approx. 60 m north of the northern boundary of the site, which drains under the N1 towards the Rietspruit tributary. No scheduled water uses are anticipated through the proposed housing development.

### 3.5 National Heritage Resources Act, 1999

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. In terms of Section 38 (1) of the NHRA, subject to the provisions of subsections (7), (8) and (9), the following activities trigger the need for a HIA:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length (applicable to this development);
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site (applicable to this development);
- The re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent (applicable to this development);  
or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA) or a Provincial Heritage Resources Agency (PHRA).

As such, a Phase 1 HIA was prepared and is included as Appendix B-1.

## 4 PROJECT MOTIVATION AND NEED & DESIRABILITY

The site falls within the Urban Development Zone of the Gauteng Provincial Environmental Management Framework (GPEMF) (Gauteng Department of Agriculture and Rural Development, 2014). Zone 1 is intended to streamline urban development activities and to promote development infill, densification and concentration of urban development within the urban development zones as defined in the Gauteng SDF (GSDF), to establish a more effective and efficient city region that will minimise urban sprawl into rural areas. The boundary of this zone is the effective equivalent of an “urban edge” as envisaged by the GSDF and incorporated in the GPEMF. It should be used as such for the purpose of interpreting the EIA Regulations. As such, the proposed housing development is in line with the zonation in the GPEMF.

The site also falls within a built-up area and within an area designated as priority densification and intensification according to the GSDF (Gauteng Spatial Master Plan: GIS Portal, n.d.).

The location of the proposed Evaton West- F housing project seeks to maximise the residential component on the site, allowing for densification to avoid urban sprawl. The site is located

adjacent to existing residential settlements. As such, the proposed housing development is a logical extension of the existing settlements.

A residential market study undertaken by Demacon in February 2020 (Appendix D), the site is deemed suitable for social housing, especially medium to high density housing options. The study found that the proposed project size of 450 units could be accommodated by the primary trade area within an average time period of 4.3 years, given a market share of 10% to 15% (Demacon, 2020).

## 5 DEVELOPMENT ALTERNATIVES

Development alternatives are defined in relation to a proposed activity as different means of meeting the general purposes and requirements of the activity, which may include alternatives to -

- The property on which, or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

### 5.1 Alternate Development Layouts

Two alternative development concepts have been proposed (see layout plans in Appendix E):

**OPTION 1** (Figure 12): higher density residential development in line with the residential market study that identified the demand for 450 social housing dwelling units. The bulk of the site (3.2ha) would be earmarked for two to three-storey residential walkups. Three storey buildings at the eastern entrance to create a gateway to the development. The remainder of the buildings are two-storeys in height. The access road is diverted to form a circle in the centre of the site. A communal open space will be provided in this circle. A social facility, such as a community hall or creche is proposed within the public open space. An estimated 460 dwelling units can be provided translating into a density of roughly 120 du/ha.

**OPTION 2:** (Figure 13) Medium density housing consisting of a mix of residential typologies at a density of 60 du/ha as prescribed by the 2030 GSDF. A mix of walk-up flats and single residential erven with a minimum size of 250 m<sup>2</sup> was applied. The bulk of the site (3.2 ha) would be utilised for residential development. The northern and central portions of the site are earmarked for two to three-storey walk-ups. These are placed at the main entrance road at

points of highest accessibility. The walk-ups are located on 1.86ha and approximately 155 units can be achieved with a resultant net density of 120 du/ha. The southern periphery of the site is earmarked for single residential erven. These are placed adjacent to the abutting residential properties to form a buffer between the walk-up flats and the surrounding low-density development. A total of 45 dwelling units with a minimum size of 250 m<sup>2</sup> can be achieved. This takes up 1.37 ha of the site with a resultant density of just over 30 du/ha.

Both options have the same proposed development footprint, although option 1 proposes a density four times higher than that of option 2. As such, option 2 is deemed a more preferable layout, in line with urban densification and infill policies. However, the higher density residential development would require approval from the local municipality in terms of the applicable rezoning planning process. Option 2 may be preferable as it provides single residential units along the southern periphery of the development, compatible with the adjacent residential developments.

## **5.2 Alternate Development Types**

No alternate development types have been proposed as the project aims to fulfil the housing requirements of the ELM, in line with DHS standards.

## **5.3 Alternate Designs**

No alternate design types have been proposed as the project aims to comply with the design standards of the ELM and DHS.

## **5.4 No Go Alternative**

Should the proposed Evaton West- F housing development not go-ahead, the existing informal settlements will likely extend further into the proposed developable footprint. Dumping of waste may continue across the site impacting on the health and safety of adjacent residents and contributing to contamination of the soil, groundwater and surface water resources.

# **6 ENVIRONMENTAL ATTRIBUTES**

This section outlines the biophysical and cultural heritage attributes of the study area, and indicates any environmental sensitivities that must be considered in planning and design, and in the impact assessment process.



## 6.1 Topography

The proposed site can be considered to be flat to having slightly undulating plains and low hills. The lowest point on the site is recorded as being approximately 1539 meters above mean sea level (mamsl), while the highest point is outside the site to the west and is recorded at 1541 masl. Although available topographic contours show a gentle dip slope south-westward with a gradient of merely 1:75 (0.8° or 1.3%), the Civil Engineering Services Report prepared by Phumaf (7 July 2019) (Appendix C), the site is described as “hummocky” as a consequence of widespread dumping throughout the site.

Much of the proposed housing development would be visible to road users of the N1 and adjacent roads based on the relatively flat topography of the site (Figure 16). The site would also be visible from the formal settlements immediately adjacent to the site. From Figure 17, which shows a cross-section profile from the southern to the northern end of the site, it is clear that the site is predominately flat (around 1540 mamsl across the site). The existing stormwater canal is located to the north at an elevation of approx. 1542 mamsl, which means that the surface water flow would not naturally drain in this direction. Additional stormwater management infrastructure would be required to facilitate drainage towards the canal.

## 6.2 Climate

In the Evaton area, the highest average monthly maximum temperature occurs in January (30.2 °C) and the lowest average monthly maximum temperature occurs in July (21.1 °C). The highest average monthly minimum temperature occurs in June/ July (-1.9 °C) and the highest average monthly minimum temperature occurs in January (11 °C). Evaton West falls within a summer rainfall area where precipitation is highest on average in January (125 mm) and lowest in July (4 mm) (Meteovista, 2020).



Figure 16: View Profile from N1 highway west of the site



Figure 17: View Profile from south to north of the site

The climate is characterised by warm, wet summers and cool, dry winters; this, combined with the effects of altitude, results in a long growing season (centred over summer) lasting about

six to seven months, alternating with unproductive winter and early spring seasons. There is also high primary productivity leading to a rapid build-up of biomass, resulting in a high fuel load and potentially intense fires (SANBI, 2013).

### 6.3 Geology

The diverse geology underlying Mesic Highveld Grassland correlates closely with high levels of plant species richness and endemism. The soils derived from the diverse types of parent rock vary in texture from sandy to clayey and the sandier soils tend to support lower basal cover but higher plant species diversity than less sandy ones (SANBI, 2013).

Geoid Geotechnical Engineers (Pty) Ltd was appointed to conduct a GFSH2 - Phase 1 Geotechnical Site Investigation for Erf 5085, Evaton West Ext.4. The information below is extracted from the recommendations from the Geotechnical Investigation Report (Appendix C). Several foundation strategies are presented in the report. The selection of a foundation solution will require appropriate consideration of the relative stiffness and deformation potential with that of the top-structure in each instance, as well as environmental issues inclusive of potential disturbance to neighbouring developments from compaction vibrations, noise, space for stockpiling excavated materials, etc. Test pits profiling indicates that there is limited colluvial material which may satisfy nominally G6-G7 standards, with the remainder of the natural soils rated as poor to very poor quality in terms of their engineering applications. As such, none of these soils, other than the pebble marker, should be relied upon for high-quality soil mattress construction.

Moreover, the highly bouldery nature of both the fill and the underlying residual lava are poorly suited to an earthwork's solution - unless this were to be fragmented and crushed on-site to generate a suitable engineered fill material. If the fill is not to be removed, the site should be approximately leveled, whereafter the fill should be impact rolled, and buried beneath imported fill of at least 2B thickness to facilitate adequate load distribution to overcome the irregular support offered by the underlying fill. This is, however, not a recommended option for consideration.

Depending on the foundation solution to be adopted, the pebble marker horizon may be of sufficient bulk for reuse beneath all surface beds but is likely to be of insufficient volume. As such, concrete should be constructed on a consistent bed of at least two 150mm layers of imported / colluvial gravel, compacted to 95% Mod AASHTO density to prevent cracking induced by differential support. Where the pebble marker cannot be harvested, nor the bouldery fill crushed to provide this material, provision should be made for suitable G5/G6 materials to be imported from commercial quarries.

In view of the site classification, the general drainage precautions presented in Appendix C should be strictly applied to obviate any unnecessary/avoidable saturation of the profile immediately adjacent to the structures. The drainage patterns of the site under the present surface must, however, be formally investigated to assess if the perimeter canal deals with all the surface water challenges, as the site observations suggest that there may be some internal drainage problems induced by the fill deposits.

The flat slope of the site means that only minor terracing for the proposed housing development would be required. Notwithstanding this, the sidewalls of any deep services trenches or box cuts should be appropriately battered or propped during construction. The surcharging of cut sidewalls by way of spoil heaps, construction materials, and equipment (including those with outrigger jacks) should be strictly avoided as being highly-detrimental to cut stability, particularly when workers are present in trenches/box excavations in excess of 1.5 m deep.

#### **6.4 Terrestrial Biodiversity**

According to Mucina and Rutherford (2006) the proposed development area falls within the Soweto Highveld Grassland vegetation unit. This vegetation unit has been classified as 'endangered' with almost half already having been impacted or transformed due to cultivation, urban sprawl, mining and building of road infrastructure (Mucina and Rutherford, 2006). Despite the ongoing impacts to this vegetation unit, only 0.2% is protected which is far below the conservation target of 24%.

The Civil Engineering Report (Appendix C) states that vegetation is very sparse and limited to veld grass with scattered trees and shrubs dotted around the site.

According to the Gauteng CPlan Version 3.3 (GDARD, 2011), there are no CBAs or ESAs on or adjacent to the site.

The site is located within an area classified as part of the Threatened Ecosystem (Soweto Highveld Grassland- Vulnerable). Soweto Highveld Grassland is a form of Mesic Highveld Grassland (SANBI, 2013). In this landscape, there is a high natural incidence of fire, owing to frequent storms, and lightning strikes. The natural occurrence of fire, combined with the effects of frost and hail storms, maintains the open, largely treeless character of these grasslands (SANBI, 2013).

The site has been subjected to high levels of disturbance, with clearing, excavations, illegal dumping and pedestrian activity taking place on the site. An analysis of aerial imagery dating back to 2004 indicates that the site has been subjected to disturbance over more than 16 years.

## 6.5 Hydrology

The area of study is located within DWS Quaternary Catchment C22H, in the Vaal Water Management Area (WMA).

No watercourses or wetlands are located within the proposed site. A man-made stormwater canal is located approx. 60 m north of the northern boundary of the site, which drains under the N1 towards the Rietspruit tributary. No scheduled water uses are anticipated through the proposed housing development. The Rietspruit River runs south of the site, and its associated tributaries and wetland systems are located north and west of the site. The site does not fall within 500 m regulated of the NFEPA wetlands (Figure 18).

The site is located in a high rainfall region. The characteristically dense vegetation in mesic grassland landscapes cover traps surface water, slowing runoff and allowing more time for water to drain vertically through the porous soil profile; this water is then stored as sub-surface water by the impermeable rock layers that lie beneath the subsoil. This sub-surface water drains slowly as clean water into the many wetland systems that occur throughout this ecosystem (as a result of its flattish topography), replenishing streams and rivers almost year-round. The supply of good quality water from these ecosystems is important for domestic, agricultural, industrial and commercial water users both in South Africa and neighbouring countries (SANBI, 2013).

In the Civil Engineering Services report (Appendix C), the need for further assessment of the capacity of the existing stormwater canal to the north of the site is highlighted. From the topographic profile of the site in Figure 17, which shows a cross-section profile from the southern to the northern end of the site, it is clear that the site is predominately flat (around 1540 mamsl across the site). The existing stormwater canal is located to the north at an elevation of approx. 1542 mamsl, which means that the surface water flow would not naturally drain in this direction. Additional stormwater management infrastructure would be required to facilitate drainage towards the canal.

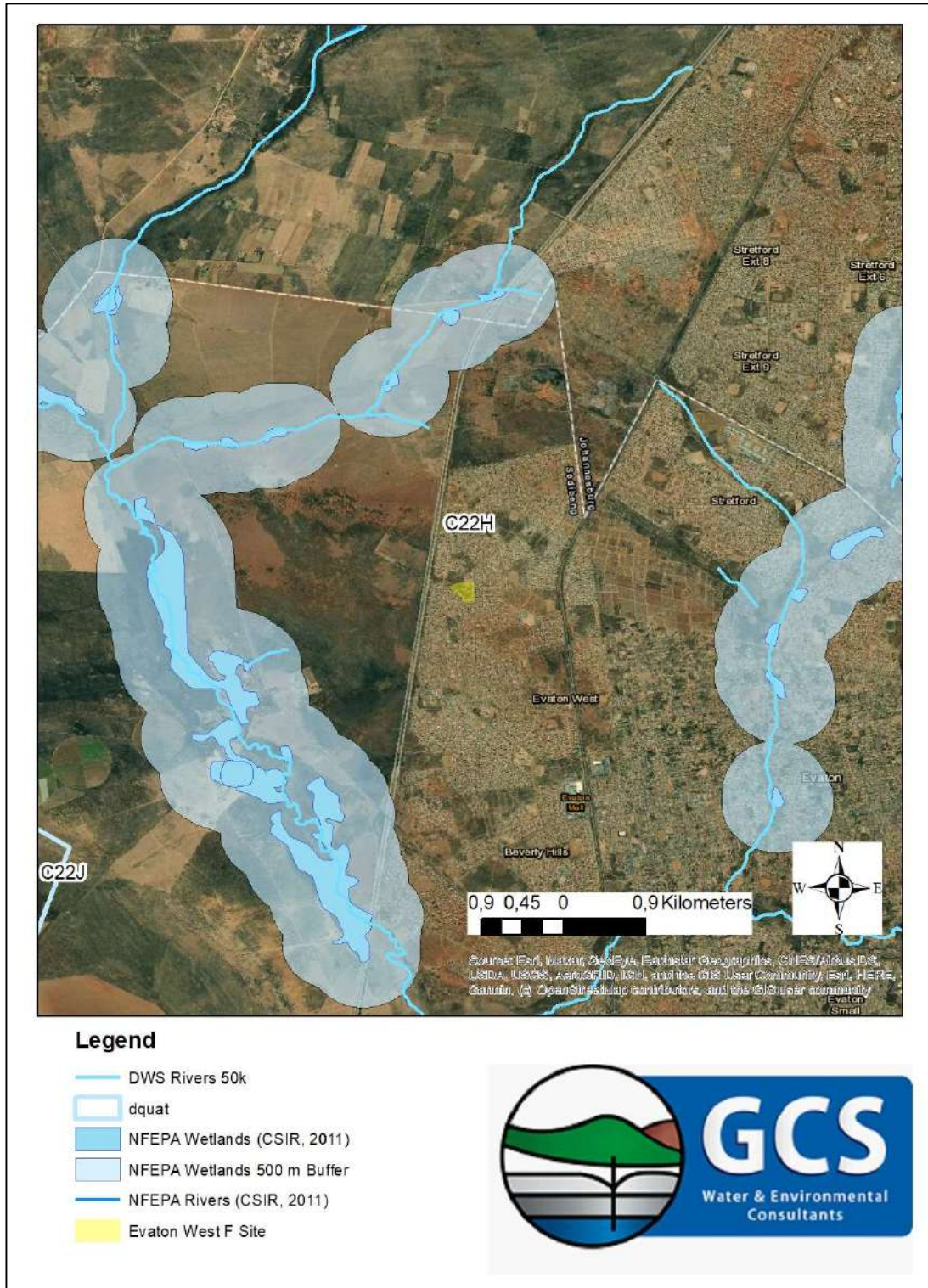


Figure 18: Map showing the local hydrological setting within the catchment of the development site

## 6.6 Socio-Economic Context

According to the Sedibeng Growth and Development Strategy 2 (Sedibeng District Municipality, 2012), the Evaton population is of low-Living Standards Measurement with a low access to services. This places the community as vulnerable to impact. The community also has a high unemployment rate. These factors must be considered when proposing development within Evaton West. The community is not positioned to address impacts to their human health, living conditions or environment. Therefore, it is important that the developer communicate with neighbouring community members in order to minimize negative impacts of the development. This will be focused within the construction phase of the project. It must be noted that neighbouring households are located within 15m of the proposed development area.

Stats SA provides the following information: According to Census 2011, ELM has a total population of 721 663, of which 85,4% are black African, 12% are white, 1,2% are coloured, and 1,0% are Indian/Asian. Of those 20 years and older, 3,6 % completed primary school, 36,7% have some secondary education, 32,4% completed matric, and 12,9% have some form of higher education. The percentage with no form of schooling is 4,0%. Of the population, 202 543 people are economically active (employed or unemployed but looking for work) and, of these, 34,7% are unemployed. Of the 85 594 economically active youth (15-35 years) in the area, 45% are unemployed.

## 6.7 Cultural Heritage Resources

A Phase 1 HIA was undertaken in March 2020 by HCAC - Heritage Consultants (Appendix B-1) in terms of the NHRA.

The study area is currently vacant, bordered by township development apart from areas to the north and north-west that consists of vacant land. The study area is approximately 3.8 ha in size and shows signs of clearing and excavation activities that would have impacted on surface indicators of heritage sites if any occurred in the study area. The lack of significant heritage resources in the study area was confirmed by a survey of the impact areas of the proposed project, and no heritage sites were identified.

An independent paleontological study (Bamford 2020) concluded that the proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age that do not preserve fossils. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed and the study included a Fossil Chance Find Protocol.

Due to the apparent lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the Environmental Management Programme (EMPr) (Appendix I) and based on approval from SAHRA:

- Implementation of a chance find procedure (archaeological and paleontological).

## **6.8 Traffic**

A Traffic Impact and Access Study was undertaken. The proposed site is within the Orange Farm - Sebokeng 'urban cluster'. This cluster is a deprivation area that straddles the Emfuleni and City of Johannesburg municipal areas. 15 - 20km to the north are Lenasia and Ennerdale. The closest urban node is Vanderbijlpark and Vereeniging which are 15 - 20km to the south. The site is located between the N1 to the west and Golden Highway (R553) to the east, which provides it with high levels of regional accessibility. On the sub-regional level accessibility is impaired by the lack of connector roads to the N1: access to the N1 is approximately 16.3km or 20 minutes' drive from the development site. It is to be noted that the surrounding area has a well-developed street network. It is however a curvilinear layout that limits permeability for pedestrians.

## **7 PUBLIC PARTICIPATION PROCESS**

The Public Participation Process (PPP) is a legislated requirement environmental authorisation procedure. Refer to Appendix H for related documentation.

### **7.1 Objectives of Public Participation**

The procedures followed during the undertaking of the PPP for the proposed Application for EA must adhere to the NEMA principle whereby the participation of all Interested and Affected Parties (I&APs) 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 involvement by vulnerable and disadvantaged individuals must be ensured [NEMA, Section 2(1)(f)].

The primary objectives of the PPP are to:

- Identify key stakeholders (i.e. Non-Governmental Organisations [NGOs], municipalities, government departments, traditional authorities) and I&APs (i.e. surrounding



businesses, residents, landowners, interested members of the public);

- Inform I&APs about the proposed Application for EA;
- Establish lines of communication between I&APs and the project team to deal with potentially contentious issues;
- Provide ample opportunity to all parties to exchange information and express their views and raise issues and concerns; and
- Obtain contributions of I&APs and ensure that all issues, concerns and questions raised are fully documented and assessed as part of the BA process.

## **7.2 Public Participation Process**

The public participation process included the following activities:

- An electronic I&AP database was developed, which is maintained and updated throughout the project. Appendix H-1 contains a copy of the latest I&AP database;
- An English advertisement for the registration and participation of I&APs was placed in the Vaal Weekblad on Wednesday, 10 February 2021. Refer to Appendix H-2 for a copy of the media notice;
- Three English notice boards (Appendix H-3) detailing information about the project and the BA Process, as well as invitation to register as I&APs, were placed at three strategic points around the development site on 12 February 2021. All notice boards were designed to the specification of Section 54 (3) of the NEMA EIA Regulations. Refer to Appendix H-3 for a copy of site notice;
- Email notifications will be circulated to all I&APs on the database (as applicable) inviting comments from 12 February 2021 to 15 March 2021. Refer to Appendix H-4.

## **7.3 Public Review of Draft BAR**

The Draft Basic Assessment Report (DBAR) will be made available for public comment for 30 days. The DBAR has been submitted for public review from 12 February 2021 until 15 March 2021 (30 days). Due to COVID-19 restrictions, no hard copies of the report will be available for review at public venues. However, the report is available electronically via the GCS Website ([www.gcs-sa.biz](http://www.gcs-sa.biz)) or a CD can be made available upon request.

## **7.4 Comments and Responses**

All comments received during the application process will be captured in a Comments and Responses Report (CRR). This CRR will be updated on a continuous basis and will be presented

to the authorities and other I&APs together with the consultation and final reports as a full record of issues raised, including responses on how the issues were considered during the application process.

## **8 IMPACT ASSESSMENT**

This section outlines the anticipated environmental impacts associated with each phase of the proposed housing development. These impacts are later rated in terms of significance.

### **8.1 Methodology**

Possible impacts were identified through comments from I&APs, specialist reports, and from the EAP's experience.

To ensure uniformity, the assessment of potential impacts is addressed in a standard manner so that a wide range of impacts are comparable. For this reason, a clearly defined rating methodology has been used to assess the impacts identified in each specialist study.

Each impact identified must be assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To enable a scientific approach to the determination of the environmental significance (importance), a numerical value is linked to each rating scale.

The following criteria must be applied:

#### Occurrence

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long the impact may last).

#### Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site).

To assess each of these factors for each impact, the ranking scales are presented in Table 9 were used.

**Table 7: Impact Assessment Scoring**

Probability (P)	Duration (D)
5 - Definite / Don't know	5 - Permanent
4 - Highly probable	4 - Long-term (ceases with operational life)
3 - Medium probability	3 - Medium-term (5 - 15 years)
2 - Low probability	2 - Short-term (0 - 5 years)
1 - Improbable	1 - Immediate
0 - Not applicable/None/Negligible	0 - Not applicable/None/Negligible
Scale (S)	Magnitude (M)
5 - International	10 - Very high / Don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 - Not applicable/None/Negligible	0 - Not applicable/None/Negligible

Status of Impact

Positive: + (A benefit to the receiving environment)

Negative: (A cost to the receiving environment)

Neutral: N (No cost or benefit to the receiving environment)

The following formula was applied to calculate the impact significance, or Significance Points (SP) after the factors were ranked for each impact:

$$SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value that can be achieved is 100 SP. Environmental effects were rated as per Table 10.

**Table 8: Impact Significance Ratings**

SIGNIFICANCE	ENVIRONMENTAL SIGNIFICANCE POINTS (SP)	COLOUR CODE
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60 (max = 100)	H

The significance of an impact gives one an indication of what mitigation measures need to be taken to control negative impacts and reduce environmental damage during the construction and operational phases. Suitable and appropriate mitigation measures were identified for each of the potential impacts based on specialist recommendations and GCS expertise.

Activities to be undertaken during the construction and operation phases have the potential to cause environmental impacts.

The following information/documentation was reviewed to inform the assessment of impacts related to the proposed housing development project:

- Appendix C: Civil Engineering Services Report;
- Appendix D: Residential Market Study; and
- Appendix E: Urban Design Framework Including Layout Plans.

The impact descriptions and assessment are based on the author's understanding of the proposed development based on the information provided.

#### **8.1.1 Planning and Design Phase**

This phase includes the planning and siting of the position of the construction camp, access routes for construction vehicles, contractors' camp and lay down areas, excavations, placement of chemical toilets, site offices, topsoil and spoil stockpiles, rubble and waste rock storage sites, spoil areas, solid waste storage and disposal sites, construction materials stores, equipment stores, hazardous materials and waste storage sites and fuel stores. The location of the proposed construction camp/s is not known at this stage.

Given the nature of the site, there are no environmental or topographic features that must be considered in the final layout planning to mitigate impacts.

The establishment of the construction camp/s may result in a localised visual impact through the stockpiling, storage of equipment and machinery, and the storage of reflective materials. This can be partly mitigated by erecting a shade cloth fence around the construction camp/s. No temporary construction site camps, vehicle parking or material stockpiling / laydown areas to be located within the mapped primary degraded grassland areas.

The following tasks are to be undertaken during the planning and design phase:

- Final layout plan and final service infrastructure designs;
- Implementation of the Draft EMPr and conditions of the SPLUMA approval and EA.

### **8.1.2 Construction Phase**

The construction phase impacts related to the proposed layout and design of the housing development are discussed below, and the significance rating for each impact are presented in Table 11. Construction activities are understood to include the following:

- Clearing of vegetation and grading of the site: Vegetation clearing, soil stripping and earthworks for the foundations for housing units and associated access road and service infrastructure will take place on the property. The clearing of vegetation would expose bare soils to erosive elements leading to increased runoff.
- Construction of residential housing and service infrastructure: Once the site has been cleared and graded, construction of the roads and building infrastructure will take place. This will likely require bulk earthworks, cement/concrete mixing and infrastructure construction. It is anticipated that roads will be gravel surfaced. The installation of water and sewer pipelines to reticulate potable water and domestic wastewater will also take place at this stage, with the water and sewer pipelines within the road reserves (Appendix C). Pipelines will reticulate wastewater to the municipal sewer tie-in point. Open space will be retained in the north of the site.

#### **8.1.2.1 Impact on Topography and Soil Erosion**

Given the flat topography of the site, the proposed activity will not significantly alter the topography of the area. Any excavations could pose a safety risk to people and animals. The topographical impact is an unavoidable project-related impact. Excavations to be limited to the designated works areas.

The significance of the impact on the site topography is anticipated to be **Medium** and through the implementation of the proposed mitigation measures, the rating remains **Low**.

To minimise the safety impact of excavations and construction activities, ensure proper access control to the development area:

- Fencing.
- Security.
- Barriers.

Additionally, ensure warning signs are erected on the perimeter of these areas in the most prevalent local language. Structural safety to be ensured according to engineering standards.

Given the flat topography, there is a low risk of soil erosion associated with the construction activities. However, most of the impacts can be mitigated through the implementation of the EMPr (Appendix I). The impact of the proposed housing development on soil erosion is considered of **Medium** significance pre-mitigation. Through effective soil erosion prevention measures (terracing, operations on contour), the impact will remain **Medium**.

During construction, erosion control measures must be implemented in areas sensitive to erosion such as exposed soil, trenches cut for construction, etc. These measures include but are not limited to - the use of sandbags, hessian sheets, silt fences and retention or replacement of vegetation.

#### *8.1.2.2 Impact on Air Quality and Climate*

Localised impacts on ambient air quality are anticipated through the generation of inhalable particulate matter (PM10) and (PM2.5) and larger total suspended particulates (TSP) through the following activities:

- Construction of housing top structures, and the installation of pipelines and the movement of heavy construction vehicles, equipment and personnel along gravel roads/ tracks and subsequent compaction and erosion of soil;
- Excavation using heavy machinery/ vehicles; and
- Transportation of construction materials.

The impact of dust generation can be mitigated through the implementation of dust control measures and dust suppression. A water cart could be used to wet all affected areas during the construction phase. Watering for dust suppression should be undertaken twice daily, or as needed.

Based on the scale of the development, the impact on local air quality associated with construction activities is anticipated to be **Medium**, and with the implementation of the proposed mitigation measures and the EMPr (Appendix I), will remain **Medium**.

Greenhouse gases (GHGs), which contribute to global climate change, will be generated throughout the construction phase of the project. Direct GHG emissions include exhaust fumes

from equipment, vehicles and backup generators (when required). Indirect sources include those of supplier/services related activities such as commercial electricity generation, materials manufacturing and logistics. The use of non-renewable electricity on site for operation of machinery, lighting and general construction activities would increase the overall carbon footprint during the construction phase.

The anticipated impact of the construction activities on GHG emissions and climate is anticipated to be **Medium** and can be reduced to **Low** with the implementation of the proposed mitigation measures.

Fuel-saving and energy efficiency measures should be implemented, including optimal vehicle and equipment use scheduling, servicing and maintenance, use of fuel-saving technology and high-efficiency generators, and use of low carbon and sulphur fuels will reduce this impact. Waste management through reuse and recycling will additionally reduce the projects overall carbon footprint.

#### *8.1.2.3 Contamination of soils*

Soil loss and contamination could occur due to improper stormwater management, erosion control, vegetation stripping, poor management of construction activities, poor waste management (there is evidence of illegal dumping on site and this may continue or increase), spillages and uncontrolled maintenance of vehicles and machinery.

The impact of soil contamination due to construction activities is anticipated to be **Low** and will remain **Low** if the development footprint area is restricted to the works area, clearly demarcated, and the movement of construction activities outside of this area is restricted. Edge effects of construction activities need to be carefully and actively managed through ensuring good housekeeping and strict management of activities, with specific consideration to erosion control and alien floral species management.

If any spills occur, they should be immediately cleaned up and in the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practised preventing the ingress of hydrocarbons into the topsoil. All hazardous materials should be stored within a bund capable of containing 110% of the stored capacity to prevent potential spillages and soil contamination. Maintenance should not be conducted on site, and bunds and spill kits should be available, particularly during refuelling. Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility.

Clean up of the site and removal of litter and illegal dumping waste will improve the status quo, and reduce the potential for soil contamination. Removal of contaminated soil in the

vicinity of dumping of oils or greases may be required. This impact is positive and is rated as **Low** significance.

#### *8.1.2.4 Impact on Land use*

The current land use on the site comprises illegal waste dumping, excavations and pedestrian pathways. The proposed construction activity will have a short-term, negative impact due to the temporary change in land use from open space to construction due to the restriction on access through fencing and securing of the Works area, an influx of construction staff, machinery, equipment and the establishment of a site office, construction camp/s and laydown area/s.

Vehicle and employee movement should be restricted to within the construction footprint. Working hours should be limited and an open channel of communication with surrounding residents and landowners must be ensured, mitigate all intrusive impact and complaints. A complaints register should be available on site to ensure that all complaints are addressed.

The proposed construction activities may impact on existing land use, and the impact is anticipated to be **Medium** given the scale of the footprint of the works area. The works area will be rehabilitated to pre-construction specifications. With the implementation of the proposed mitigation measures, the impact on land use will be **Low**.

#### *8.1.2.5 Impact on vegetation*

The proposed clearing and excavation of the footprint areas will result in the clearing of vegetation. This impact refers to the direct physical destruction and/or modification of terrestrial habitat and includes habitat loss impacts, habitat and vegetation degradation impacts (e.g. species composition and abundances changes) and invasive alien plant invasion.

The housing development will result in the permanent and irreversible transformation of areas of grassland vegetation on the site. The process will involve vegetation clearing, excavations and bulk earthworks for the development. Given the highly disturbed nature of the site (see Figures 4-8), which has been subject to illegal dumping of waste, excavations and pedestrian activity, the impact intensity is likely to be **Low**.

#### *8.1.2.6 Impact on Fauna*

Impacts on fauna and faunal habitats are linked to the proposed footprint and clearing as well as general disturbance levels during construction. Given that the site is close to existing formal residential settlements, and there are existing disturbances, the impact on fauna is anticipated to be **Low**. Should clearing and activities be restricted to existing disturbed areas, and limited



to the designated works areas, the impact on fauna can be mitigated and the impact will be **Low**. Additional measures to limit disturbance are detailed in the EMPr (Appendix I).

#### 8.1.2.7 *Alteration of hydrological and geomorphological processes (erosion and sediment)*

Construction activities in the catchment areas of on site watercourses will result in a temporary reduction in catchment vegetation cover which could be associated with increased runoff and increased sediment supply to downstream watercourses or wetlands associated with the Rietspruit system, especially where bare soils are exposed during peak rainfall periods. Should these impacts occur they are however likely to be temporary and are unlikely to significantly affect long-term ecological processes associated with off-site watercourses. The catchment is already impacted by dense residential settlements, roads and generation of stormwater and pollution associated with these activities. Hydrological and geomorphological impacts could be of a **Medium** ecological significance but can be reduced to **Low** through the implementation of mitigation measures.

Recommended mitigation measures include:

- Construction activities are to be limited to the dry (winter) season where possible, to reduce erosion and sediment risks (June/ July);
- Potential erosion and sedimentation risks must be addressed on site through the implementation of Best Management Practices (BMPs) in erosion and sediment control;
- Temporary erosion and sediment control measures are to be implemented, with a greater level of need if construction proceeds into the summer (wet/rainy) period. Temporary erosion/sediment control to remain in place until construction has been completed and operational stormwater management infrastructure is suitably in place and operating correctly.
- Any erosion or vegetation clearing impacts must be rehabilitated as soon as practically possible; and
- A Construction phase method statement(s) is to be developed and finalised prior to construction taking place, taking into consideration the requirements of the EMPr (Appendix I).

#### 8.1.2.8 *Impacts on water quality*

Water quality impacts during construction will likely be limited to potential increased surface water turbidity due to sediment inputs and / or erosion and physio-chemical pollution related to potential spillages of cement and fuels during construction. Turbidity impacts are likely to be limited given the temporary nature of onsite earthworks. Spillages of fuel and other harmful substances could alter the physio-chemical and biological characteristic of surface water and

contaminate watercourse substrate, with potential consequences for both fauna and flora communities. If poorly managed, impacts to water quality could be of **Medium** significance where turbidity and sediment and / or pollution risks are not effectively mitigated. Where best practical mitigation is implemented, this can be potentially limited to **Low** and environmentally acceptable level.

Recommended mitigation measures include:

- Limit construction activities to the dry (winter) season where possible, to reduce erosion and sediment risks (June/ July);
- Address potential erosion and sedimentation risks on site through the implementation of BMPs in erosion and sediment control;
- Address potential spill and pollution risks on site through the implementation of BMPs in spill and pollution control and hazardous substances management;
- Rehabilitate any spill-related impacts as soon as practically possible;
- Suitable spill response and remediation plan to be developed for the construction phase; and
- Construction phase method statement(s) to be developed and finalised prior to construction taking place, taking into consideration the requirements of the EMP (Appendix I).

#### 8.1.2.9 Visual Impacts

Given the flat topography of the site and surrounding areas, much of the proposed housing development and related construction activities would be visible to road users of the N1 and local road network. The site is also visible from the formal settlement immediately adjacent to the site.

The establishment of the construction camp/s may result in a localised visual impact through the stockpiling, storage of equipment and machinery, and the storage of reflective materials. This can be partly mitigated by erecting a shade cloth fence around the construction camp/s.

The visual impact of the construction activities is rated as **Medium**, given the scale of the development and number of possible visual receptors. This impact remains **Medium**, post-mitigation.

Mitigation measures include limiting the construction footprint to the designated works area, minimising construction duration, reinstating and rehabilitating disturbed areas as soon as possible, limiting construction to working hours, and minimising night lighting.

#### *8.1.2.10 Noise Impacts*

Movement of construction-related heavy machinery and workers on the site during the construction phase will impact on the residents, and the housing density adjacent to the site is high. This impact is rated **Medium** and will be maintained at **Medium** with the implementation of the proposed mitigation measures.

#### *8.1.2.11 Socio-Economic Impacts*

Positive impacts on the social environment related to the construction phase are anticipated to include job creation and associated local economic growth. The financing for the project will come from the National Treasury. Approx. 750 new employment opportunities will be created in the construction phase of the project (30% skilled, 70% unskilled).

This is a positive impact is rated **Medium**. Though ensuring open channels of communication with surrounding landowners to address all complaints, and by maintaining a complaint register on site, this impact will be **Medium** (positive).

#### *8.1.2.12 Heritage Impacts*

Given that the Phase 1 HIA (Appendix B-1) did not identify heritage resources on site and the likelihood of fossil finds was rated low (Appendix B-2), there is not anticipated to be a direct impact on palaeontological or cultural heritage resources. The impact is thus rated **Low**.

It is recommended that the construction of the project may continue as long as the recommendations and mitigation measures provided in the HIA report are adhered to.

Table 9: Construction Phase Impacts

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	P	TOTAL	STATUS		SP	M	D	S	P	TOTAL	STATUS	SP
<b>TOPOGRAPHY AND SOIL EROSION</b>																	
Alterations to the topography	Development footprint	Earthworks for the foundations for housing units and associated access road and service infrastructure Grading of roads	6	2	1	4	36	-	M	<ul style="list-style-type: none"> <li>The topographical impact is an unavoidable project-related impact. Excavations to be limited to the Works areas.</li> <li>To minimise the safety impact of excavations and construction activities, ensure proper access control to the development area:                             <ul style="list-style-type: none"> <li>o Fencing.</li> <li>o Security.</li> <li>o Barriers.</li> </ul> </li> <li>Additionally, ensure warning signs are erected on the perimeter of these areas:                             <ul style="list-style-type: none"> <li>o Signage in most prevalent local language.</li> <li>o Structural safety to be ensured according to engineering standards.</li> </ul> </li> </ul>	6	2	1	3	27	-	L
Increase in soil erosion and sedimentation	Quaternary catchment C22H	Earthworks for the establishment of foundations for housing units and associated access road and service infrastructure Grading of roads	6	2	2	4	40	-	M	<ul style="list-style-type: none"> <li>A suitable SWMP and erosion control measures must be implemented. Vegetation stripping must be restricted to a minimum and all removed soils must be stockpiled separately for use during rehabilitation.</li> <li>Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced</li> <li>Pipelines must be buried at a sufficient depth to not interfere with surface water movement leading to erosion.</li> <li>Keep vehicle movement to designated access roads to avoid spreading the impact to wider areas.</li> <li>Erosion control measures must be implemented in areas sensitive to erosion. These measures include but are not limited to - the use of sandbags, geotextiles such as soil cells which are used in the protection of slopes, silt fences and retention or replacement of vegetation.</li> <li>Construct silt traps to stop sediments from reaching the stormwater channels.</li> </ul>	6	2	2	3	30	-	M
<b>AIR QUALITY &amp; CLIMATE</b>																	
GHG emissions during the construction activities	Regional	Vehicle, plant and machinery emissions Waste management Increased carbon footprint through the use of electricity, fuel, and generation of waste	4	3	3	4	40	-	M	<ul style="list-style-type: none"> <li>Fuel-saving through optimal vehicle and equipment use scheduling</li> <li>Servicing and maintenance of vehicles, plant and machinery</li> <li>Use of fuel-saving technology and high-efficiency generators</li> <li>Use of low carbon and sulphur fuels</li> <li>Waste management through reuse and recycling</li> </ul>	4	3	3	3	30	-	M
Generation of inhalable PM2.5, PM10 and TSP and impacts on health	Adjacent residential areas, dwellings adjacent to access roads	Construction activities and the installation of pipelines and the movement of heavy construction vehicles, equipment and personnel along gravel roads/ tracks and subsequent compaction and erosion of soil Excavation using heavy machinery/ vehicles Transportation of construction materials	6	2	3	3	33	-	M	<ul style="list-style-type: none"> <li>The use of heavy machinery is to be limited on site, and hand trenching undertaken where possible.</li> <li>Regular inspection and wet suppression of stockpiles where necessary (including wind shielding or complete enclosure, storage away from site boundaries, and restricted height of stockpiles)</li> <li>Ensuring that vehicles carrying dry soil and other materials are covered during travel</li> <li>Best practices adopted to control emissions from loading and dumping material include water application, minimisation of drop heights and suspension or modification of activities during adverse weather conditions</li> <li>Restricting vehicle speeds on access routes and other unsurfaced areas of the work site</li> <li>Increase frequency of site inspections by the responsible person for air quality and dust issues on site when activities with a high potential to produce dust are being carried out</li> <li>Restrict vehicle access to defined areas to avoid unnecessary off-road vehicle movements outside of the active work sites</li> <li>Implement methods of reducing wind speed around potentially dusty activities/areas. Early planting of site perimeter areas with native tree species could potentially screen the site and reduce wind speed across the site.</li> </ul>	6	2	3	2	22	-	L

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	P	TOTAL	STATUS		SP	M	D	S	P	TOTAL	STATUS	SP
<b>CONTAMINATION OF SOILS</b>																	
Soil Contamination	Development footprint	Movement of construction vehicles and machinery Storage of hazardous waste and substances Maintenance activities Installation and emptying of temporary ablutions (chemical toilets) Generation and storage of general waste Mixing of soil layers during excavation or stockpiling Improper stormwater management and erosion control Evidence of illegal dumping on site and this may continue or increase	4	2	1	4	28	-	L	<ul style="list-style-type: none"> <li>Restrict movement of construction employees outside of construction areas</li> <li>Restrict vehicles to travel only on designated roadways</li> <li>Park construction vehicles in areas lined with concrete or fitted oil traps</li> <li>Ensure vehicles are in good condition and not leaking fuel or oil when entering the mining areas</li> <li>Regular vehicle and equipment inspections</li> <li>Use of bunds during refuelling</li> <li>Maintenance to be done off-site</li> <li>Suitable spill prevention measures to be in place</li> </ul>	2	2	1	2	10	-	L
Control and Reduction of illegal dumping	Development footprint	Removal of waste from the development footprint A  Access control to the Works area	4	2	1	3	21	+	L	Upfront environmental training for all construction personnel to prevent litter on site and in adjacent areas, particularly the primary degraded grassland areas. Clearing and removal of waste from the site prior to construction with disposal to a licensed landfill site.	4	2	1	3	21	+	L
<b>LAND USE</b>																	
Temporary change in land use from open space to construction	Development footprint	<ul style="list-style-type: none"> <li>Construction activities</li> <li>General vehicular movement</li> <li>Movement of construction vehicles and machinery</li> <li>Activities increasing noise pollution</li> <li>Increased human activity</li> <li>Site clearing</li> <li>Site camp establishment and equipment storage</li> <li>Restriction of access, fencing and securing of the site</li> </ul>	4	2	2	4	32	-	M	Vehicle and employee movement should be restricted to within the construction footprint. Working hours should be limited and an open channel of communication with surrounding residents and landowners must be ensured, mitigate all intrusive impact and complaints. A complaints register should be available on site to ensure that all complaints are addressed. All areas disturbed by construction activities must be subject to landscaping and rehabilitation.	4	2	1	3	21	-	L
<b>VEGETATION</b>																	
Loss of grassland vegetation (Soweto Highveld Grassland)  Direct physical destruction and/or modification of terrestrial habitat and invasive alien plant invasion	Development footprint	Clearing and excavation of the footprint areas Permanent and irreversible transformation of areas of grassland vegetation	4	5	2	2	22	-	L	No temporary construction site camps, vehicle parking or material stockpiling / laydown areas to be located outside the designated works areas;	4	5	2	2	22	-	L
<b>IMPACT ON FAUNA</b>																	
Disturbance of locally common wetland-dependent species such as amphibians, reptiles, birds, and small mammals	Development footprint and adjacent habitats/ecosystems	Presence of workers and machinery on site Noise and vibration disturbances	4	4	3	2	22	-	L	Restrict worker and machinery access to the active construction site and construction site camp areas only; Prohibit the poaching of animals and/or collection of plants and biota from natural areas; Temporary erosion/sediment control to be removed once construction has been completed and operational stormwater management infrastructure is suitably in place and operating correctly; and Rehabilitate any erosion or vegetation clearing impacts as soon as practically possible.	4	3	2	2	22	-	L

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP
Loss of habitat Disturbance of fauna	Development footprint and adjacent habitats/ecosystems	Clearing and excavation of the footprint areas Movement of construction vehicles and machinery	4	4	3	2	22	-	L	Restrict the development to designated works areas; and Prohibit the poaching of animals and/or collection of plants and biota from natural areas;	4	4	3	2	22	-	L
<b>ALTERATION OF HYDROLOGICAL AND GEOMORPHOLOGICAL PROCESSES (EROSION AND SEDIMENT)</b>																	
Temporary reduction in catchment vegetation cover which could be associated with increased runoff and increased sediment supply to downstream wetlands Alteration of the geomorphic structure and hydrological regime of on site wetlands	Quaternary catchment C22H	Clearing and excavation of the footprint areas Exposure of bare soil during peak rainfall periods	4	4	3	3	33	-	M	Construction activities are to be limited to the dry (winter) season where possible, to reduce erosion and sediment risks (May to September); Potential erosion and sedimentation risks must be addressed on site through the implementation of BMPs in erosion and sediment control; Temporary erosion and sediment control measures are to be implemented, with a greater level of need if construction proceeds into the summer (wet/rainy) period. Temporary erosion/sediment control to remain in place until construction has been completed and operational stormwater management infrastructure is suitably in place and operating correctly. Any erosion or vegetation clearing impacts must be rehabilitated as soon as practically possible; A Construction phase method statement(s) is to be developed and finalised prior to construction taking place, taking into consideration the wetland impact mitigation measures and requirements of the EMPr (Appendix I).	4	4	3	2	22	-	L
<b>WATER QUALITY</b>																	
Increased surface water turbidity due to sediment inputs and / or erosion Physio-chemical pollution related to potential spillages of cement and fuels during construction Alteration of the physio-chemical and biological characteristic of surface water and contamination of watercourse substrate	Quaternary catchment C22H	Clearing and excavation of the footprint areas Exposure of bare soil during peak rainfall periods Storage and handling of cement and fuels	4	4	3	3	33	-	M	Limit construction activities to the dry (winter) season where possible, to reduce erosion and sediment risks (May to September); Address potential erosion and sedimentation risks on site through the implementation of BMPs in erosion and sediment control; Address potential spill and pollution risks on site through the implementation of BMPs in spill and pollution control and hazardous substances management; Rehabilitate any spill-related impacts as soon as practically possible; Suitable spill response and remediation plan to be developed for the construction phase; Construction phase method statement(s) to be developed and finalised prior to construction taking place, taking into consideration the wetland impact mitigation measures and requirements of the EMPr (Appendix I).	4	4	3	2	22	-	L
<b>VISUAL IMPACTS</b>																	
Visual impact and loss of sense of place	Road users on N1 and local road networks Adjacent residents	Establishment of the construction camp/s Stockpiling, storage of equipment and machinery, and the storage of reflective materials	6	2	3	4	44	-	M	Limit the construction footprint to the designated works area. Limit the construction duration. Reinstating and rehabilitating disturbed areas as soon as possible. Limiting construction to working hours. Minimising night lighting.	4	2	3	3	33	-	M
<b>NOISE IMPACTS</b>																	
Increase in ambient noise levels	Adjacent settlements	Movement and operation of construction-related heavy machinery, movement of vehicles and workers	6	2	3	4	44	-	M	The Contractor must keep noise level within acceptable limits. Comply with the Noise Control Regulations in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA) (GN R154 of 10 January 1992) and all local noise bylaws. Restrict the use of sound amplification equipment for communication and emergency only; All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; Any complaints received by the Contractor regarding noise must be recorded and communicated to the Environmental Control Officer (ECO) and Project Manager (PM). Develop a Code of Conduct for the construction phase in terms of the behaviour of construction staff.	4	4	3	3	33	-	M

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP
										Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.							
<b>SOCIOECONOMIC IMPACTS</b>																	
Job creation and associated local economic growth 750 employment opportunities will be created in the construction phase of the project	Local businesses and industries Unemployed skilled and unskilled labourers	Employment of construction workers Procurement of construction supplies	6	2	3	4	44	+	M	Ensure open channels of communication with surrounding landowners to address all complaints Maintaining a complaint register on site	6	2	3	4	44	+	M
<b>CULTURAL HERITAGE</b>																	
Destruction or damage to potential heritage site s	Development footprint and adjacent areas	Establishment of the construction camp/s Movement and operation of construction-related heavy machinery, movement of vehicles and workers Clearing and excavation of the footprint areas	4	5	1	1	10	-	L	For any chance finds of heritage resources, such as graves, all work must cease in the affected area and the Contractor must immediately inform the Project Manager/Developer. A heritage specialist must be called to site for inspection. The relevant heritage resource agency (the Institute) must also be informed about the finding. The heritage specialist will assess the significance of the resource and guide the way forward. Written permission must be obtained from the Institute if heritage resources are to be removed, destroyed or altered. All heritage resources found close to the construction area must be protected by a 5 m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews. Under no circumstances may any heritage material be destroyed or removed from the site unless under the direction of a heritage specialist. Should any recent remains be found on site that could potentially be human remains, the South African Police Service (SAPS) as well as the Institute must be informed. No SAPS official may remove remains until the correct permit/s have been obtained. The recommendations and mitigation measures included in the desktop palaeontological study must be implemented and adhered to.	4	5	1	1	10	-	L

### 8.1.3 Operational Phase

The impacts identified during the construction phase is discussed below and the significance rating for each impact is presented in Table 13.

Operational activities which may have environmental impacts include:

- Management of stormwater runoff from residential housing development (roofs, roads)
- Discharge of stormwater runoff to the environment, leading to increased volumes and velocities of runoff water;
- Management of domestic solid waste (rubbish)- Litter/waste entrained in stormwater and solid waste dumping; and
- Operation of sewer pipelines - Potential for spills due to malfunction or accidental failure of sewer pipeline.

#### 8.1.3.1 Alteration of hydrological and geomorphological processes (erosion and sediment)

The housing development will increase hardened catchment surfaces and an associated increase in surface runoff which will largely be released into the environment as part of the operation of the formal stormwater management system. This could potentially result in erosion and sedimentation, affecting downstream watercourses and wetlands. The controlled release of high stormwater runoff volumes (during storms etc.) by planned attenuation structures must be implemented to aid in preventing erosion and sedimentation associated with increased flow volumes. It is also important that the stormwater system be designed to have a limited impact on base / low flows to mitigate operation phase hydrological and geomorphological impacts associated with the development. Due to domestic water being obtained from the local municipality, there will be no reduction in water within the onsite and downstream watercourses (no direct abstraction of water).

If poorly mitigated through inappropriate stormwater outfall and attenuation structure design, this impact could be of **Medium** significance. Where best practical ecological design is incorporated to allow flows and sediment fluxes to remain largely unimpeded, this impact will be maintained at **Medium**.

Key mitigation recommendations:

- Operational SWMP to be compiled and implemented, based on best practice stormwater management design, including erosion protection at outfalls;
- Stormwater and energy dampening systems to be designed and implemented to decrease the risk of erosion;
- Maintain stormwater infrastructure as necessary through unblocking of drains, desilting where required, etc; and
- Implement and adhere to buffer zones for wetlands.



#### 8.1.3.2 *Impacts on Water Quality*

Water quality impacts during the operation of on site infrastructure will be limited to potential increased water turbidity due to sediment inputs and / or erosion, which is linked to the alteration of hydrological and geomorphological processes (erosion and sediment). There is also the potential for contaminated surface runoff/stormwater flows from roads to enter downstream watercourses and for improper solid waste management (i.e. dumping into natural areas). If turbidity and / or pollution risks are not effectively mitigated, impacts to water quality associated with the operation of onsite infrastructure could be of **Medium** significance. Where sewer pipelines are properly designed and installed with adequate risk mitigation, the probability of spillage of raw sewage is likely to be low, however, blockage and surcharging of sewer manholes and pollution of the environment could occur. Where best practical mitigation is implemented, this can be maintained at **Medium**.

Key mitigation recommendations:

- Implement best practice stormwater management design;
- Design and construct sewer pipeline as per industry standards;
- Water and sewer pipelines to be buried below ground to prevent exposure and damage; and
- Rules to provide for the operation of flush toilet systems to prevent blockage of sewer pipelines/manholes.

#### 8.1.3.3 *Alien plant encroachment*

During the operational phase, there is also a risk of alien plant encroachment into areas disturbed post-construction, and this could affect wetlands and their buffer zones, where poorly managed. Under both the poor and good mitigation scenarios, this impact is rated as **Medium**.

Key mitigation recommendations:

- Implementation of an approved alien and invasive plant control and eradication plan;
- Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained;
- A daily register must be kept of all relevant details of herbicide usage; and
- Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.

#### 8.1.3.4 Impact on vegetation

This impact refers to the direct physical destruction and/or modification of terrestrial habitat and includes habitat loss impacts, habitat and vegetation degradation impacts (e.g. species composition and abundances changes) and invasive alien plant invasion.

During the operational phase, impacts to grassland adjacent to and outside of the housing development area may occur as a result of increased human activity and disturbance, including:

- Increased levels of alien plants following disturbance; and
- Ongoing solid waste dumping and burning of waste, leading to loss of vegetation/biodiversity and more frequent veld fires that can negatively affect grassland composition and structure.

As these impacts are already taking place in the area, the impact significance is likely to be **Medium** significance and will be maintained at **Medium** through mitigation measures.

Key mitigation recommendations:

- Control alien plants on the site and surrounds;
- Formalise municipal waste management plan to service the site;
- Remove and rehabilitate informal solid waste dumping sites; and
- Work with livestock owners to reduce/control indiscriminate grazing practices on remaining primary grassland patches.

#### 8.1.3.5 Visual Impacts

Much of the proposed housing development and related construction activities would be visible to road users of the N1 highway and local roads based on the topography of the site. The site is also visible from the formal settlements adjacent to the site. The top structures will vary from double to triple storey buildings. The impact significance of the impact on sense of place is likely to be of **Medium** significance.

#### 8.1.3.6 Socio-Economic Impacts

The long term socio-economic benefits include the creation of 468 employment opportunities during the operational phase of the project (30% skilled, 70% unskilled). This impact is rated positive and **Medium**.

The addition of possibly 450 (Option 1) or 200 (Option 2) housing units in the neighbourhood would place strain on existing services, including water, sewage, waste collection, and roads. Given the scale of the proposed housing development, this negative impact is rated **Medium**.

Local qualifying beneficiaries will benefit from improved quality of life associated with formal housing, electrification and provision of sewage and water infrastructure. This impact is rated positive and **Medium**.

**Table 10: Socio-Economic Benefits**

Anticipated CAPEX of the project on completion	TBC
What is the expected capital value of the activity on completion?	TBC
What is the expected yearly income that will be generated by or as a result of the activity?	Capital Investment: Approximate R178.2 million (Construction)
Will the activity contribute to service infrastructure?	YES
Will the activity contribute to a public amenity?	NO
Total number of new employment opportunities to be created in the <b>construction phase</b> of this activity.	Approximately 750
<b>Of these opportunities how many are:</b>	
Women	Approximately 40%
<b>People with disabilities</b>	
Female	Approximately 5%
Male	Approximately 5%
<b>Youth</b>	
Female	Approximately 25%
Male	Approximately 25%
What is the expected value of the employment opportunities during the construction phase?	TBC
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 75%
How many new skilled employment opportunities created in the construction phase of the project?	Approximately 30%
How many new un-skilled employment opportunities created in the construction phase of the project?	Approximately 70%
Total number of new employment opportunities to be created in the <b>operational phase</b> of this activity.	Approximately 468
<b>Of these opportunities how many are:</b>	
Women	Approximately 50%
<b>People with disabilities</b>	
Female	Approximately 5%
Male	Approximately 5%
<b>Youth</b>	
Female	Approximately 25%
Male	Approximately 25%
What is the expected current value of the employment opportunities during the first 10 years?	TBC
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 75%
How many new skilled employment opportunities created in the operational phase of the project?	-
How many un-skilled employment opportunities created in the operational phase of the project?	30%

Table 11: Operational Phase Impacts

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	P	TOTAL	STATUS		SP	M	D	S	P	TOTAL	STATUS	SP
<b>ALTERATION OF HYDROLOGICAL AND GEOMORPHOLOGICAL PROCESSES (EROSION AND SEDIMENT)</b>																	
Increase in hardened catchment surfaces, and an associated increase in surface runoff which will largely be released into the environment  Erosion and sedimentation  No reduction in water within the onsite and downstream watercourses (no direct abstraction of water)	Quaternary catchment C22H	Operation of the formal stormwater management system Inappropriate stormwater outfall and attenuation structure design	6	4	3	3	39	-	M	Implementation of controlled release of high stormwater runoff volumes (during storms etc.) by planned attenuation structures to aid in preventing erosion and sedimentation associated with increased flow volumes. Stormwater system to be designed to have a limited impact on base / low flows to mitigate operation phase hydrological and geomorphological impacts associated with the development. Best practical ecological design is incorporated to allow flows and sediment fluxes to remain largely unimpeded. Operational SWMP to be compiled and implemented, based on best practice stormwater management design, including erosion protection at outfalls and allow for unimpeded base flows to downstream wetlands; Stormwater and energy dampening systems to be designed and implemented to decrease the risk of erosion; Maintain stormwater infrastructure as necessary through unblocking of drains, desilting where required, etc.	4	4	3	3	33	-	M
<b>WATER QUALITY</b>																	
Potential increased water turbidity due to sediment inputs and / or erosion, which is linked to the alteration of hydrological and geomorphological processes (erosion and sediment)  Potential for contaminated surface runoff/stormwater flows from roads and for improper solid waste management (i.e. dumping into natural areas)  Spillage of raw sewage	Quaternary catchment C22H	Operation of the formal stormwater management system Inappropriate stormwater outfall and attenuation structure design Improper solid waste management (i.e. dumping into natural areas) Operation of sewerage system	6	4	3	3	39	-	M	Implement best practice stormwater management design; Design and construct sewer pipeline as per industry standards, avoiding crossings of wetlands; Water and sewer pipelines to be buried below ground to prevent exposure and damage; and Rules to be provided for the operation of flush toilet systems to prevent blockage of sewer pipelines/manholes.	4	4	3	3	33	-	M
<b>ALIEN PLANT ENCROACHMENT</b>																	
Risk of alien plant encroachment into areas disturbed post-construction	Adjacent areas	Presence of humans Extent of domesticated animals in the area	6	4	3	4	52	-	M	No solid waste dumping. Implementation of the approved alien and invasive plant control and eradication plan.	6	4	3	3	39	-	M
<b>VEGETATION STRUCTURE AND PLANT SPECIES COMPOSITION</b>																	
Loss of grassland vegetation  Direct physical destruction and/or modification of terrestrial habitat and invasive alien plant invasion	Development footprint	Increased levels of alien plants following disturbance; Ongoing solid waste dumping and burning of waste, leading to loss of vegetation/biodiversity and more frequent veld fires that can negatively affect grassland composition and structure.	6	5	2	4	52	-	M	Control alien plants on the site and surrounds; Formalise municipal waste management plan to service the site; Remove and rehabilitate informal solid waste dumping sites; and	4	5	2	4	44	-	M
<b>VISUAL IMPACTS</b>																	
Visual impact and loss of sense of place	Road users on N1 and local road networks Adjacent residents	Establishment of housing development	6	4	3	4	52	-	M	No mitigation proposed.	6	4	3	4	52	-	M

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP
<b>NOISE IMPACTS</b>																	
Increase in ambient noise levels	Adjacent settlements	Establishment of housing development	4	4	3	2	22	-	L	No mitigation proposed. Local noise bylaws apply.	4	4	3	2	22	-	L
<b>SOCIOECONOMIC IMPACTS</b>																	
Job creation and associated local economic growth 468 employment opportunities will be created during the operational phase of the project.	Local businesses and industries Unemployed skilled and unskilled labourers	Employment of operational workers	4	4	3	4	44	+	M	No mitigation proposed.	4	4	3	4	44	+	M
Additional strain on existing services, including water, sewage, waste collection, and roads	Municipal services infrastructure	Establishment of housing development	6	4	3	4	52	-	M	Services infrastructure to be upgraded to accommodate the proposed development.	6	4	3	4	52	-	M
Improved quality of life	Qualifying beneficiaries (450 or 200 households)	Provision of formal housing, electrification and provision of sewage and water infrastructure	6	4	3	4	52	+	M	No mitigation proposed.	6	4	3	4	52	+	M

#### *8.1.4 Decommissioning Phase*

The decommissioning of the site is not foreseen to take place. However, should the site be decommissioned at some point, environmental impacts are anticipated to be similar to those identified for the construction phase, specifically in terms of topography, soil, surface water contamination, waste management, and impacts on vegetation.

#### *8.1.5 Cumulative Impacts*

Section 2 of the NEMA requires the consideration of cumulative impacts as part of the environmental assessment process. EIAs have traditionally, however, failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires co-ordinated institutional arrangements; and
- EIA's are typically carried out on specific developments, whereas cumulative impacts result from broader biophysical, social and economic considerations, which typically cannot be addressed at the project level.

Cumulative impacts associated with this type of development could lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within the available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional scale. In most cases, these effects are not bound and are dispersed or diluted over an area that is much larger than the actual footprint of the causal factor. These impacts are usually most prevalent in areas where continuous and long-term impacts have been experienced.

One of the key cumulative impacts relates to the cumulative loss of the Soweto Highveld Grassland, a Threatened Ecosystem (vulnerable). Any further cumulative loss of this type is likely to reduce the capacity to meet provincial and national conservation targets. Loss of grassland in this area (given the threat status of the vegetation type) may be considered significant. However, the site has been exposed to illegal dumping, excavations, and pedestrian activity, and is adjacent to existing formal settlements. As such, the loss of the grassland on site is not considered significant.

Another consideration is the cumulative impact on the provision of municipal services in the local area. Sewage and water infrastructure are reported as being insufficient to accommodate the proposed housing development, which would necessitate upgrades to bulk water and sewage infrastructure.

## 9 ASSUMPTIONS, UNCERTAINTIES, AND GAPS IN KNOWLEDGE

Information in this report has been obtained from various sources. The following gaps, uncertainties or assumptions have been identified:

- This geotechnical report (included in Appendix C) is based on preliminary investigations within the area with minimal representative test locations and the recommendations given are based on information gathered from this. It should be borne in mind that other conditions which were not encountered during this specific investigation may exist. Detailed investigations by an Engineering Geologist or Geotechnical Engineer are recommended during the construction phase of this project, to determine the site-specific geotechnical characteristics;
- The proposed development layout plan / SDP is currently being prepared to establish the suitability and capacity of the services connections. Additional studies such as the GLS masterplan will be required to determine the capacity analysis of the existing infrastructure once an SDP has been completed and approved;
- A conceptual SWMP has been prepared (Appendix C);
- The finalisation of the infrastructure route and design will take place during the detailed design phase and is subject to all necessary approvals being obtained and any changes to the SDP which may occur;
- No faunal verification was undertaken and no formal faunal sampling or searches were undertaken; and
- No formal vegetation study was undertaken.

The impact descriptions and assessment are based on the author's understanding of the proposed development based on the information provided.

## 10 ENVIRONMENTAL IMPACT STATEMENT

### 10.1 Negative Impacts

The following impacts associated with the proposed project are rated as **Medium (Negative)** significance (**post-mitigation**):

#### 10.1.1 Construction phase:

- Increase in soil erosion and sedimentation associated with earthworks for the establishment of foundations for housing units and associated access road and service infrastructure and grading of roads;
- GHG emissions during the construction activities associated with vehicle, plant and machinery emissions, waste management, and increased carbon footprint through the

use of electricity, fuel, and generation of waste;

- Visual impact and loss of sense of place associated with the establishment of the construction camp/s, stockpiling, storage of equipment and machinery, and the storage of reflective materials;
- Increase in ambient noise levels associated with movement and operation of construction-related heavy machinery, vehicles and workers.

#### *10.1.2 Operational phase:*

- Increase in hardened catchment surfaces, and an associated increase in surface runoff which will largely be released into the environment, and associated erosion and sedimentation;
- Potential increased water turbidity due to sediment inputs and/or erosion, which is linked to the alteration of hydrological and geomorphological processes (erosion and sediment);
- Potential for contaminated surface runoff/stormwater flows from roads and for improper sewage infrastructure (spillages) and solid waste management (i.e. dumping into natural areas);
- Risk of alien plant encroachment into areas disturbed post-construction;
- Loss of Soweto Highveld Grassland vegetation through direct physical destruction and/or modification of terrestrial habitat and invasive alien plant invasion;
- Visual impact and loss of sense of place associated with the establishment of the housing development; and
- Additional strain on existing services, including water, sewage, waste collection, and roads.

## **10.2 Positive Impacts**

The following impacts associated with the proposed project are considered of **Positive** significance:

#### *10.2.1 Construction phase:*

- Control and Reduction of illegal dumping associated with removal of waste from the development footprint, and access control to the Works area; and
- Job creation and economic growth associated with 750 new employment opportunities in the construction phase of the project.



### **10.2.2 Operational phase:**

- Job creation and associated local economic growth, associated with the creation of 468 employment opportunities during the operational phase of the project; and
- Improved quality of life associated with the provision of formal housing, electrification and provision of sewage and water infrastructure.

## **11 IMPACT MITIGATION AND EMPr**

An EMPr related to the construction and operational phases of the proposed housing development is included as Appendix I.

## **12 MOTIVATION OF THE EAP**

The EAP is confident that all major impacts associated with the proposed housing development have been adequately described and mitigated. Given the generally medium-low impacts associated with the proposed housing development and the implementation of the proposed mitigation measures including those in the detailed EMPr (Appendix I), the EAP is confident that the project can proceed without significant impact on the receiving environment.

# APPENDICES

**APPENDIX A**  
Qualifications and Declaration of the EAP





**Gerda Bothma**

**Senior Environmental Consultant**

## CORE SKILLS

- Project Management
- Technical & Impact Assessment Guidance
- Environmental Assessment
- Water Use Licencing
- Waste Management Licencing
- Environmental & Waste Auditing and Compliance Monitoring

## DETAILS

### Qualifications

- B.Sc. Microbiology (Honours) University of Pretoria 1996
- B.Sc. Biological Sciences University of Pretoria 1994

### Memberships

- International Association for Impact Assessors of South Africa (IAIA)
- Institute of Waste Management of South Africa (IWMSA)
- SACNASP (No.117348) (South African Council for Natural Scientific Professionals)

### Languages

- Afrikaans
- English

### Countries worked in:

South Africa, Zambia, Namibia

## PROFILE

Gerda has over 20 years' experience within the environmental and waste management field and strives to deliver custom environmental services to clients.

Gerda began her career in the environmental field within the government sector, managing environmental aspects and impacts as well as reviewing environmental assessments with the view of authorizing or declining authorization of the developments.

After six years within the government sector she joined a consulting engineering firm where she was ultimately responsible for the Management of the Environmental Sub-Division. Gerda has experience in project and client management, financial management and the compilation and costing of project proposals and tenders. She has been involved in several engineering projects as the Environmental Assessment Practitioner as well as the Environmental Control Officer during construction working closely with the Occupational Health and Safety Officer. Gerda has also been involved in projects where waste licencing as well as water use licencing processes formed an integral part of the services offered. Environmental auditing and compliance monitoring of waste disposal sites also forms part of her experience gained. She also has experience in dealing with projects which involve NEC3 Contracts.

Gerda has specialist skills in the following areas:

- Project proposals, planning, costing and timing
- Project and Client Management
- Authority Liaison
- Basic Assessments & Scoping/EIA Processes
- Compilation
- Amendment of EA's & EMP's
- Facilitation of Public Participation Processes & stakeholder engagement
- IWULA & IWWMP Applications
- Environmental Control Officer (ECO) duties
- Environmental Compliance Auditing (IFC Performance Standards & Equator Principles)
- Mentorship & Guidance



## Professional Experience

Year	Client	Project Description	Role/ Responsibility
<b>Strategic and Environmental Guidance Projects</b>			
1999 to 2003	Gauteng Department of Agriculture, Conservation & Environment	Development of a Health Care Risk Waste Management Strategy for Gauteng.	Part of Development Team
2001 to 2003	Gauteng Department of Agriculture, Conservation & Environment	Development of Minimum Domestic Waste Collection Standards for Gauteng Province.	Part of Development Team
2002	Gauteng Department of Agriculture, Conservation & Environment	Development of new EIA guidelines and regulations for the Gauteng Province.	Part of Development Team
2005	Gauteng Department of Agriculture, Conservation & Environment	GDACE Green Procurement Project: Development of the GDACE Green Procurement Policy, Gauteng	Project Manager & Reviewer
2008	GAUTRAIN Project Engineers (i.e. KV3 Engineers)	Environmental Assistance for the Gautrain Project: Environmental Evaluation of various documentation and engineering designs in terms of their environmental compliance.	Project Manager & Reviewer
2009	Department of Environmental Affairs	Alignment of MIG Project Process with EIA Process: Evaluation of the EIA process as well as the MIG process in order to produce a process alignment guideline to the municipalities to streamline the two processes.	Part of Development Team
<b>Environmental Feasibility and Screening</b>			
2008	Nu Way-property Developments	Management of Environmental Screening and Due Diligence Assessment for several proposed Nu Way-property Developments, Gauteng.	Project Manager
2008	Department of Water Affairs	Mokolo Croc WAP Environmental Feasibility and Screening, Limpopo.	Project Manager & Senior Environmental Assessment Practitioner (EAP)
2016	Kwadukuza Municipality	Environmental Feasibility for Civil Engineering Project Foxhill Road Alignment and Construction, Tongaat, Kwa-Zulu-Natal.	Environmental Project Leader
2016	King Sabata Dalindyebo Local Municipality (C/O OR Tambo District Municipality)	Environmental Screening Investigation of six proposed development corridors for the Mthatha Bulk Water Infrastructure Presidential Intervention - Phase 2: Secondary Bulk Infrastructure project.	Environmental Project Leader
<b>Development Environmental Assessments</b>			
2003 to 2005	ABSA DevCO	Environmental Impact Assessment for a change of land-use from agricultural to Residential and Town Development of the farm Brakfontein 399 JR, Centurion, Gauteng.	Project Manager & Senior EAP
2005 to 2010	Air Traffic Navigation Services	The project entails the upgrading of existing, and the provision of new air navigation	Project Manager & Senior

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
	(ATNS)	sites (27 in total) throughout South Africa. Civil and electrical infrastructure to the sites needed to be upgraded to accommodate the equipment. Various Environmental Impact Assessments for various individual projects in various provinces within South Africa.	EAP
2006 to 2009	Amathole District Municipality	Elliotdale Rural Sustainable Human Settlement Pilot Project Environmental Impact Assessment. Responsible for the environmental assessment process which was based on a strategic approach for the Elliotdale Rural Housing Project, Elliotdale, Eastern Cape.	Project Manager & Senior EAP
2007	Elkem Ferroveld	Environmental Basic Assessment for the upgrading and expansion of the Ferroveld Plant in Ferrometals, Emalaheni, Mpumalanga.	Project Manager & Senior EAP
2008	ABSA DevCO	Environmental Impact Assessment for a change in land use from agricultural to Residential and Town development of Montana X40, Pretoria, Gauteng.	Project Manager & Senior EAP
2012	Transnet Capital Projects	Environmental Basic Assessment and technical environmental investigations for the proposed expansion of the existing tug jetty and construction of a new tug jetty for Transnet Capital Projects in the Port of Durban, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2016	Dube TradePort	Environmental Impact Assessment for the proposed construction of the Dube TradePort TradeZone 2 in La Mercy, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2017	Dube TradePort	Environmental Impact Assessment for the proposed Support Precinct 2 Development in La Mercy, KwaZulu-Natal.	Project Manager & Senior EAP
2016 to 2017	Areena Resort	Application for rectification in terms of S24G and associated Environmental Basic Assessment for the alleged unlawful construction activities at the Areena Resort, Great Kei Municipality, Eastern Cape.	Project Manager & Senior EAP
2016 to 2017	Areena Resort	Application for rectification in terms of S24G and associated Environmental Basic Assessment for the alleged unlawful construction activities on Hillsdrift Farm, Great Kei Municipality, Eastern Cape.	Project Manager & Senior EAP
2018 to 2019	Watchman Properties (Pty) Ltd	Environmental Basic Assessment for the proposed Vendome Residential Development on Portion 1 of Farm 1766 and Portion 2 of Farm 1766, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Keysha Investments 213 (Pty) Ltd	Environmental Basic Assessment for the proposed River Farm Estate Development and associated infrastructure on remainder of farm Rivierplaas No. 1486, Erf 111 and Erf 197, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Paarl Vallei Developments (Pty) Ltd	Environmental Basic Assessment for the proposed Paarl Vallei Retirement Village Development, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Val de Vie Investments (Pty) Ltd	Parallel Substantive Amendment Application process for the authorised Pearl Valley II & Levendal Residential Developments, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
<b>Renewable Energy Environmental Assessments</b>			
2011	Farmsecure Carbon	Environmental Basic Assessment and Water Use License Application process for a proposed Biogas Waste to Energy project for a pig farm, Moorriver, KwaZulu-Natal.	Project Manager & Senior EAP

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2018 to 2019	GPIPD - Doornfontein Solar Farm (Pty) Ltd	Environmental Impact Assessment for the proposed 230 MW Doornfontein Photovoltaic Solar Energy Facility (PVSEF) located on Remainder of Farm 118, Doornfontein, Piketberg, Bergrivier Local Municipality, Western Cape.	Project Manager & Senior EAP
2018 to 2019	GPIPD - Kruispad Solar Farm (Pty) Ltd	Environmental Impact Assessment for the proposed 150 MW Kruispad Photovoltaic Solar Energy Facility (PVSEF) located on Remainder of Farm 120, Kruispad, Piketberg, Bergrivier Local Municipality, Western Cape.	Project Manager & Senior EAP
2018 to 2019	Brandvalley Wind Farm (Pty) Ltd	Substantive Amendment Application for the authorised 140 MW Brandvalley Wind Energy Facility (WEF) located within the Karoo Hoogland, Witzenberg and Laingsburg Local Municipalities in the Northern and Western Cape Provinces.	Project Manager & Senior EAP
2018 to 2019	Copperton Wind Farm (Pty) Ltd	Non-Substantive Amendment Application to update the information of the Holder of the Environmental Authorisation & an EMPr Amendment Process to update the Airstrip Alignment and to provide an updated "outcomes based" EMPr for the Copperton Wind Energy Facility near Copperton in the Northern Cape.	Project Manager & Senior EAP
2018 to 2019	WKN Windcurrent SA (Pty) Ltd	Environmental Impact Assessment for the proposed 150 MW Haga Haga Wind Energy Facility (WEF) & Environmental Basic Assessment for the associated Haga Haga Overhead Powerline (OHPL) in Haga Haga, Great Kei Local Municipality, Eastern Cape.	Project Manager & Senior EAP
<b>Mining Environmental Assessments</b>			
2007	Chris Hani Municipality	Environmental Assessment and DME Licence Application on behalf of Chris Hani Municipality. Responsible for exemption application from Mining Permit and Environmental Management Programmes for 17 borrow pits in Middelburg, Eastern Cape.	Project Manager & Senior EAP
2010	Samancor Chrome Limited	The Lwala Greenfields Mine and Smelter EIA and EMP. Responsible for the Environmental impact assessment and technical investigations for the waste management issues for the proposed development of a new chrome smelter project in the Steelpoort area, Limpopo.	Project Manager & Senior EAP
2011	Xtrata Alloys	Xtrata Alloys Western Mines PSV application for authorization in terms of the MPRDA. Responsible for the undertaking of the EIA and compilation of the amended EMPr and technical environmental investigations for the proposed development of an open cast mine in Rustenburg, North West.	Project Manager & Senior EAP
<b>Waste Management Environmental Assessments</b>			
2003	Assmang Chrome Machadodorp	Environmental Impact Assessment for the permitting of the H:H Hazardous Waste Disposal Facility at Assmang Chrome, Machadodorp.	Senior EAP
2004	Emfuleni Local Municipality	Environmental Impact Assessment for the closure of the Zuurfontein Landfill site for the Emfuleni Local Municipality, Sedibeng, Gauteng	Senior EAP
2004	Ekurhuleni Municipality	Environmental Impact Assessment for the closure of the Sebenza Landfill Site for the Ekurhuleni Municipality, Gauteng.	Senior EAP
2004	Tzaneen Local Municipality	Application for authorisation and EIA for the permitting of an existing solid waste disposal site for the Tzaneen Local Municipality, Mpumalanga.	Senior EAP

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2006	Samancor Chrome Middelburg	Environmental Basic Assessment for the permitting of the existing Slag Waste Disposal facility for Samancor Chrome Middelburg, Mpumalanga.	Senior EAP
2006	Samancor Chrome Ferrometals	Environmental Basic Assessment for the permitting of the existing Slag Waste Disposal facility for Samancor Chrome Ferrometals Witbank, Mpumalanga.	Senior EAP
2007	Steve Tshwete Municipality	Environmental Impact Assessments for four Solid waste Transfer Stations for the Steve Tshwete Municipality, Mpumalanga.	Senior EAP
2008	Assmang Chrome Machadodorp	Environmental Impact Assessment for the expansion of the existing Slag Waste Disposal Facility at Assmang Chrome. Responsible for the EIA application for authorization for the proposed expansion project in Machadodorp, Mpumalanga.	Project Manager & Senior EAP:
2010	ArcelorMittal	ArcelorMittal BOF Slag Disposal site licensing of new site and closure of old site, Newcastle, KwaZulu-Natal.	Project Manager & Senior EAP:
2010	Lekwa Municipality	Waste Management License Application for authorization and the conducting of an EIA and technical environmental investigation for the proposed development of two landfill sites for the Lekwa Municipality, Mpumalanga.	Project Manager & Senior EAP:
2015 to 2017	Umgungundlovu Municipality	Advanced Solid Waste Management Project for Umgungundlovu Municipality for proposed Materials Recovery Facilities located in various Local Municipalities, Umgungundlovu Municipality, KwaZulu-Natal.	Project Manager & Senior EAP:
<b>Water and Wastewater Environmental Assessments</b>			
2004	Msukaligwa Municipality	Environmental Impact Assessment for the installation of a water reticulation system at Nganga for the Msukaligwa Municipality, Mpumalanga.	Senior EAP
2006 to 2010	eThekwini Municipality: Water and Sanitation	Proposed upgrading of the WWTW capacity in the Northern Areas of the eThekwini Municipality. Responsible for EIA application for authorization, technical environmental investigations, and waste management license application for the proposed expansion of the WWT capacity in Northern eThekwini, KwaZulu-Natal.	Project Manager & Senior EAP
2008	Johannesburg Water	Environmental Management Services for Johannesburg Water: Environmental Impact Assessment (Exemption) for various individual projects related to the upgrading of the Bryanston Water Mains, Gauteng.	Project Manager & Senior EAP
2014 to 2017	eThekwini Municipality: Water and Sanitation	Environmental Basic Assessment and Water Use License Application for the Northern Aqueduct Water Augmentation Project (Phase 5), Durban, KwaZulu-Natal.	Project Manager & Senior EAP
<b>Electrical and Linear Environmental Assessments</b>			
2005	Magallies Water	Application for (exemption) authorisation on behalf of Magallies Water for the installation of the Rising Main from the Roodeplaats Waterworks to the Wallmannsthal Reservoir, in Wallmannsthal, Gauteng.	Senior EAP
2010	Moloto Rail Corridor Development	EIA for the Moloto Rail Corridor Development. Responsible for the EIA application for authorization and technical environmental investigations for the proposed Moloto Rail Corridor Development, Moloto, Gauteng.	Project Manager & Senior EAP



## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2010	ESKOM	Environmental Basic Assessment of for the ESKOM Honingklip 88kV & ESKOM Randjiesfontein 88kV overhead line and Sub-Stations, Johannesburg, Gauteng.	Project Manager & Senior EAP
2010	ESKOM	Environmental Basic Assessment of for the ESKOM Ubertas Strategic Servitude Sub-Station, Johannesburg, Gauteng	Project Manager & Senior EAP
2014 to 2017	Msunduzi Municipality	Environmental Impact Assessment for the proposed Msunduzi IRPTN project, Pietermaritzburg, KwaZulu-Natal	Project Manager & Senior EAP
<b>Environmental and Waste Management Compliance Monitoring and Auditing</b>			
2005 to 2009	Sedibeng District Municipality	Auditing of Zuurfontein and Boitshepi Landfill sites for the Sedibeng District Municipality, Gauteng.	Part of Audit Team
2006 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Amberfield Development on the farm Brakfontein 399 JR, Centurion, Gauteng.	Project Manager & Environmental Control Officer (ECO)
2007 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Zambezi Estate Development, Montana, Gauteng.	Project Manager & ECO
2008 to 2009	Steve Tshwete Municipality	Auditing of Middelburg Landfill Site for the Steve Tshwete Municipality, Mpumalanga.	Part of Audit Team
2008 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Cedar Creek Development, Fourways, Gauteng.	Project Manager & ECO
2017 to 2018	Dube TradePort	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the construction of TradeZone 2, Dube TradePort, La Mercy, KwaZulu-Natal.	Project Manager & ECO
2017	Richards Bay Minerals	Environmental Legal Compliance Audit to determine the level of compliance of Richards Bay Minerals' to their various mining, water and waste licenses and environmental authorisations and permits, Richards Bay, KwaZulu-Natal.	Project Manager & Environmental Auditor
2017 to 2018	eThekwini Municipality	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the construction of the Northern Aqueduct Phase 5, Durban, KwaZulu-Natal.	Project Manager & ECO
<b>Integrated Water Use License Applications</b>			
2010	FOSKOR	Integrated Water Use License Application for a new storage dam for FOSKOR, Richards Bay, KwaZulu-Natal.	Part of Project Team
2014 to 2015	SANRAL	Integrated Water Use License Applications as required for the proposed SANRAL N2 Road upgrade from Mthunzini to Empangeni, KwaZulu-Natal.	Project Manager & Senior EAP
2014	eThekwini Municipality: Roads	Integrated Water Use License Application for the proposed Realignment of Inanda Arterial Road, Durban, KwaZulu-Natal.	Project Manager & Senior EAP



## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2015 to 2017	SMEC (Umzimkulu Municipality)	Integrated Water Use License Application for the proposed Licensing of the existing Umzimkhulu Waste Water Treatment Works, Umzimkhulu, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2016	eThekweni Municipality: Roads	Water Use License Application for the proposed eThekweni BRT Route C1A, Durban, KwaZulu-Natal.	Project Manager & Senior EAP
<b>Management and Master Plans</b>			
2005	Livingstone Municipality	Development of the Livingstone Integrated Development Plan, Zambia.	Part of the Project Team
2008	Steve Tshwete Municipality	Development of an Integrated Waste Management Plan for the Steve Tshwete Municipality, Mpumalanga.	Part of the Project Team
2008	Kungwini Local Municipality	Development of an EMP (Framework) for Kungwini Local Municipality, Mpumalanga.	Part of the Project Team
2010	KZN Department of Public Works - Southern Region	Compilation of an Environmental Management Plan for the Fort Napier sewage upgrading project, Pietermaritzburg, Kwa-Zulu Natal.	Project Manager & Senior EAP

# **APPENDIX B**

## Specialist Studies



**APPENDIX B-1**  
Phase 1 Heritage Impact Assessment



# HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38 (8) OF THE NHRA (No. 25 OF 1999))

**FOR THE PROPOSED EVATON WEST PROJECT F TOWNSHIP  
DEVELOPMENT LOCATED ON ERF 5085, GAUTENG PROVINCE.**

**Client:**

GCS Water and Environmental Consultants

**Client info:**

Sharon Meyer



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**Amendments on Document**

<b>Date</b>	<b>Report Reference Number</b>	<b>Description of Amendment</b>

#### **INDEMNITY AND CONDITIONS RELATING TO THIS REPORT**

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and HCAC reserves the right to modify aspects of the report including the recommendations if and when new information becomes available from ongoing research or further work in this field or pertaining to this investigation.

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- The technology described in any report; and
- Recommendations delivered to the client.

Should the applicant wish to utilise any part of, or the entire report, for a project other than the subject project, permission must be obtained from HCAC to do so. This will ensure validation of the suitability and relevance of this report on an alternative project.

## REPORT OUTLINE

Appendix 6 of GNR 326 EIA Regulations (7 April 2017) as amended provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

**Table 1. Specialist Report Requirements.**

<b>Requirement from Appendix 6 of GNR 326 EIA Regulations (7 April 2017)</b>	<b>Chapter</b>
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Section 1, 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(l) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 9
(k) Mitigation measures for inclusion in the EMPr	Section 9 and 10
(l) Conditions for inclusion in the environmental authorisation	Section 9 and 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9 and 10
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.2
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BA Report
(q) Any other information requested by the competent authority	Section 10



## Executive Summary

HCAC was appointed to conduct a Heritage Impact Assessment of the proposed Project F Township development on Erf 5085 IQ Evaton West. The study area is located close to Adidas Road and the National Road N1, situated to the west of the study area. Orange Farm and Ennerdale are situated to the north of the site, and Sebokeng is located to the south. The aim of the assessment is to understand the heritage character of the study area as well as the impact of the proposed development on non-renewable heritage resources that might occur in the impact areas. The study area was assessed both on desktop level and by a non-intrusive pedestrian field survey.


The study area is currently vacant, bordered by township development apart from areas to the north and north-west that consists of vacant land. The study area is approximately 3.8 hectares in size and shows signs of clearing and excavation activities that would have impacted on surface indicators of heritage sites if any occurred in the study area. The lack of significant heritage resources in the study area was confirmed by a survey of the impact areas of the proposed project, and no heritage sites were identified.

An independent paleontological study (Bamford 2020) concluded that the proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age that do not preserve fossils. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed and the study included a Fossil Chance Find Protocol.

Due to the apparent lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance find procedure (archaeological and paleontological).

**Declaration of Independence**

<b>Specialist Name</b>	Jaco van der Walt
<b>Declaration of Independence</b>	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> <li>- I act as the independent specialist in this application;</li> <li>- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;</li> <li>- I declare that there are no circumstances that may compromise my objectivity in performing such work;</li> <li>- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;</li> <li>- I will comply with the Act, Regulations and all other applicable legislation;</li> <li>- I have no, and will not engage in, conflicting interests in the undertaking of the activity;</li> <li>- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;</li> <li>- All the particulars furnished by me in this form are true and correct; and</li> <li>- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.</li> </ul>
<b>Signature</b>	
<b>Date</b>	14/03/2020

**a) Expertise of the specialist**

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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## ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BA: Basic Assessment
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

*\*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

## GLOSSARY

Archaeological site (remains of human activity over 100 years old)  
 Early Stone Age (~ 2.6 million to 250 000 years ago)  
 Middle Stone Age (~ 250 000 to 40-25 000 years ago)  
 Later Stone Age (~ 40-25 000, to recently, 100 years ago)  
 The Iron Age (~ AD 400 to 1840)  
 Historic (~ AD 1840 to 1950)  
 Historic building (over 60 years old)

## 1 Introduction and Terms of Reference:

Heritage Contracts and Archaeological Consulting CC (**HCAC**) has been contracted by GCS Water and Environmental Consultants to conduct a heritage impact assessment of the proposed Project F township development located on Erf 5085 IQ Evaton West (Figure 1 – 3).

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, no heritage features were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a decision-making authority under section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all documents, compiled in support of this application to be submitted to SAHRA.

### 1.1 Terms of Reference

#### Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

#### Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

**Table 2: Project Description**

<b>Size of property</b>	3,8 hectares
<b>Magisterial District</b>	Emfuleni Municipality
<b>1: 50 000 map sheet number</b>	2627 DB
<b>Central co-ordinate of the development</b>	26°30'39.09"S 27°48'57.11"E

**Table 3: Infrastructure and project activities**

<b>Type of development</b>	Township Development
<b>Project size</b>	Approximately 3,8 hectares
<b>Project Components</b>	The Gauteng Rapid Land Release Programme aims to fast track the release of serviced stands from state-owned land to qualifying beneficiaries. Phumaf Holdings was appointed to assist the Department of Human Settlements with all pre-planning, planning work, design and construction management to enable the release of the identified stands



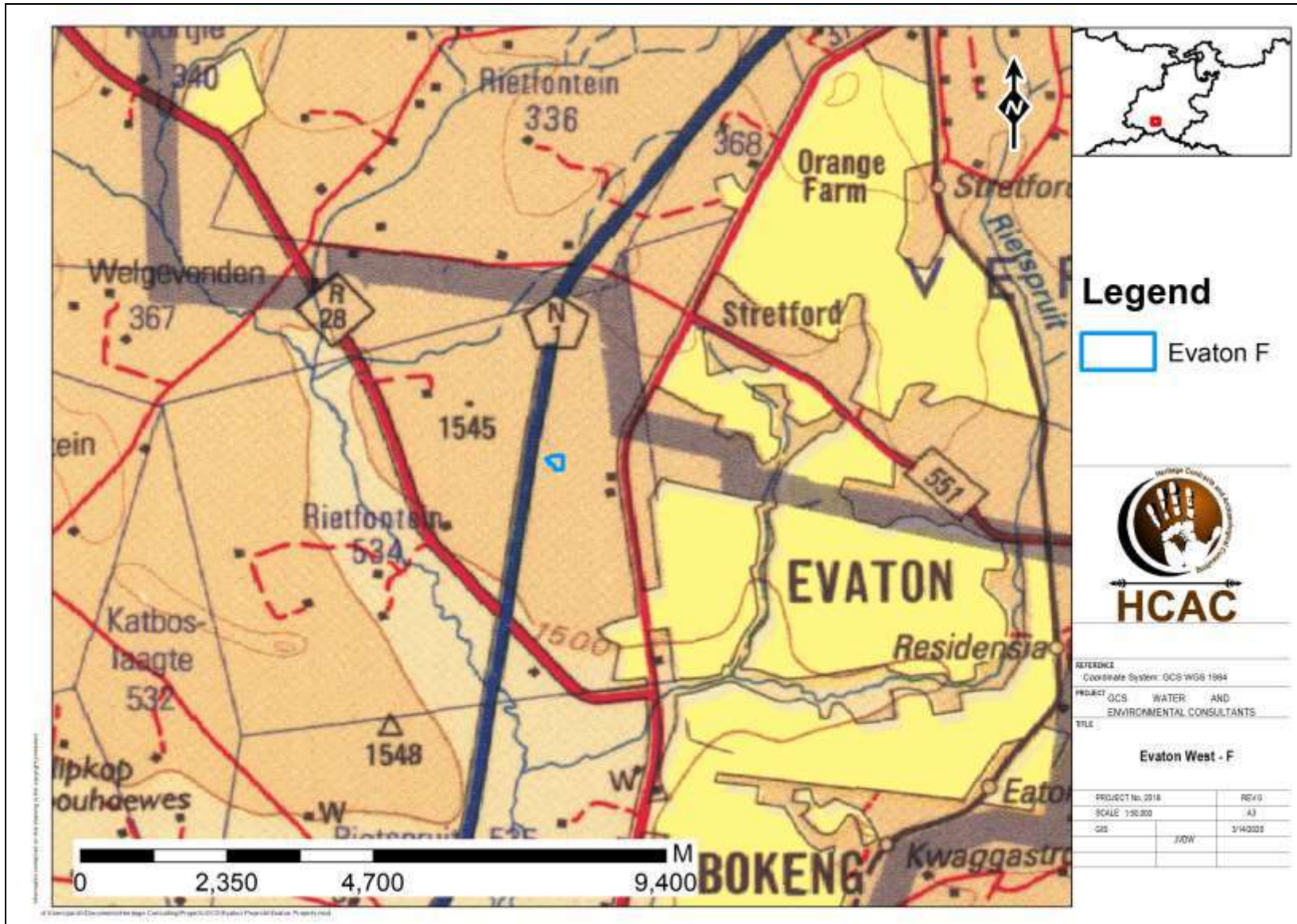


Figure 1. Regional setting (1: 250 000 topographical map).

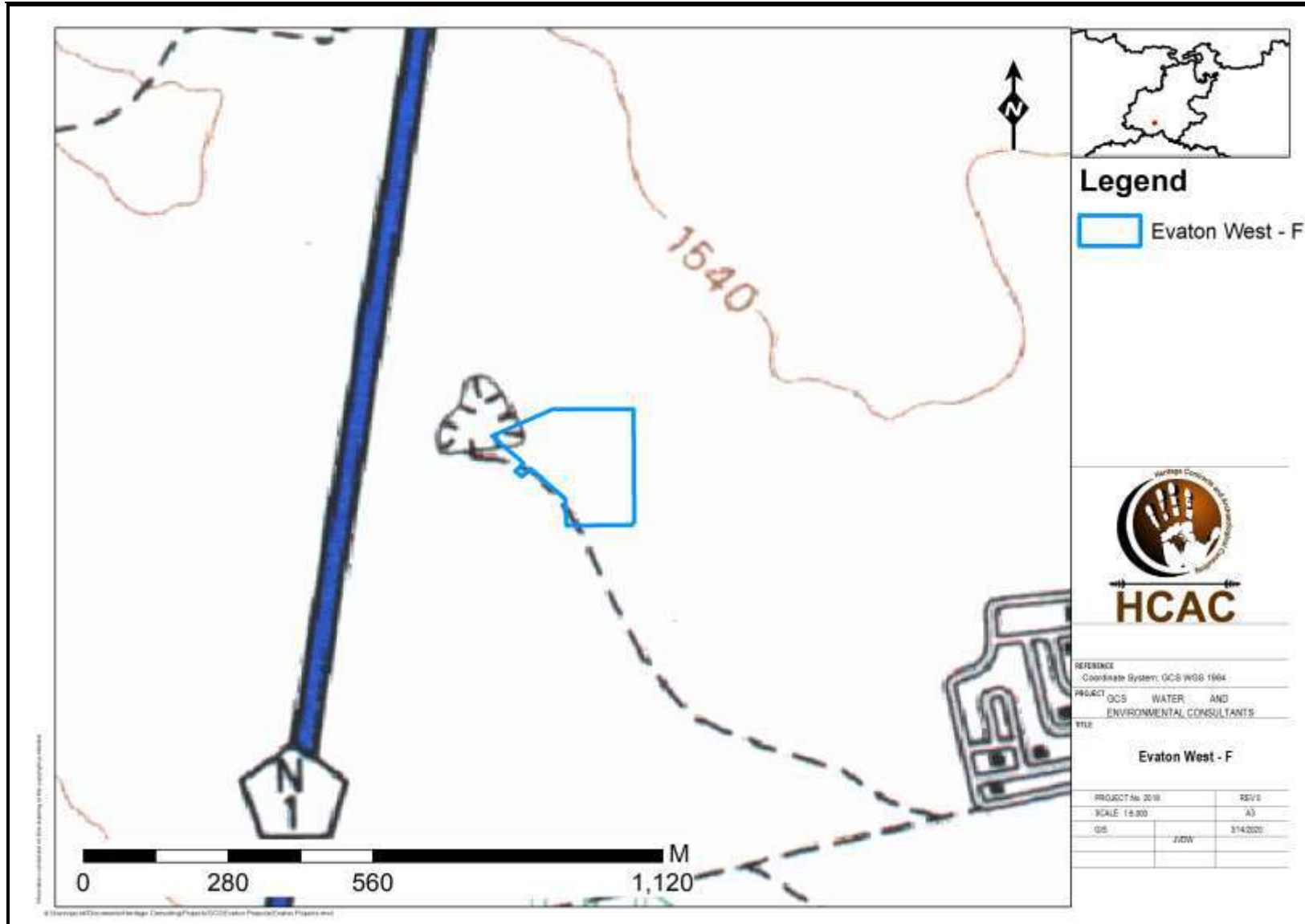


Figure 2: Local setting (1:50 000 topographical map).



Figure 3. Satellite image indicating the study area (Google Earth 2020).

## 2 Legislative Requirements

The HIA is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation.

The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the impact assessment report and/or EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

### 3 METHODOLOGY

#### 3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

#### 3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the field work phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

#### 3.3 Stakeholder Engagement and Public consultation

Stakeholder engagement is a key component of any BAR process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of a Basic Assessment Report (BAR).

Please refer to section 6 for more detail.

### 3.4 Site Investigation

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

**Table 4: Site Investigation Details**

	<b>Site Investigation</b>
Date	27 February 2020
Season	Summer- Visibility on site was generally low due to grass cover. The area under investigation was sufficiently covered (Figure 4) to understand the heritage character of the study area.

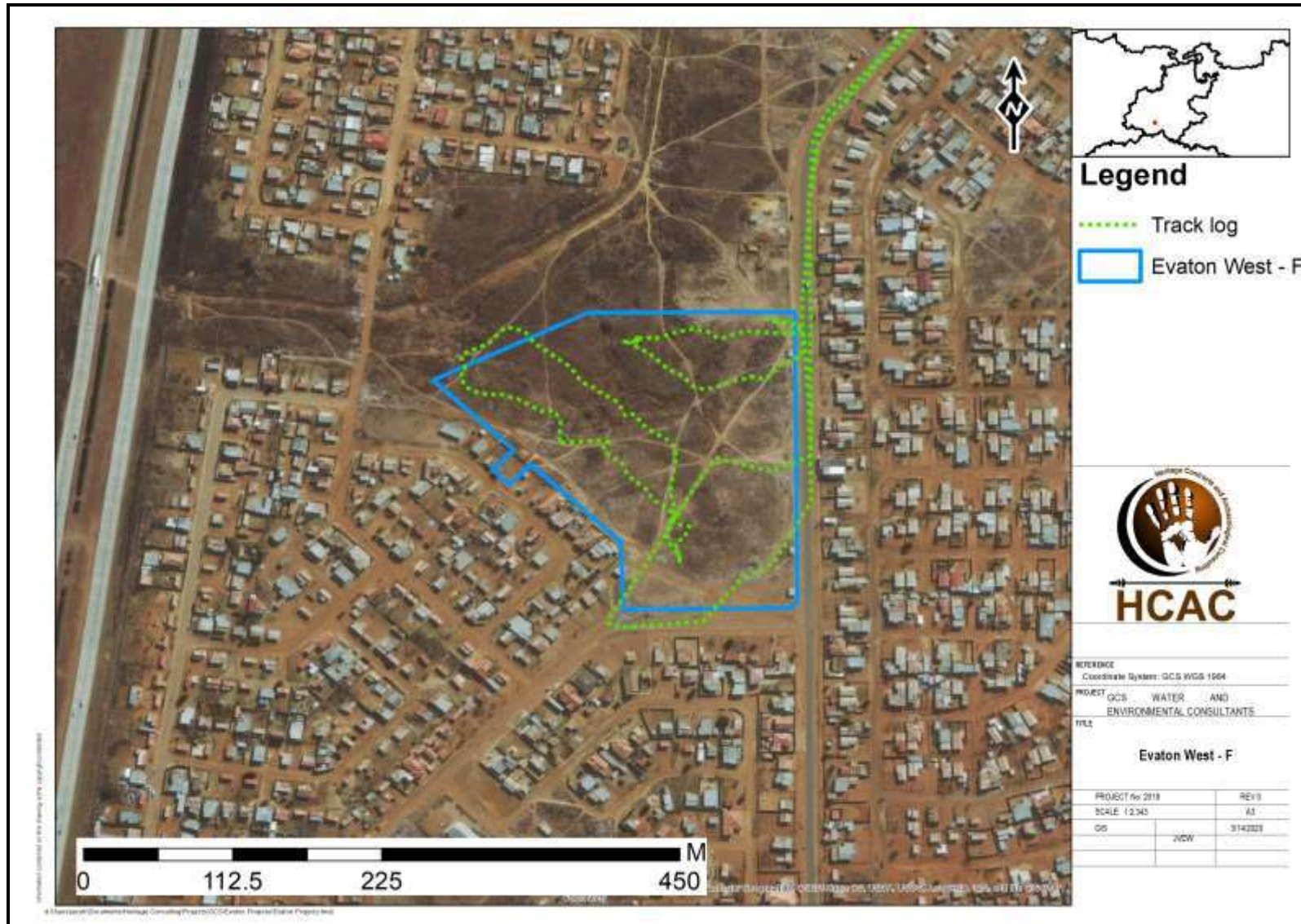


Figure 4: Track logs of the survey in green.

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### 3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.



<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

### 3.6. Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
  - \* medium-term (5-15 years), assigned a score of 3;
  - \* long term (> 15 years), assigned a score of 4; or
  - \* permanent, assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

### 3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. The possibility exists that some features or artefacts may not have been discovered/recorded during the survey. Similarly, the possible occurrence of graves and other cultural material cannot be excluded. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

## 4 Description of Socio-Economic Environment

Stats SA provides the following information: According to Census 2011, Emfuleni Local Municipality has a total population of 721 663, of which 85,4% are black African, 12% are white, 1,2% are coloured, and 1,0% are Indian/Asian. Of those 20 years and older, 3,6 % completed primary school, 36,7% have some secondary education, 32,4% completed matric, and 12,9% have some form of higher education. The percentage with no form of schooling is 4,0%. Of the population, 202 543 people are economically active (employed or unemployed but looking for work) and, of these, 34,7% are unemployed. Of the 85 594 economically active youth (15–35 years) in the area, 45% are unemployed.

## 5 Description of the Physical Environment:

Evaton West – Project F Erf 5085 is located within Evaton West, close to Adidas Road and the National Road N1, which is located to the west of the study area. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The study area mainly consists of a disturbed layer of topsoil with multiple areas that have been cleared for informal use as well as illegal dumping. The site has a moderate overgrowth of tall grass hampering archaeological visibility (Figure 5 -9).

Vegetation in the area is described as Soweto Highveld Grassland (Mucina *et al* 2006). The site shows very little of the original prevailing vegetation types as it has been altered over an extended period of time. Land use surrounding the study area consist of township development and road infrastructure. The study area is flat without any major topographical features like pans or ridges.



Figure 5. General site conditions - Northern Border.



Figure 6. General site conditions - Eastern border.



Figure 7. General site conditions - Western border.



Figure 8. General site conditions - Southern border.



Figure 9. Boulders in the study area.

**6 Results of Public Consultation and Stakeholder Engagement:**

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process and no formal consultation was conducted by the heritage team. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process conducted by GCS.

**7. Literature / Background Study:****7.1. Literature Review**

CRM assessments conducted in the general vicinity help to contextualise the study area. The following assessments conducted in the immediate vicinity that were consulted is listed below:

Author	Year	Project	Findings
Van Schalkwyk, J.	2013	Heritage impact assessment for the Proposed Construction of Eskom Five (5) 88kv Powerlines Connecting Kookfontein and Jaguar Substations, Midvaal and Emfuleni Municipalities, Gauteng Province	Farmsteads and cemeteries
Van Schalkwyk, J.	2014	Cultural Heritage Impact Assessment Report for the Proposed Development of a Sports Centre in Palm Springs, Emfuleni, Gauteng Province	No Sites
Coetzee, F. P.	2008	Cultural Heritage Survey of the Proposed Mixed/Residential Development on Doornkuil 369 IQ, and Associated Infrastructure Upgrades, Sedibeng District Municipality	Structures and cemeteries

**7.1.1. Genealogical Society and Google Earth Monuments**

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

## 7.2. Archaeology of the greater study area

### ***The Stone Age***

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contain sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges.

The Stone Age can be divided in three main phases as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

There is evidence of the use of the larger area by Stone Age communities for example along the Kliprivier where ESA and MSA tools were recorded. Bergh (1999) indicates that in the greater study area seven Early Stone Age terrains occur. One Late Stone Age terrain is located at Vereeniging. The Amcor, Acacia Road, Kantienkoppie, Duncanville and Klipplaatdrif Stone Age terrains are all located rather close to Vanderbijlpark. Evidence as to Stone Age peoples that inhabited the area does not end here. It is also indicated in Bergh's source that a number of rock engravings dating from prehistoric times can be found in the vicinity of the study area. For the Later Stone Age some petroglyphs occur to the south at Redan as well as along the Vaal River (Bergh 1999).

### ***The Iron Age***

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. The greater study area does not fall into an Iron Age terrain, but there are two large terrains located to the west and the east thereof, respectively. (Bergh 1999: 4-5, 7).

The Khudu Tribe seemed to be the most prominent tribe in the greater area by the beginning of the nineteenth century. This tribe had split off from the Kwena-Fokeng Tribe, which had at that time settled to the north of Rustenburg and Pretoria. It was recorded that the Khudu Tribe was living at the area of the conjunction of the Vaal River with the Suikerbosrand River up until 1823. (Bergh 1999: 10; 106-107) In a few decades, the sociographic nature of the then Transvaal province would change forever. The Difaqane (Sotho), or Mfekane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's. (Bergh 1999: 109-115) It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka's Zulus to attack other tribes. (Bergh 1999: 14; 116-119)

In 1823, Mzilikazi and his Ndebele raiders had moved southward after having attacked a tribe in the Middelburg district. By August of that year, the Ndebeles reached the area where the Khudu Tribe had settled, and the latter was forced to flee in a westward direction to the Rolong area. Hereafter, the Ndebele Tribe settled along the northern and southern sides of the Vaal River, in an area stretching from the present-day Heidelberg to Potchefstroom. (Bergh 1999: 111)

### 7.2.1. Cultural Landscape

Evaton West – Project F erf 5085 is located within Evaton West, close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is currently vacant, with residential land use to the south west, east and south of the stand. Land to the north and north west is vacant (Figure 10 and 11). The general area used to consist of commercial farms with their main focus on the production of crops and the raising of live-stock. Most of these farms were later sub-divided into small holdings and erven and are now densely built-up residential areas and do not have significant cultural landscape elements.



Figure 10. 2004 Google Image of the study area.



Figure 11. 2015 Google Image of the study area.

## 8. Findings of the Survey

It is important to note that only the development footprint was assessed as indicated in Figure 1 - 4. This portion has multiple gravel roads running through the area as well as the main road running on the eastern edge of the site. A cluster of boulders are dumped in the centre of the study area, as a result of earthmoving activities. The study area mainly consists of a disturbed layer of topsoil with multiple areas that have been cleared for informal use as well as illegal dumping.

The above-mentioned activities have transformed the study area and would have impacted on surface indicators of heritage features if any ever existed in the area. During the survey no heritage significant features were identified within the study area and there are no standing structures older than 60 years.

An independent paleontological assessment was conducted by Prof Marion Bamford and concluded that the proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age that do not preserve fossils. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed and the study included a Fossil Chance Find Protocol.



## 9. Potential Impact

The chances of impacting unknown archaeological sites in the study area is considered to be negligible as no heritage resources were identified. If any direct impacts did occur it would be during the construction phase only and would be of low to medium significance.

### 9.1. Pre-Construction phase:

The area will be upgraded and it is assumed that this phase will entail groundworks. Impacts (if heritage resources are present) include destruction or partial destruction of non-renewable heritage resources.

### 9.2. Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

### 9.3. Operation Phase:

No impact is envisaged during this phase.

Table 5. Impact of the project on heritage resources.

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects as well as graves (if present).		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/ excavation of site)</b>
<b>Extent</b>	Local (3)	Local (3)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Not probable (2)	Not probable (2)
<b>Significance</b>	<b>20 (Low)</b>	<b>20 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	No resources were recorded	No resources were recorded.
<b>Can impacts be mitigated?</b>	Yes, a chance find procedure should be implemented.	Yes
<b>Mitigation:</b> A chance find procedure must be incorporated for the project.		
<b>Residual Impacts:</b> Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted but this cannot be quantified.		

#### 9.4. Cumulative Impacts

**Table 6. Cumulative Impact of the project.**

Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. The area is of low heritage sensitivity and the possibility of unearthing subsurface heritage resources is small.

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects as well as graves (if present).		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Very Improbable (1)	Very Improbable (1)
<b>Significance</b>	<b>8 (Low)</b>	<b>8 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	No resources were recorded	No resources were recorded.
<b>Can impacts be mitigated?</b>	Yes, a chance find procedure should be implemented.	Unknown
<b>Confidence in findings</b>	High	High
<b>Mitigation:</b> A Chance Find Procedure should be implemented should any sites be identified.		

## 10. Recommendations and conclusion

The study area is vacant and is characterised by a disturbed layer of topsoil with multiple areas that have been cleared for informal use as well as multiple gravel roads running through the area together with a main road located on the eastern border of the study area. A cluster of boulders are dumped in the centre of the study area, as a result of earthmoving activities. Illegal dumping of household refuse and building rubble occurs throughout the study area hampering archaeological visibility.

The above-mentioned activities have transformed the study area and would have impacted on surface indicators of heritage features if any ever existed in the area. During the survey no heritage significant features were identified within the study area and no standing structures older than 60 years occur in the area.

An independent paleontological study (Bamford 2020) concluded that the proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age that do not preserve fossils. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed and the study included a Fossil Chance Find Protocol.

Due to the apparent lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance find procedure as outlined below.

### 10.1. Chance Find Procedure

The possibility of the occurrence of subsurface finds or previously unknown sites cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place for the project. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

**Monitoring Programme for Palaeontology – to commence once the excavations activities begin.**

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (stromatolites, microbially induced sedimentary structures) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar structures are provided here for the developer to assist in recognizing the microfossils.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

**10.2. Reasoned Opinion**

The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures (i.e. chance find procedure) are included in the EMPr.

**10.3. Potential risk**

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed or obscured by vegetation and subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in Section 10.1.

## 11. References

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- Ross, R. A concise history of South Africa. Cambridge University Press. Cambridge. 1999.
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- Van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment Report for the Proposed Development of a Sports Centre in Palm Springs, Emfuleni, Gauteng Province

**Appendix A - Curriculum Vitae of Specialist**

Jaco van der Walt  
Archaeologist

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+27 86 691 6461

**Education:****Particulars of degrees/diplomas and/or other qualifications:**

**Name of University or Institution:** University of Pretoria  
**Degree obtained** : BA Heritage Tourism & Archaeology  
**Year of graduation** : 2001

**Name of University or Institution:** University of the Witwatersrand  
**Degree obtained** : BA Hons Archaeology  
**Year of graduation** : 2002

**Name of University or Institution** : University of the Witwatersrand  
**Degree Obtained** : MA (Archaeology)  
**Year of Graduation** : 2012

**Name of University or Institution** : University of Johannesburg  
**Degree** : PhD  
**Year** : Currently Enrolled

**EMPLOYMENT HISTORY:**

2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC).**  
2007 – 2010 : **CRM Archaeologist**, Managed the Heritage Contracts Unit at the University of the Witwatersrand.  
2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants  
2004: **Technical Assistant**, Department of Anatomy University of Pretoria  
2003: **Archaeologist**, Mapungubwe World Heritage Site  
2001 - 2002: **CRM Archaeologists**, For R & R Cultural Resource Consultants, Polokwane  
2000: **Museum Assistant**, Fort Klapperkop.

**Countries of work experience include:**

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

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**SELECTED PROJECTS INCLUDE:**

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**Archaeological Impact Assessments (Phase 1)**

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana

Archaeological Impact Assessment Mmamethlake Landfill

Archaeological Impact Assessment Libangeni Landfill

**Linear Developments**

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve

Archaeological Impact Assessment Medupi – Spitskop Power Line,

Archaeological Impact Assessment Nelspruit Road Development

**Renewable Energy developments**

Archaeological Impact Assessment Karoshoek Solar Project

**Grave Relocation Projects**

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.

Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.

Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal

Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

**Phase 2 Mitigation Projects**

Field Director for the Archaeological Mitigation For Booyesdal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman

Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.

Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.

Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

**Heritage management projects**

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.



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**MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:**


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- Association of Southern African Professional Archaeologists. Member number 159  
Accreditation:
  - Field Director Iron Age Archaeology
  - Field Supervisor Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

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**PUBLICATIONS AND PRESENTATIONS**


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- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
  - J van der Walt, A Meyer, WC Nienaber
  - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
  - WC Nienaber, M Hutten, S Gaigher, J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
  - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
  - Paper read at the 12<sup>th</sup> Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
  - J van der Walt, P Birkholtz, W. Fourie
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008

- 
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.
    - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008
  
  - Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep*)
    - J van der Walt and J.P Celliers
  
  - Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
  
  - Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
  
  - Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
  
  - Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
    - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

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**REFERENCES:**

---

1. Prof Marelize Lombard      Senior Lecturer, University of Johannesburg, South Africa  
E-mail: mlombard@uj.ac.za
  
2. Prof TN Huffman      Department of Archaeology Tel: (011) 717 6040  
University of the Witwatersrand
  
3. Alex Schoeman      University of the Witwatersrand  
E-mail: Alex.Schoeman@wits.ac.za

# **APPENDIX B-2**

## Paleontological Impact Assessment



**Palaeontological Impact Assessment for the proposed  
development on Evaton West Erf 5085, southern  
Gauteng Province**

**Project F  
Desktop Study (Phase 1)**

**For**

**Heritage Contracts and Archaeological Consulting**

**10 March 2020**

**Prof Marion Bamford**

Palaeobotanist

P Bag 652, WITS 2050

Johannesburg, South Africa

[Marion.bamford@wits.ac.za](mailto:Marion.bamford@wits.ac.za)

## **Expertise of Specialist**

The Palaeontologist Consultant: Prof Marion Bamford  
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf  
Experience: 31 years research; 3years PIA studies

## **Declaration of Independence**

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Heritage Contracts and Archaeological Consulting (HCAC), Modimolle, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

Signature: 

## **Executive Summary**

A palaeontological Impact Assessment was requested for the proposed development on Erf 5085 Evaton West, Gauteng Province in order to comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The site was indicated as moderately sensitive on the SAHRIS map so a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age. Such rocks do not preserve fossils and it is suggested here that the Gauteng Palaeotechnical Report and the SAHRIS map are incorrect and should be updated. Because SAHRA requires a Fossil Chance Find Protocol it is added here. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed.

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# 1. Background

The Gauteng Rapid Land Release Programme aims to fast track the release of serviced stands from state-owned land to qualifying beneficiaries. Phumaf Holdings was appointed to assist the Department of Human Settlements with all pre-planning, planning work, design and construction management to enable the release of the identified stands. GCS Water and Environment has been contracted by Phumaf Holdings to undertake the environmental authorization processes required for the stands in order for compliance to the National Environmental Management Act NEMA (Act 107 of 1998, as amended).

Evaton West – Project F erf 5085 is located within Evaton West, close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is currently vacant, with residential land use to the south west, east and south of the stand. Land to the north and north west is vacant. The site is approximately 3.8 hectares in extent. Refer to the maps below for the location and regional locality map, indicating the surrounding residential allotment townships. Evaton West is inside of the 2010 urban edge. The site is zoned as “community facilities”.

A Palaeontological Impact Assessment was requested for the above project. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein.

Table 1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (amended 2017).

	<b>A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:</b>	<b>Relevant section in report</b>
ai	Details of the specialist who prepared the report	Appendix B
a ii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A



e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
k	Any mitigation measures for inclusion in the EMPr	Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	N/A
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	N/A
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies if any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A



Figure 1: Google Earth map of the proposed development of the vacant land Erf 5085 in Evaton West with the section indicated with a yellow pin. Map supplied by HCAC.

## 2. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.

The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases;
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representivity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

## 3. Geology and Palaeontology

- i. Project location and geological context

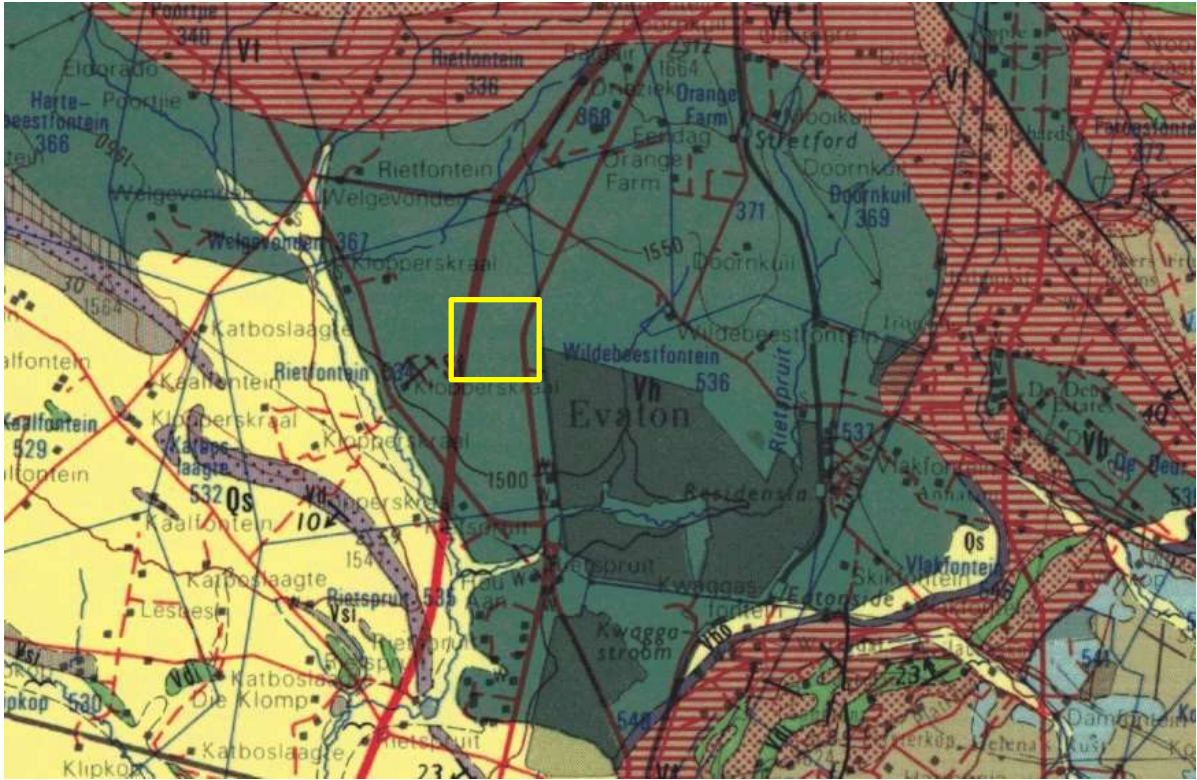


Figure 2: Geological map of the area around Evaton, south of Johannesburg and north of Vereeniging. The location of the proposed project is indicated within the yellow rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2626 West Rand.

Table 2: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006, 2012). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 25 Ma to present
Vd	Diabase	Intrusive volcanic rocks	Post Transvaal SG
Vh	Hekpoort Fm, Pretoria Group, Transvaal SG	Andesite, agglomerate, tuff	Ca 2224 Ma
Vt	Timeball Hill Fm, Pretoria Group, Transvaal SG	Quartzite, mudrock, diamictite	< 2420 Ma

The site lies in the southern part of the Transvaal Basin, in one of three late Archaean to early Proterozoic basins that together form the Transvaal Supergroup. In the Transvaal Basin the Pretoria Group overlies the Chuniespoort Group. There are three major cycles of infilling of the basin and the Hekpoort Formation is within the third or upper cycle and the Timeball Hill Formation within the second cycle (Eriksson et al., 2012) so although the sediments are adjacent to each other there is quite a lot of time separating them.

Beneath the Hekpoort Formation is the Boeshoek Formation's immature conglomerates, sandstones and subordinate mudrocks that entered the basin from the northeast and northwest. They were laid down on an uneven topography as distal fans and sandy fluvial brain-plains (Eriksson et al., 2006: 253). The authors interpreted the environment to be a shallow lacustrine central basin. The overlying Hekpoort Formation comprises subaerial basaltic-andesitic lava produces from a series of volcanic events. These rocks are overlain by sandy distal fan and braid-plain deposits of the Dwaalheuveld Formation (Eriksson et al., 2006, 2012; Frauenstein et al., 2009).

To the west are considerably younger deposits of Quaternary Kalahari sands comprising sands, alluvium and soils but they are not in the development footprint.

## ii. Palaeontological context

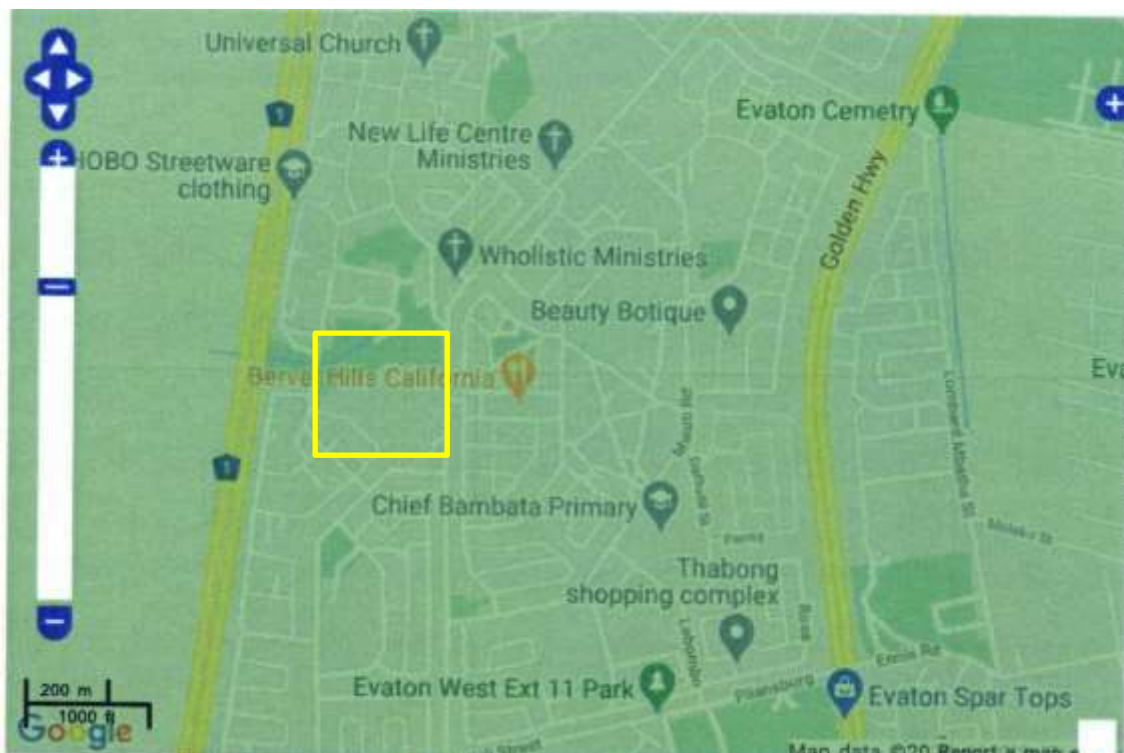


Figure 3: SAHRIS palaeosensitivity map for the proposed development on Erf 5085 Evaton West shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

The palaeontological sensitivity of the area under consideration is presented in Figure 3. Evaton West is entirely on the volcanic rocks of the Hekpoort Formation. According to the geological maps and literature (Eriksson et al., 2006, 2012, Frauenstein et al., 2009; Schroder et al., 2016) the Hekpoort Formation is volcanic. The minor lacustrine shale

deposits and the supposed palaeosol at the top of the sequence are questionable (Eriksson et al., 2006). In the SAHRA Palaeotechnical Report for Gauteng (Groenewald et al., 2014), the Hekpoort Formation is listed as moderately sensitive but no references and evidence are provided. Based on the geology of the formation, it is highly unlikely that it is really moderately sensitive. It is suggested here that the Sahris palaeosensitivity map should be updated.

From the SAHRIS map above the area is indicated as moderately sensitive (green) so a desktop PIA has been completed. As noted above, however, the rocks of the Hekpoort Formation are volcanic so it is extremely unlikely that any fossils do occur. The palaeoenvironment is completely unsuitable for stromatolites or microbially induced sedimentary structures (MISS sensu Noffke et al., 2006) as the former requires a shallow marine setting and the latter a shoreline. Lava and basalt from volcanic eruptions do not provide a suitable environment for the preservation of any microfossils, and the age is too great for the occurrence of any body fossils. A Fossil Chance Find Protocol has been added for stromatolites and MISS, only because SAHRA requires it and not because there is any chance of finding fossils.

## 4. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 3:

**TABLE 3A: CRITERIA FOR ASSESSING IMPACTS**

<b>PART A: DEFINITION AND CRITERIA</b>		
<b>Criteria for ranking of the SEVERITY/NATURE of environmental impacts</b>	<b>H</b>	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	<b>M</b>	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	<b>L</b>	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	<b>L+</b>	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	<b>M+</b>	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	<b>H+</b>	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
<b>Criteria for ranking the DURATION of impacts</b>	<b>L</b>	Quickly reversible. Less than the project life. Short term
	<b>M</b>	Reversible over time. Life of the project. Medium term
	<b>H</b>	Permanent. Beyond closure. Long term.
<b>Criteria for ranking the SPATIAL SCALE of impacts</b>	<b>L</b>	Localised - Within the site boundary.
	<b>M</b>	Fairly widespread – Beyond the site boundary. Local
	<b>H</b>	Widespread – Far beyond site boundary. Regional/ national
<b>PROBABILITY (of exposure to impacts)</b>	<b>H</b>	Definite/ Continuous
	<b>M</b>	Possible/ frequent
	<b>L</b>	Unlikely/ seldom

**TABLE 3B: IMPACT ASSESSMENT**

<b>PART B: ASSESSMENT</b>		
<b>SEVERITY/NATURE</b>	<b>H</b>	-
	<b>M</b>	-
	<b>L</b>	Lava and basalt (Hekpoort Fm) do not preserve any fossils. The rocks are too old to contain any body fossils. The impact would be very unlikely.
	<b>L+</b>	-
	<b>M+</b>	-
	<b>H+</b>	-
<b>DURATION</b>	<b>L</b>	-
	<b>M</b>	-
	<b>H</b>	Where manifest, the impact will be permanent.
<b>SPATIAL SCALE</b>	<b>L</b>	Since only the possible fossils within the area would be fossil plants from the <i>Glossopteris</i> flora in the shales, the spatial scale will be localised within the site boundary.
	<b>M</b>	-
	<b>H</b>	-
<b>PROBABILITY</b>	<b>H</b>	-
	<b>M</b>	-
	<b>L</b>	It is extremely unlikely that any fossils would be found in the volcanic rocks and the SAHRIS designation is incorrect. Because is a requirement of SAHRA a Fossil Chance Find protocol is added here.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old and of the wrong kind, i.e. ancient volcanics, to contain fossils. Although it is likely that the SAHRIS map is incorrect a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

## 5. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the basalts and lavas of the early Proterozoic (ca 2224 Ma) are typical for the country and do NOT contain fossil plant, insect, invertebrate and vertebrate material. According to the geological maps there would be no fossils. The interpretation in the Gauteng Palaeotechnical Report is questionable.

## 6. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the lavas and basalt of the Hekpoort Formation (Pretoria Group, Transvaal Supergroup) of early Proterozoic age. A Fossil Chance Find Protocol is included here for microfossils only because it is a SAHRA requirement. It is suggested that the SAHRIS map be updated.

## 7. References

- Eriksson, P.G., Altermann, W., Hartzer, F.J., 2006. The Transvaal Supergroup and its precursors. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 237-260.
- Eriksson, P.G., Bartman, R., Catuneanu, O., Mazumder, R., Lenhardt, N., 2012. A case study of microbial mats-related features in coastal epeiric sandstones from the Palaeoproterozoic Pretoria Group, Transvaal Supergroup, Kaapvaal craton, South Africa; the effect of preservation (reflecting sequence stratigraphic models) on the relationship between mat features and inferred palaeoenvironment. *Sedimentary Geology* 263, 67-75.
- Frauenstein, F., Veizer, J., Beukes, N., Van Niekerk, H.S., Coetzee, L.L., 2009. Transvaal Supergroup carbonates: Implications for Paleoproterozoic  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  records. *Precambrian Research* 175, 149–160.
- Groenewald, G., Groenewald, Groenewald S., 2014. SAHRA Palaeotechnical Report. Palaeontological Heritage of Gauteng. 16 pp.
- Noffke, N., Eriksson, K.A., Hazen, R.M., Simpson, E.L. 2006. A new window into Early Archean life: Microbial mats in Earth's oldest siliciclastic tidal deposits (3.2 Ga Moodies Group, South Africa). *Geology* 34, 253–256.
- Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.
- Schröder, S., Beukes, N.J., Armstrong, R.A., 2016. Detrital zircon constraints on the tectonostratigraphy of the Paleoproterozoic Pretoria Group, South Africa. *Precambrian Research* 278, 362 – 393.

## 8. Chance Find Protocol

### **Monitoring Programme for Palaeontology – to commence once the excavations activities begin.**

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (stromatolites, microbially induced sedimentary structures) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar structures are provided here for the developer to assist in recognizing the microfossils (for example see Figure 4, 5).

4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

## **Appendix A – Examples of fossils of MISS and stromatolites**



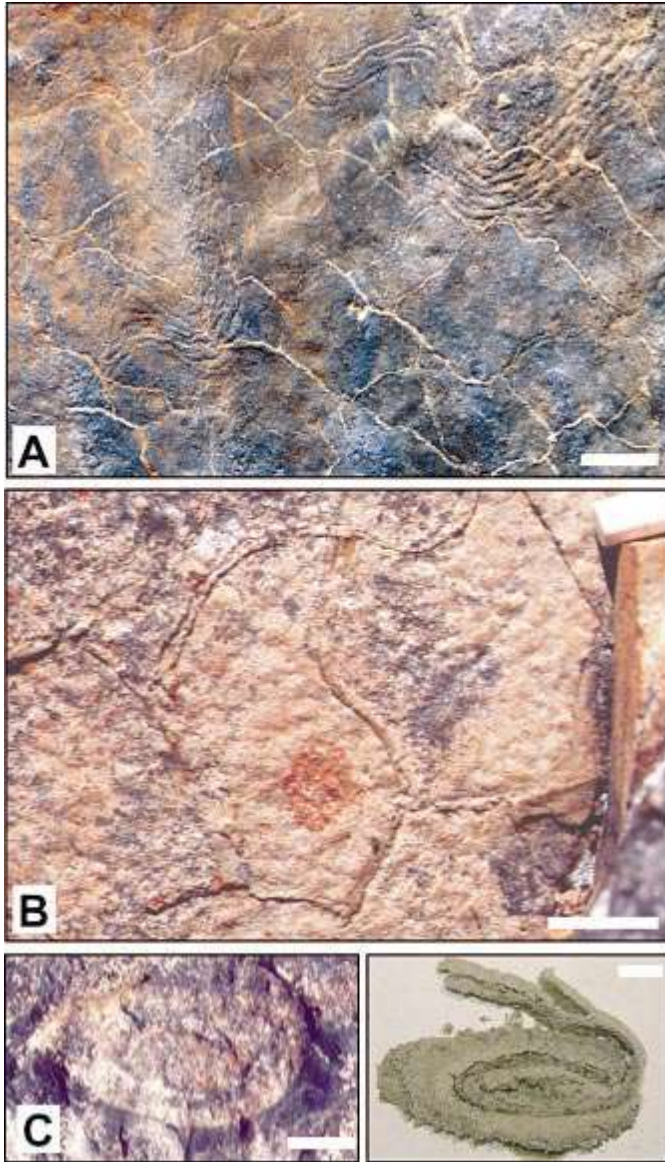


Figure 4: Microbially induced sedimentary structures (MISS), Moodies Group. A: Wrinkle structure scale: 10 cm. B: Wrinkle structure and desiccation cracks on sandstone bedding plane; scale: 2 cm. C: Rollup structure; scale: 1 cm; for comparison, modern roll-up structure from tidal flats of Fishermans Island, Virginia, USA, is shown on right; scale: 1 cm. (Noffke et al.,2006; Fig 2.)



Figure 5: examples of stromatolites as seen in the field.

## Appendix B – Details of specialist

### Curriculum vitae (short) - Marion Bamford PhD January 2020

#### i) Personal details

Surname : **Bamford**  
First names : **Marion Kathleen**  
Present employment : Professor; Director of the Evolutionary Studies Institute.  
Member Management Committee of the NRF/DST Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa-  
Telephone : +27 11 717 6690  
Fax : +27 11 717 6694  
Cell : 082 555 6937  
E-mail : [marion.bamford@wits.ac.za](mailto:marion.bamford@wits.ac.za) ; [marionbamford12@gmail.com](mailto:marionbamford12@gmail.com)

#### ii) Academic qualifications

Tertiary Education: All at the University of the Witwatersrand:  
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.

1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.  
 1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.  
 1986-1989: PhD in Palaeobotany. Graduated in June 1990.

### iii) Professional qualifications

*Wood Anatomy Training (overseas as nothing was available in South Africa):*

1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps

1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer

1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

### iv) Membership of professional bodies/associations

Palaeontological Society of Southern Africa

Royal Society of Southern Africa - Fellow: 2006 onwards

Academy of Sciences of South Africa - Member: Oct 2014 onwards

International Association of Wood Anatomists - First enrolled: January 1991

International Organization of Palaeobotany – 1993+

Botanical Society of South Africa

South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016

SASQUA (South African Society for Quaternary Research) – 1997+

PAGES - 2008 –onwards: South African representative

ROCEEH / WAVE – 2008+

INQUA – PALCOMM – 2011+onwards

### vii) Supervision of Higher Degrees

All at Wits University

Degree	Graduated/completed	Current
Honours	7	0
Masters	10	4
PhD	12	5
Postdoctoral fellows	10	3

### viii) Undergraduate teaching

Geology II – Palaeobotany GEOL2008 – average 65 students per year

Biology III – Palaeobotany APES3029 – average 25 students per year

Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology;

Micropalaeontology – average 2-8 students per year.

### ix) Editing and reviewing

Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor

Guest Editor: Quaternary International: 2005 volume  
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –  
Cretaceous Research: 2014 –  
Journal of African Earth Sciences: 2020 -

Review of manuscripts for ISI-listed journals: 25 local and international journals

## **x) Palaeontological Impact Assessments**

Selected – list not complete:

- Thukela Biosphere Conservancy 1996; 2002 for DWAF
- Vioolsdrift 2007 for Xibula Exploration
- Rietfontein 2009 for Zitholele Consulting
- Bloeddrift-Baken 2010 for TransHex
- New Kleinfontein Gold Mine 2012 for Prime Resources (Pty) Ltd.
- Thabazimbi Iron Cave 2012 for Professional Grave Solutions (Pty) Ltd
- Delmas 2013 for Jones and Wagener
- Klipfontein 2013 for Jones and Wagener
- Platinum mine 2013 for Lonmin
- Syferfontein 2014 for Digby Wells
- Canyon Springs 2014 for Prime Resources
- Kimberley Eskom 2014 for Landscape Dynamics
- Yzermyne 2014 for Digby Wells
- Matimba 2015 for Royal HaskoningDV
- Commissiekraal 2015 for SLR
- Harmony PV 2015 for Savannah Environmental
- Glencore-Tweefontein 2015 for Digby Wells
- Umkomazi 2015 for JLB Consulting
- Ixia coal 2016 for Digby Wells
- Lambda Eskom for Digby Wells
- Alexander Scoping for SLR
- Perseus-Kronos-Aries Eskom 2016 for NGT
- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klipportjie and Finaalspan 2017 for Delta BEC
- Ledjadja borrow pits 2018 for Digby Wells
- Lungile poultry farm 2018 for CTS
- Olienhout Dam 2018 for JP Celliers
- Isondlo and Kwasobabili 2018 for GCS
- Kanakies Gypsum 2018 for Cabanga
- Nababeep Copper mine 2018
- Glencore-Mbali pipeline 2018 for Digby Wells
- Remhoogte PR 2019 for A&HAS
- Bospoort Agriculture 2019 for Kudzala
- Overlooked Quarry 2019 for Cabanga

- Richards Bay Powerline 2019 for NGT
- Eilandia dam 2019 for ACO
- Eastlands Residential 2019 for HCAC
- Fairview MR 2019 for Cabanga
- Graspan project 2019 for HCAC
- Lieliefontein N&D 2019 for Enviropro
- 

## **xi) Research Output**

Publications by M K Bamford up to December 2019 peer-reviewed journals or scholarly books: over 140 articles published; 5 submitted/in press; 8 book chapters.

Scopus h-index = 27; Google scholar h-index = 32; -i10-index = 80

Conferences: numerous presentations at local and international conferences.

## **xii) NRF Rating**

NRF Rating: B-2 (2016-2020)

NRF Rating: B-3 (2010-2015)

NRF Rating: B-3 (2005-2009)

NRF Rating: C-2 (1999-2004)

**APPENDIX C**  
Civil Engineering Services Report





**GAUTENG PROVINCE**  
HUMAN SETTLEMENTS  
REPUBLIC OF SOUTH AFRICA

# GAUTENG RAPID LAND RELEASE

CIVIL ENGINEERING SERVICES OUTLINE SCHEME REPORT

EVATON WEST EXTENSION.4 ERF 5085

PROJECT No.: 7001

07 JULY 2020

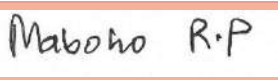
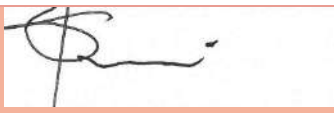




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# DOCUMENT CONTROL

<b>Job Title</b>			<b>Job Number:</b> 7001
<b>Document Title</b>	<b>CIVIL ENGINEERING SERVICES OUTLINE SCHEME REPORT EVATON WEST EXT.4 ERF 5085 – PROJECT F</b>	<b>File Ref:</b> T:\PROJECTS 2009\7000 Projects\7001 Gauteng Rapid Land Release Programme\03 CIVL\11 Design reports\Report\CIVIL ENGINEERING SERVICES OUTLINE SCHEME	
<b>Document Revision</b>	<b>Revised/ Issued By</b>	<b>Date</b>	
A	Sikelela Mnguni (Pr.Tech.Eng)	07 JULY 2020	
<b>Compiled By:</b>	Rofhiwa Maboho (Pr.Tech.Eng)	 Maboho R.P	07 JULY 2020
	<i>Name &amp; Surname</i>	<i>Signature</i>	<i>Date</i>
<b>Reviewed &amp; Checked By:</b>	Sikelela Mnguni (Pr.Tech.Eng)		07 JULY 2020
	<i>Name &amp; Surname</i>	<i>Signature</i>	<i>Date</i>
<b>Client Approval:</b>	 Sikelela Mnguni	 Rofhiwa Maboho	2/7/20 Date



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    Emfuleni Local Municipality (Metsi A Lekoa) Sewer Master Plan Layout

ANNEXURE F: Proposed Sewer Reticulation Layout

ANNEXURE G: Proposed Roads Layout

ANNEXURE H: Environmental Screening Report

ANNEXURE I: Proposed Stormwater Reticulation Layout

## EXECUTIVE SUMMARY

The Gauteng Rapid Land Release Programme aims to fast track the release of serviced stands from State-owned land to qualifying beneficiaries. Phumaf Holdings (Pty) Ltd was appointed to assist the Department of Human Settlements with all preplanning, planning work, design & construction management to enable the release of the stands in question.

One of the land parcels identified for the Gauteng Rapid Land Release Programme is Erf 5085, Evaton West Extension 4. The site is 3.84Ha in extent and is located Northern side in the Emfuleni Local Municipality of the Sedibeng District. The erven in question is currently zoned “Community facility” but will be required to be rezoned to “Residential 1, 2, and 3” to accommodate the proposed development. There is a stream that runs on the north-western side of the site. The Department seeks to develop the site for high density mixed housing development to yield approximately 462 residential 2-3 or 226 mixed single and residential 2 housing opportunities.

Phumaf Holdings (Pty) Ltd was appointed to undertake planning and engineering activities on various land parcels in preparation for the installation of services and/or construction of top structures.

The purpose of this report investigates and identifies whether the proposed development can be serviced economically with the existing bulk infrastructure and, design norms and standards of the internal engineering services.

This Civil Engineering Services Outline Scheme Report addressed the following:

- Bulk Potable Water and Internal reticulation
- Bulk Portable Sanitation and Internal reticulation
- Roads Design
- Stormwater Management
- Conclusion and Recommendation

This investigation will be based on available, local knowledge and discussions with the relevant officials. This Civil engineering Services Outline scheme report is based on the Civil Engineering Services Bulk Information from Emfuleni Local Municipality (Metsi a Lekwa), Water and Sanitation GLS Master planning department, and Emfuleni Spatial Development Framework 2017-2025.

### **DESIGN NORMS AND STANDARDS**

The following guidelines and standards will be used for the design of proposed Civil Engineering services for this development are as follows:

- Emfuleni Local Municipality (Metsi-A-Lekoa) Design Criteria and Internal Services Standards
- “Guidelines for Human Settlement, Planning and Design”, published by the Building and Construction Technology Division of the CSIR (also known as the Red Book)
- The Standardized Specification for Civil Engineering Construction (SANS 1200), published by the South Africa Bureau of Standards
- SANS 1936 published by SABS Standards Division.
- SANRAL Drainage Manual

### **ENVIRONMENTAL**

Evaton West – Project F erf 5085 is located within Evaton West, close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is currently vacant, with residential land use to the southwest, east, and south of the stand. Land to the north and northwest is vacant.

The site is approximately 3.84 hectares in extent. Evaton West is inside of the 2010 urban edge. The site is zoned as “community facilities”.

The Environmental Screening Report is attached in **Annexure H**.

### **WATER**

The proposed development falls under the Emfuleni Local Municipality (Metsi-A-Lekoa) Water jurisdiction. Information from Emfuleni Spatial Development Framework 2017-2025, Compiled on Behalf of the Emfuleni Local Municipality by Urban Dynamics Gauteng, dated September 2017 and Project 14/2006 Civil Engineering Services Master Planning Volume 1 Water Supply, Draft report

compiled in April 2009 and updated in April 2013 states that currently there is not sufficient capacity to supply the current water demand and also to accommodate future demand from future developments, therefore, new water bulk infrastructure will be required to accommodate the proposed development and other future developments.

## **SEWER**

The proposed development falls under the Emfuleni Local Municipality (Metsi-A-Lekoa) Water jurisdiction. Information obtained from Emfuleni Spatial Development Framework 2017-2025 (ESDF), Compiled on Behalf of the Emfuleni Local Municipality by Urban Dynamics Gauteng, dated September 2017, Project SNM/2012 Civil Engineering Services Master Planning Volume 2 Sewage Disposal, first edition dated August 2013 and Southern Corridor Regional Implementation Plan indicates that the existing bulk sanitation network is old, and it is overworked due to the demand for sanitation services therefore new infrastructure needs to be constructed.

## **ROADS**

The proposed site is surrounded by one surfaced road whereas the rest of the streets are gravel roads. The surfaced road is adjacent to the site and forms the eastern boundary of the Proposed development. A new road network system, parking, and stormwater pipe systems will be constructed within the proposed site connecting to the existing roads and stormwater infrastructure discharging to the nearest stream on the northern side of the proposed Evaton West Ext.4, Erf 5085 development.

The site is surrounded by class 5 gravel roads with no street names. There is one surfaced No Name street adjacent to the proposed development which forms the eastern boundary and is currently serves as a taxi route and main access to the site connecting to Moleli Street/Pilansburg Road. Moleli Street/Pilansburg Road is located to the far south side of the site and serves as the main collector road connecting to Golden Highway (R553). However, the internal road will have a total length of approximately 0.755km including the proposed parking and walkways within the proposed development. There are no bus and taxi bays planned for the development.

## **STORMWATER**

There is no stormwater infrastructure within the site, and no existing stormwater systems in the vicinity of the proposed site.

A new stormwater pipe system will be constructed within the proposed site discharging to nearby outlets and natural watercourses.

The minor stormwater system consists of a few sub-catchments. Stormwater is discharged from the development to the existing natural watercourses like rivers and streams by means of stormwater pipes. The minimum stormwater pipe size will be from 450mm diameter within the erf and 600mm on road reserves. The total pipe length is approximately 0.920 km.

The new development will have to have internal water, sewer, road, and stormwater networks designed per the Emfuleni Local Municipality municipal standards and guidelines.

## **ESTIMATED PROJECT COST**

There will be 0.952 km of water pipes, 0.993km of sewer pipes, 0.92 km of stormwater pipes, and a total road length of 0.755km. The estimated total construction cost for this project is **R 30 981 887.89** for option 1 and **R 17 725 717.88** for Option 2 which is inclusive of 25% contingencies and exclusive of VAT.



## 1 INTRODUCTION

### 1.1 Project Brief and Background

The Gauteng Rapid Land Release Programme aims to fast track the release of serviced stands from State-owned land to qualifying beneficiaries. Phumaf Holdings (Pty) Ltd was appointed to assist the Department of Human Settlements with all preplanning, planning work, design & construction management to enable the release of the stands in question.

One of the land parcels identified for the Gauteng Rapid Land Release Programme is Erf 5085, Evaton West Extension 4. The site is 3.84Ha in extent and is located Northern side in the Emfuleni Local Municipality of the Sedibeng District. The erven in question is currently zoned “Community facilities” but will be required to be rezoned to “Residential 1, 2, and 3” to accommodate the proposed development.

There is a stream that runs on the north-western side of the site. The Department seeks to develop the site for high density mixed housing development to yield approximately 462 residential 2-3 or 226 single dwelling and residential 2 housing opportunities.

The proposed development land use is shown in **Annexure A** proposed Option 1 and Option 2 draft layout as part of Evaton West, Erf 5085 – Project F Urban design framework dated June 2020 prepared by Metroplan Town Planners and Urban Designers.

The purpose of this report investigates and identifies whether the proposed development can be serviced economically with the existing bulk infrastructure and, design norms and standards of the internal civil engineering services.

This Civil engineering Services Outline scheme report is based on the Civil Engineering Services Bulk information Emfuleni Local Municipality (Metsi a Lekwa) **Water and Sanitation GLS** planning department, Geographic Information System (GIS), and Infrastructure Asset Management (IAM) IMQS Software.



## 2 DEVELOPMENT DETAILS

### 2.1 Locality

Evaton West – Project F erf 5085 is located within Evaton West, close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is currently vacant, with residential land use to the southwest, east, and south of the stand. land to the north and northwest is vacant.

Access to the project area can be via adjacent no name Street to Moleli Street/Pilansbrg Road to Golden Highway (R553). The site is bound by surfaced no name Street to the East, and no name gravel Street to the South.

A Locality Map is shown in **Annexure A**.

### 2.2 Proposed land- Uses and Zoning

The proposed extent of the Evaton West Ext.4, Erf 5085 development area is approximately 38 400 m<sup>2</sup> on which land use is known to be 'Community facilities' according to the Emfuleni Spatial Development Framework 2017-2025, Compiled on Behalf of the Emfuleni Local Municipality by Urban Dynamics Gauteng, dated September 2017 and Vereeniging planning Scheme,1992. The site is currently vacant, with residential land use to the southwest, east, and south of the stand. land to the north and northwest is vacant



## 3 SITE CONDITIONS

### 3.1 Topography and Vegetation

The proposed site can be considered to be flat to having slightly undulating plains and low hills. The lowest point on the site is recorded as being approximately 1539 meters above sea level, while the highest point is outside the site to the west and is recorded at 1541 meters above sea level.

The average annual temperature is 16.2 °C in Evaton. About 679 mm of precipitation falls annually. The driest month is August. There is 6 mm of precipitation in August. In January, the precipitation reaches its peak, with an average of 117 mm. The precipitation varies 111 mm between the driest month and the wettest month. The variation in annual temperature is around 12.6 °C.

Available topographic contours show a gentle dip slope south-westward with a gradient of merely 1:75 (0.8° or 1.3%). This does not, however, provide an accurate description of the site, which is very hummocky as a consequence of widespread dumping throughout the site.

Vegetation is very sparse and limited to veld grass with scattered trees and shrubs dotted around the site, characteristic of that illustrated in the photo below.

### 3.2 Geological and Geotechnical Aspects

Geoid Geotechnical Engineers (Pty) Ltd was appointed to conduct Geotechnical Site Investigations for Erf 5085, Evaton West Ext.4. The information below is extracted from the recommendations from the Geotechnical Investigation Report.

#### General

This report presents the findings of a GFSH2 - Phase 1 geotechnical investigation for the proposed housing development to be located on Erf 5085 Evaton West Extension 4 and provides recommendations for excavations, foundations, and earthworks.



### **Foundation Recommendations**

We recommend that the structures on this site be founded using one of the following strategies detailed in Table 5 below. The selection of the solution will require appropriate consideration of the relative stiffness and deformation potential with that of the top-structure in each instance, *as well as environmental issues* inclusive of potential disturbance to neighboring developments from compaction vibrations, noise, space for stockpiling excavated materials, etc:

For further foundation, recommendations **See Table 5** for suitable solutions for the proposed structures attached in the Geotechnical Report in **Annexure B**.

### **Material Usage**

Test pits profiling indicates that there is *limited colluvial material* which may satisfy nominally G6-G7 standards, with the remainder of the natural soils rated as poor to very poor quality in terms of their engineering applications. As such, none of these soils, other than the pebble marker, should be relied upon for high-quality soil mattress construction.

Moreover, the highly bouldery nature of both the fill and the underlying residual lava are poorly suited to an earthwork's solution - unless this were to be fragmented and crushed on-site to generate a suitable engineered fill material.

If the fill is not to be removed, the site should be approximately leveled, whereafter the fill should be impact rolled, and buried beneath imported fill of at least 2B thickness to facilitate adequate load distribution to overcome the irregular support offered by the underlying fill.

This is, however, not a recommended option for consideration.

### **Surface Beds**

Depending on the foundation solution to be adopted, the pebble marker horizon may be of sufficient bulk for reuse beneath all surface beds but is likely to be of insufficient volume. As such, concrete should be constructed on a consistent bed of at least two 150mm layers of imported / colluvial gravel, compacted to 95% Mod AASHTO density to prevent cracking induced by differential support.



Where the pebble marker cannot be harvested, nor the bouldery fill crushed to provide this material, provision should be made for suitable G5/G6 materials to be imported from commercial quarries.

### **Drainage Precautions**

In view of the site classification, the general drainage precautions presented in Appendix F should be strictly applied to obviate any unnecessary/avoidable saturation of the profile immediately adjacent to the structures.

The drainage patterns of the site under the present surface must, however, be formally investigated to assess if the perimeter canal deals with all the surface water challenges, as the site observations suggest that there may be some internal drainage problems induced by the fill deposits.

### **Slope Stability**

Subject to generally leveling of the site or prior removal of the fill deposits and deal with any drainage challenges, the present flat slope of the site is such that individual structures are unlikely to necessitate anything but minor terracing, obviating all slope stability concerns.

Notwithstanding this, the sidewalls of any deep services trenches or box cuts should be appropriately battered or propped during construction.

The surcharging of cut sidewalls by way of spoil heaps, construction materials, and equipment (including those with outrigger jacks) should be strictly avoided as being highly-detrimental to cut stability, particularly when workers are present in trenches/box excavations in excess of 1.5m deep.

Further information can be found in the geotechnical investigation report located in **Annexure B**.

Also, more geotechnical information received from Geoscience on Engeodata data Request ST2013-1180 drawing geological survey mapping shows that the site is not underlain by dolomite. See drawing ST2013-1180 Engeode data request in **Annexure B**.

### 3.3 Environmental Aspects

GCS Water & Environmental Consultants was appointed to undertake the environmental assessment for the proposed Erf 5085 of the Evaton West Extension 4 Township project and the Environmental Screening report was prepared.

The information below was extracted from the report under the heading Recommendation and Way forward which consists of two subheadings Authorisations and Way forward Conclusion and is as follows:

#### **Recommendations and Way Forward**

##### **Authorizations**

No NEMA listed activities are triggered and therefore no authorisation process is required in terms of the NEMA. However, due to the sensitivity of the critical biodiversity area to the west, and the stormwater channel on site, it is recommended that the following is carried out:

- Environmental Management Plan (EMP) is compiled and implemented during the construction phase.
- An ecological desktop assessment is carried out to confirm the sensitivity of the wetland and watercourse, so as to input recommendations to the EMP.
- An Environmental Control Officer (ECO) is employed by the client during the construction phase to audit the site on a regular basis and ensure compliance of to the EMP.
- A Notice of Intent to Develop (NID) should be sent to the South African Heritage Resources Agency (SAHRA) to indicate the proposed development.

Therefore, it would appear that any environmental and social impacts will be of low consequence. However, with the implementation of the above recommendations, the client will ensure that best practice is followed, and that effective mitigation and management can be undertaken to minimise any negative impacts.



### **Way forward and conclusion**

GCS will provide a breakdown of the costs for the supporting processes and reports, and a meeting will be set up with the client to discuss these.

Further Information can be found in the environmental screening report located in **Annexure H**.

## **4 BULK EARTHWORKS**

For information regarding the type of materials recommended for bulk earthworks, roads and parking layers, building platforms, and foundations the design engineers will refer to Geotechnical Investigation Report prepared for this site for soil conditions and recommendations.



## 5 BULK WATER SUPPLY AND RETICULATION

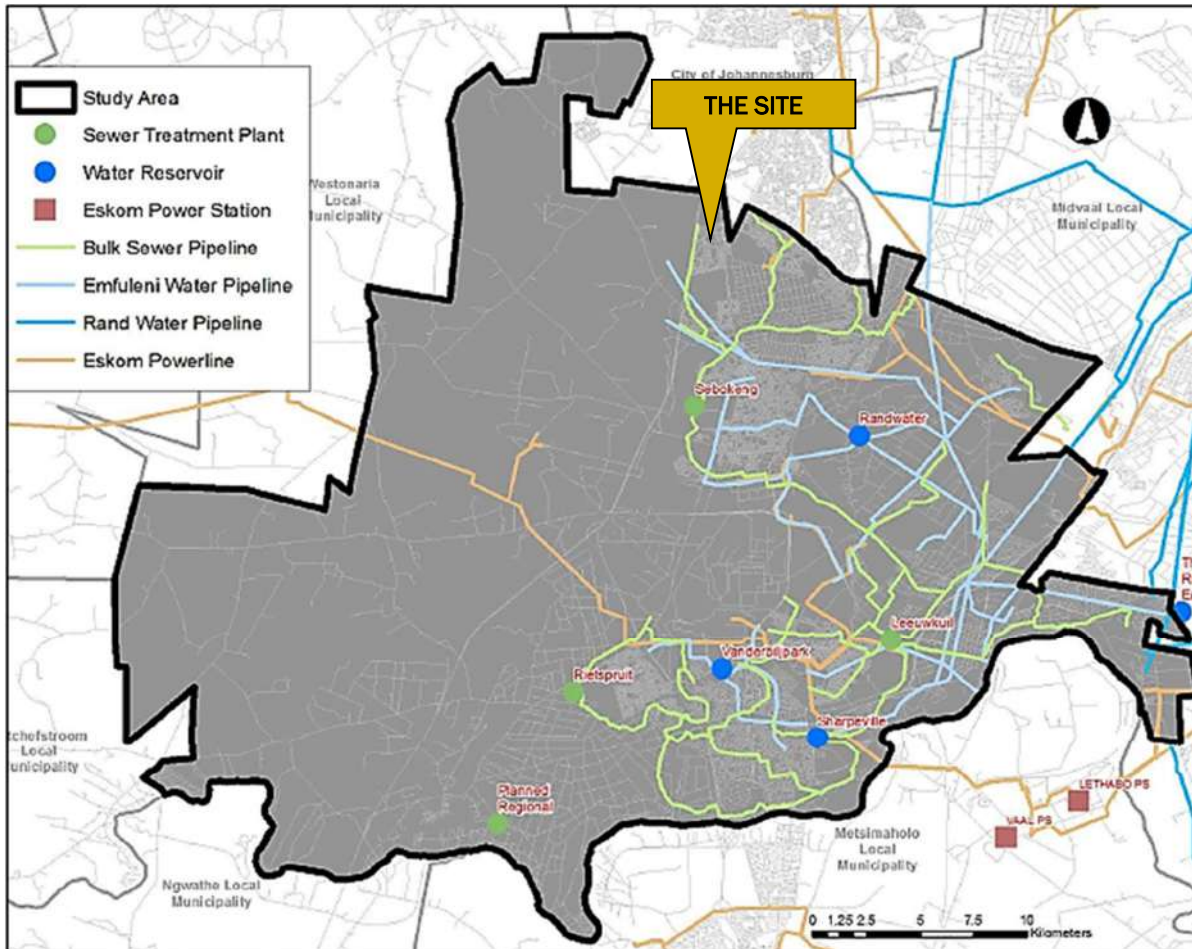
### 5.1 Authority and Provider Arrangements

The proposed development area falls within the Emfuleni Local Municipality (Metsi-A-Lekoa) Water jurisdiction and the municipality serves as both the Water Service Authority as well as the Water Service Provider.

The content of this section is based on information obtained from Emfuleni Spatial Development Framework 2017-2025, Compiled on Behalf of the Emfuleni Local Municipality by Urban Dynamics Gauteng, dated September 2017 and Project 14/2006 Civil Engineering Services Master Planning Volume 1 Water Supply, Draft report compiled in April 2009 and updated in April 2013.

### 5.2 Bulk Services and Bulk Supply Services

The content on this section below is based on the information extracted from Emfuleni Spatial Development Framework 2017-2025 report under the Municipal Services section. This section gives an insight on the conditions and status of the existing Bulk water infrastructure in Emfuleni, and the plans that Emfuleni Local Municipality has with regards to solving the problems they are currently facing with their old overworked bulk water infrastructure which does not have sufficient capacity to supply the current demand and also to accommodate future demand from future developments.



**FIGURE 5. 1: BULK SERVICES**

(EMFULENI SPATIAL DEVELOPMENT FRAMEWORK 2017-2025)

The water system consists of pipe networks, 9 reservoirs, and a small portable water treatment plant. Emfuleni borders the Vaal River and therefore extracts water from the river for consumption within Emfuleni. However, only a small amount of the required quantity is extracted from the Vaal River and purified at 0.2 MI/day. Most potable water required by Emfuleni is supplied by Rand Water (205 MI/day). The bulk water network is illustrated in **Figure 5.1**.

The bulk water network is old, and it is overworked due to the demand for potable water. The age of the networks varies between 60 -70 years across the municipal area. There are no backlogs in the supply of water connections. Additional water connections have largely been provided to informal

settlement households to cope with the growth of those settlements. In addition, water connections are continuously being provided to new housing development within Emfuleni.

## **EXISTING INFRASTRUCTURE**

This information below was obtained from the Civil Engineering Services Master Planning Volume 1 Water Supply, Draft report

### **BULK WATER SUPPLY**

Emfuleni, except for Vaaloewer, receives its bulk water supply from Rand Water. Various Rand Water pipelines traverse the municipal area from either Vereeniging or Suikerbosch. The Rand Water supply systems deliver either to Daleside Reservoirs (TWL 1528 m) or Eikenhof (TWL 1580 m). From the Daleside reservoirs, the water gravitates to Swartkoppies from where it is pumped further.

The supply pipes to Sebokeng and Evaton / Orange Farm are connected, but the capacities of the pipelines are substantially exceeded.

### **STORAGE**

- Vanderbijlpark reservoirs have some spare capacity, but the Rand Water connection and supply pipes are restrictive based on summer flow (PF) conditions.
- Sharpeville reservoirs are not utilized presently as the pump station feeding the water tower is out of operation. The supply line from Rand Water feeds directly into the Sharpeville Water Tower with a topwater level of 1504,8m. As indicated above the Rand Water connection and supply pipe to Sharpeville is restrictive. Sharpeville water supply system was provided during the separate development policy period. Sharpeville falls within the Vanderbijlpark reservoir supply zone and should be incorporated in the Vanderbijlpark system.





- Langerand Reservoir belongs to Rand Water. Rand Water policy dictates that consumers, Emfuleni Municipality, in this case, provide their storage facilities. This requirement was waived to an extent because Langerand reservoir is located at the end of the Rand Water system and dedicated to the Sebokeng / Evaton / Orange Farm area. The reservoir is, however, overextended and need to be augmented. The supply level of the Langerand reservoir is too high to supply the area within the 90 m maximum pressure criterium. Additional reservoir capacity at a lower top water level is required.

## DISTRIBUTION

The distribution system is discussed briefly below.

### a. Sebokeng / Evaton

The bulk supply system to Sebokeng and Evaton is overextended resulting in areas with insufficient peak flow pressures. The areas are located in the central, western, and northwestern areas. Also, the top water level of the Langerand Reservoir is such that static pressure exceeds the maximum acceptable pressure of 90 m in large areas.

Pressure reducing valves are installed to limit the maximum pressures, but these installations are restrictive. Sebokeng / Evaton should be divided into three supply zones i.e. the high laying areas to be supplied directly from the Langerand reservoir with TWL 1610 m, a new supply zone to be supplied from new reservoirs with TWL 1570 m and the northwestern areas to be supplied from the Orange Farm high-level reservoir with topwater level 1630 m.

These adjustments will result in reducing the pressure on the existing supply pipes from the Langerand reservoir and on the Langerand Reservoirs. The reduced peak (static) pressures will also result in reduced water losses. Provision is made for a reservoir with TWL 1570 m to feed the low laying areas of Sebokeng i.e. Golden Gardens, Johandeo, etc. An 800 mm line up to the reservoir site has been installed and the supply pipe up to Golden Gardens / Johandeo provisionally designed.

### 5.3 Design norms and standards

The design norms and standards that have been utilized for this report are the:

- “Emfuleni Local Municipality (Metsi-A-Lekoa) Design Criteria and Internal Services Standards”
- “Guidelines for Human Settlement, Planning and Design”, published by the Building and Construction Technology Division of the CSIR (also known as the Red Book)
- The Standardized Specification for Civil Engineering Construction (SANS 1200), published by the South Africa Bureau of Standards.
- SANS 1936 published by SABS Standards Division.

The design parameters utilised to calculate the demand and requirements for civil services for this report are following the Guidelines for Human Settlement Planning and Design compiled by the Department of Housing and Construction Technology (2000) and other approved design specifications.

TABLE 5.1 DESIGN PARAMETERS AND DESIGN STANDARDS FOR WATER SUPPLY		
PARAMETER	DETAIL	SPECIFICATION
Pressure	Maximum (Static)	90m
	Minimum (at peak flow)	24m
AADD	High rise flats according to FSR	0.4 kl per unit/100m <sup>2</sup> /day
	Single Dwelling daily Flow	0.9 kl / day/erf
Peak Factor	Entire Development	4.0
Flow Velocity	Supply mains (max)	1,5 - 2,5 m/s
	Supply mains (recommended)	1,0 m/s
	Network pipe maximum	1,2 m/s
	Network pipe recommended	0,6 m/s
	At fire flow	3,5 m/s *

Piping	Sizes Material	Min – 75mm dia ND HDPE, uPVC class 9 / 12 SABS 966 approved No solvent welding will be allowed
Connections	Residential connections	HDPE class 12 50mm single connections – small stands 100mm single connections – larger stand Connection installed & tested up to 1m outside erf boundary
Valves	Spacing	Maximum 600m AVK Waterworks type, Cast Iron, anticlockwise closing, opposite splay pegs, Aqua-loc mono box type – blue lid color
Hydrant Spacing	Maximum Spacing	120m apart Underground Byonette type opposite splay pegs, Aqua-loc mono box type – red lid color
Fire flow:	Flow per hydrant (High Risk) Minimum pressure: Maximum Spacing:	25 ℓ/s  15 m 120m apart
Cover to Pipes	Minimum Cover	1 000mm

It must be noted that these standards have been utilised to obtain an indication of the size of the services only and they must, therefore, be confirmed through a preliminary and final design process.

## 5.4 Water Demands

The peak water demand (excluding fire flow) is calculated during the preliminary designs. The summarised AADD and peak flows calculated during the preliminary designs are summarised in table 5.2 and 5.3 below.

TABLE 5.2: WATER DEMAND (ANNUAL AVERAGE DAILY DEMAND) (OPTION 1)									
Zoning	No of Stands	No of Dwellings	Area (ha)	AADD per Unit (l/day)	Unit	Average Water Demand (l/day)	Average Water Demand (l/s)	Peak Factor	Peak Demand (l/s)
Residential 2- 3	1	462	3,2	400	Dwelling Unit	184800	2,14	4	8,556
Social	1		0,03	400	100m <sup>2</sup> of Gross Floor Area	1200	0,014		0,014
Public Open Space	1		0,2						
<b>TOTAL</b>						<b>184800</b>	<b>2,14</b>		<b>8,569</b>
SUB-TOTAL									8569,444 kl/day
PLUS UAW (20% OF TOTAL AADD)									2142,361 kl/day
TOTAL AVERAGE DEMAND (AADD)									1071,806 kl/day
PEAK DEMAND (exc. Fire flow) PF = 4									123,979 l/s
FIRE FLOW PER HYDRANT (X4) - High risk									25 l/s

TABLE 5.3: WATER DEMAND (ANNUAL AVERAGE DAILY DEMAND) (OPTION 2)									
Zoning	No of Stands	No of Dwellings	Area (ha)	AADD per Unit (l/day)	Unit	Average Water Demand (l/day)	Average Water Demand (l/s)	Peak Factor	Peak Demand (l/s)
Residential 1	1	41	1,33	900	Dwelling Unit	36900	0,43	4	1,708
Residential 2	1	185	1,17	400	Dwelling Unit	74000	0,86	4	3,426
Social	1		0,03	400	100m <sup>2</sup> of Gross Floor Area	1200	0,014		0,014
Public Open Space	1		0,2						
<b>TOTAL</b>						<b>74000</b>	<b>0,86</b>		<b>5,148</b>
SUB-TOTAL									5148,148 kl/day
PLUS UAW (20% OF TOTAL AADD)									1287,037 kl/day
TOTAL AVERAGE DEMAND (AADD)									6435,185 kl/day
PEAK DEMAND (exc. Fire flow) PF = 4									74,481 l/s
FIRE FLOW PER HYDRANT (X4) - High risk and Low risk									25 and 15 l/s

Total Instantaneous Peak Demand = Average Daily Demand X Instantaneous Peak = **8.569 l/s** for option 1 or **5.148 l/s** for option 2.

Instantaneous Peak Factor = 4 (Reference 1 & 2)

Limited calculations to determine the demand for the various services were prepared to obtain an indication of the size of the services. The actual sizes of the services will have to be determined through a final design process after the relevant details (final site layout plan, number of units, size and coverage of the various land uses, etc.) have been finalised.

### 5.5 Existing Water Pipe Networks

Information received from the Emfuleni Local Municipality (Metsi-A-Lekwa) and GLS master planning and the topographical survey indicates that there are no existing water Services within the proposed site but there are existing water services in the vicinity of the proposed development.

As attached in **Annexure C**, Emfuleni Master Plan Water Layout-North-Base Pipes-drawing number **S12-012-305** shows that there are existing water reticulation pipe systems with various pipe sizes in the area.

The Master plan layout shows that the existing water system pipe diameters vary from 90mm diameter to 250mm in diameter. However, the proposed layout plan/site development plan (SDP) is currently being prepared to establish the suitability and capacity of the services for the connection point.

GLS Water Masterplan report will be required to determine the capacity analysis of the existing pipes once an SDP has been finalised and approved.

### 5.6 Capacity analysis of Network pipes

The topographical survey done for the site confirms that there is existing water infrastructure in the vicinity of the site and no signs of other existing water pipes within the proposed site. Emfuleni Local Municipality has records of the existing water network in the **Evaton West Extension 4** area.

However, it is therefore recommended that a GLS Water Master Plan report be requested to analyse the effect the proposed development will impose on the existing network pipes and determine the required upgrades.



## 5.7 Proposed Water Network

The proposed internal water reticulation network is shown in **Annexure D**.

It must be noted that the total pipe length and the correct pipe sizes of the water services will, therefore, be confirmed through a preliminary and final design process when the proposed layout is completed and approved.

The pipe sizes, material, and class will be a minimum of 110mm mPVC Class 12. The water mains will be installed 1.5m from the erf boundary forming a loop. Isolating valves will be placed at the reticulation nodes to provide effective isolation of loops.

Emfuleni Local Municipality (Metsi-A-Lekoa) Design Criteria and Internal Services Standards together with the Red Book.

The length of internal water pipelines as per the current proposed draft layout for this project is approximately 0,952 km. The proposed designs were done according to the yield provided from the draft proposed layout.

## 5.8 Pipe Materials

All pipes used must conform to SANS 1200 L and all other standards referred to in SANS 1200 L. This will include the use of uPVC, mPVC, steel, and HDPE pipes.

### Pipe material

- Pipe material - uPVC class 9 / 12 SABS 966 approved and no solvent welding will be allowed

### Elements:

- Class 12 uPVC piping with a minimum size of 75mm dia
- Cast Iron waterworks anticlockwise closing type valves
- Underground Byonette type hydrant valves
- Erf connections using HDPE class 12 piping



## 5.9 Standard Details

SANS 1200 (together with other applicable details) details will be used to prepare project-specific details and be submitted to Emfuleni Local Municipality Metsi-A-Lekoa for their approval.

The provision of SANS 1936 is also applicable to this project.

## 5.10 Proposed link upgrades

Land use was changed from “community facilities” to “residential 1,2-3” therefore upgrading of link infrastructure will be required for this project.

## 6 BULK SEWER SYSTEM AND RETICULATION

### 6.1 Authority and Provider Arrangements

The proposed development area falls within the Emfuleni Local Municipality (Metsi-A-Lekoa) Water jurisdiction and the Municipality serves as both the Water Service Authority as well as the Water Service Provider.

The content of this section is based on information obtained from Emfuleni Spatial Development Framework 2017-2025 (ESDF), Compiled on Behalf of the Emfuleni Local Municipality by Urban Dynamics Gauteng, dated September 2017, Project SNM/2012 Civil Engineering Services Master Planning Volume 2 Sewage Disposal, first edition dated August 2013 and Southern Corridor Regional Implementation Plan.

### 6.2 Bulk Sewer Systems

The bulk sanitation network is illustrated in **Figure 5.1**. The sanitation system consists of gravity pipelines and, due to the flat terrain; it also consists of 49 sewage pump stations. The wastewater system consists of 3 wastewater treatment works. The Sebokeng wastewater treatment works, located in Sebokeng next to the Rietspruit, is the largest wastewater treatment works within Emfuleni.

This wastewater treatment facility has a capacity of 119 Ml/day. Significant parts of the sanitation system infrastructure, including the Rietspruit and Leeuwkuil wastewater treatment works, need to be upgraded and rehabilitated.

The bulk sanitation network is old, and it is overworked due to the demand for sanitation services. The age of the networks varies between 60 -70 years across the Municipal area. The short-term sanitation infrastructure plans involve the rehabilitation of existing infrastructure, including sewer pump stations to minimize sewer spills. While this will give a significant improvement to overall performance, problems that could result in raw sewage spillage cannot be ruled out. Existing sanitation infrastructure has reached the end of its lifespan and can only be kept operational with a high risk of sewer spills. New infrastructure needs to be constructed in order to prevent future sewer spills.





The long-term solution for the aging sewer network problem includes the elimination of sewer pump stations and the construction of a new gravity pipe next to the Klip and Vaal Rivers. The replacement of the 3 Emfuleni wastewater treatment plants (Sebokeng, Leeuwkuil, and Rietspruit), as well as Midvaal's wastewater treatment plants that serve Roshnee, are also included in the long-term sanitation infrastructure plans. The long-term plans aim to reduce sewer spillages and reduce the high bulk infrastructure costs associated with urban development in Emfuleni. The long-term solution is estimated to take at least 8-10 years to implement.

### EXISTING INFRASTRUCTURE

The information below is obtained from Civil Engineering Services Master Planning Volume 2 Sewage Disposal report.

The different elements of the sewage disposal scheme will be addressed separately:

### DRAINAGE AREAS

The Emfuleni Local Municipality sewage drain to four (4) wastewater treatment works, viz. Leeuwkuil WWTW`s, Rietspruit WWTW`s, Sebokeng WWTW`s, and the Midvaal WWTW`s. The Leeuwkuil WWTW`s drainage area has 34 sub-drainage areas, the Rietspruit WWTW`s has 3 sub-drainage areas, the Sebokeng WWTW`s has 6 sub-drainage areas and the Midvaal WWTW`s drainage area has 1 sub-drainage area inside the Emfuleni Local Municipality area, which either drain to a pump station or the water treatment works directly. Risiville, a portion of Duncanville and Lakeside Estates, which is located inside the Midvaal Municipal Area, Lenasia, Orange Farm, and Savanna City, located in the Johannesburg Municipal area, also drain to the Emfuleni sewer system.

Drawing number **SMN/2012/01** (attached as **Annexure E**) gives an overall indication of the Northern Drainage Area serviced by the Sebokeng WWTW`s.

### 6.3 Design norms and standards

The design norms and standards that have been utilized for this report are the:

- “Emfuleni Local Municipality (Metsi-A-Lekoa) Design Criteria and Internal Services Standards”
- “Guidelines for Human Settlement, Planning and Design”, published by the Building and Construction Technology Division of the CSIR (also known as the Red Book)
- The Standardized Specification for Civil Engineering Construction (SANS 1200), published by the South Africa Bureau of Standards
- SANS 1936 published by SABS Standards Division.

TABLE 6.1: DESIGN STANDARDS AND DESIGN PARAMETERS FOR SEWERAGE RETICULATION DESIGN		
PARAMETER	ELEMENT	GUIDELINES
Average dry weather Flow (ADWF)	High rise flats according to FSR	0.3/kl/erf/day
	Single Dwelling unit	0.9kl/day/ residential erf
Minimum Pipe diameter	Gravity sewers	160 mm
Minimum Velocity at full flow	Gravity sewers	0,7 m/s at half full
Peak Factor	Entire Development	2.5 maximum
Minimum Slopes for Pipes Diameters		1:80 at head
	100 mm	1: 120
	150 mm	1: 200
	200 mm	1: 300
	225 mm	1: 350
	250 mm	1: 400
	300 mm	1: 500
Pipe Material	Underground	Any SABS approved piping

Location of Sewers	In road reserves  Midblock	2,5 m from erf boundaries in a road reserve  1,3 m from erf boundaries or where possible
Manholes	Spacing  Material	80 m maximum  HDPE manhole /Pre-cast concrete rings  Concrete pre-heavy-duty cast-in-situ, with step  Irons and heavy-duty type concrete cover  Piping inside manhole Clay/Fibre Concrete
Pipe Covers		1.0m generally  1.4 under streets
Manhole sizes		0m to 1.2m deep: 0.9m inside diameter chamber, no shaft; 1.21m to 3.5m deep: 1.25 inside dia. chamber, no shaft; deeper than 3,5m: 1,5m inside dia chamber, no shaft  Erf connections 160mm dia minimum, SABS approved piping
Erf connections		110mm dia minimum, SABS approved piping
Erf connections slope		1.60 minimum
Erf connections depths		500mm minimum cover at buildings

It must be noted that these standards have been utilised to obtain an indication of the size of the services only and they must, therefore, be confirmed through a preliminary and final design process.

## 6.4 Sewage Flows

The following are assumed:

1. Demand rates are according to the Guidelines for Human Settlement.
2. Emfuleni Local Municipality (Metsi-A-Lekoa) Design Criteria and Internal Services Standards

TABLE 6.2: SEWER FLOW (ANNUAL AVERAGE DAILY FLOW)									
Zoning	No of Stands	No of Dwellings	Area (ha)	ADWF per Unit (l/day)	Unit	Average Sewage Outflow (l/day)	Average Sewage Outflow (ADWF)(l/s)	Peak Factor	PWWF (l/s)
Residential 2-3	1	462	3,2	300	Dwelling Unit	138600	1,604	2,5	4,010
Social	1		0,03	300	100m <sup>2</sup> of Gross Floor Area	900	0,010		0,010
Public Open Space	1		0,2						
<b>TOTAL</b>						<b>138600</b>	<b>1,604</b>		<b>4,021</b>
						<b>Total incl.15% Extraneous flow</b>			<b>4,624</b>

TABLE 6.3: SEWER FLOW (ANNUAL AVERAGE DAILY FLOW)									
Zoning	No of Stands	No of Dwellings	Area (ha)	ADWF per Unit (l/day)	Unit	Average Sewage Outflow (l/day)	Average Sewage Outflow (ADWF)(l/s)	Peak Factor	PWWF (l/s)
Residential 1	1	41	1,33	900	Dwelling Unit	36900	0,43	2,5	1,068
Residential 2	1	185	3,2	300	Dwelling Unit	55500	0,642	2,5	1,606
Social	1		0,03	300	100m <sup>2</sup> of Gross Floor Area	900	0,010		0,010
Public Open Space	1		0,2						
<b>TOTAL</b>						<b>55500</b>	<b>0,642</b>		<b>2,684</b>
						<b>Total incl.15% Extraneous flow</b>			<b>3,087</b>

Sewer design flow is estimated at approximately 80% of the water consumption plus 15% Stormwater infiltration.

The total sanitation demand calculated for the proposed development is approximately **4.624 l/s** for option 1 and **3.087 l/s** for option 2.

The chosen design standards used for the calculations above are:

Peak Flow Rate = Average Daily Flow Rate X Peak Factor

Peak Factor = 2.5 (Ref 2)

Limited calculations to determine the demand for the various services were prepared to obtain an indication of the size of the services. The actual sizes of the services will have to be determined through a final design process after the relevant details (final site layout plan, number of units, size and coverage of the various land uses, etc.) have been finalised.

## 6.5 Existing Sewer Pipe Networks

Information received from Emfuleni Local Municipality (Metsi -A-Lekoa)/ GLS master planning and the topographical survey indicates that there are existing sewer services in the vicinity of the proposed site but there are no existing services within the proposed site. New sewer reticulation design within the erf and in the road, reserves will be constructed for this proposed development. See attached in **Annexure E**, Emfuleni Local Municipality Master Plan **SMN 2012** drawing number **SMN-2012-01-03**.

The existing sewer masterplan drawings show that there are existing Sewer pipes with various pipe sizes in the Evaton West Extension4 area. The proposed development layout plan/site development plan (SDP) is currently being prepared in order to establish the suitability and capacity of the services for the connection point.

Additional Studies such as the GLS masterplan will be required to determine the capacity analysis of the existing pipes once an SDP has been completed and approved.



## 6.6 Capacity analysis of Network pipes

The topographical survey done for the proposed development confirms that there is existing sewer reticulation in the area. A new proposed sewer reticulation will be constructed within the proposed site. Emfuleni Local Municipality Master Plan and GLS water and sewer masterplan department have records of the existing Sewer network in this area.

However, it is therefore recommended that a GLS Masterplan report be requested to analyse the effect the proposed development will impose on the existing network pipes and determine the required upgrades.

See **Annexure E** for the Emfuleni Local Municipality Master Plan existing sewer reticulation layout.

## 6.7 Proposed Sewer Network

The proposed internal sewer reticulation network is shown on **Annexure F**.

It must be noted that the total pipe length of the entire layout plan and correct pipe size of the Sewer services will, therefore, be confirmed through a preliminary and final design process when the proposed layout is completed and approved.

The pipes will be 160 mm diameter uPVC (Heavy Duty) Class 34 and the manholes will be 1 000mm to 1500mm diameter precast rings with concrete covers.

The length of internal Sewer pipelines as per the current proposed draft layout for this project approximately 0,993km. The proposed designs were done according to the yield provided from the draft proposed layout.

The Emfuleni Local Municipality (Metsi-A-Lekoa) and Red book design norms were considered in the design and placement of the reticulation network of the internal sewer layout.

## 6.8 Pipe Materials

The following pipe materials are acceptable for sewers:

### Pipe material

- Any SABS approved piping

### Elements:

- SABS approved piping with minimum size 160mm diameter.
- Concrete manholes with a spacing of not more than 80m, installed at all direction changes and mains intersections
- 160mm dia. connection to all erven with a depth to ensure drainage of 100% of the stand.
- Erf connections end 1m inside the erf

## 6.9 Standard Details

SANS 1200 (together with other applicable details) details will be used to prepare project-specific details and be submitted to Emfuleni Local Municipality Metsi-A–Lekoa for their approval.

The provision of SANS 1936 is also applicable to this project.

## 6.10 Proposed Upgrades

The proposed development lies within a serviced area with the existing sewer network consisting of various pipe sizes. Most of the pipes in the network have sufficient capacity to accommodate the current sewer discharge. An upgrade to the existing sewer network will, therefore, be necessary to accommodate the proposed development. The extent of such an upgrade will be determined during the design stages of the project.

A new internal sewer reticulation network for the proposed development will be designed in line with the approved site development plan. This will connect to the existing sewer network in line with the Emfuleni Local Municipality (Metsi-A–Lekoa) for their approval water and sanitation guidelines.



## 7 ROADS

### 7.1 Authority and Provider Arrangements

The Emfuleni Local Municipality Roads and Stormwater Department is responsible for the provision and maintenance of roads and stormwater infrastructure in its area of jurisdiction.

### 7.2 Traffic Impact Study

A traffic impact assessment (TIA) is being prepared and the existing 2020 scenario, the future 2025 scenario on the existing geometry, and the 2025 future scenario on the upgraded geometry will be analysed.

The purpose of this report is to assess the traffic impact at the intersections surrounding the development, due to the additional traffic that the development will generate together with measures to mitigate the impact.

### 7.3 Access

The existing and future proposed road networks in close proximity of the proposed development are summarized in Table 7.1 below and attached in **Annexure A** as Locality Map for Existing Major Road Networks.



TABLE 7.1: EXISTING ACCESS		
Road Name	Class	Description
Golden Highway (R553)	3	District Distributor (Main Road) to the east of the proposed Site.
Moleli Street/Pilansburg Road	4	Local Distributor to the southern direction of the site
Unnamed Road	5	Access street which forms the eastern boundary of the proposed site.

Evaton West – Project F development will gain access to east from the existing unnamed Street, which connects to Moleli Street/Pilansburg Road to the south of the proposed site. Moleli Street/Pilansburg road connects to Golden highway (R553) which is located to the far eastern direction and is approximately 0.85km from the proposed site.

The layout showing Major existing and future proposed road networks for this area is attached in **Annexure A** Locality Map.

#### 7.4 Design Standards

The design norms and standards that have been utilized for this report are the:

- Guidelines for Human Settlement Planning and Design, CSIR (Redbook) (Reference 1)
- Roads and Stormwater standard details, Emfuleni Local Municipality (Reference 2)
- Any relevant published SANS documents.

The design parameters that will be utilized for geometric design and pavement structures and requirements for civil services for this report are per the Guidelines for Human Settlement Planning and Design compiled by the Department of Housing and Construction Technology (2000) and other approved design specifications.

It must be noted that these standards have been utilised to obtain an indication of the size of the services only and they must, therefore, be confirmed through a preliminary and final design process.

TABLE 7.2: DESIGN PARAMETERS AND DESIGN STANDARDS FOR ROADS	
Class	4a, 4b, 5a, 5b and 5c
Road Width	7.5m, 7m, 6m, 5.5m, and 5m
Road Reserve	22m, 20m, 16m, 13m, and 12m
Pavement Layers	No layer within the pavement structure shall be less than 125mm
Cross fall/Camber	Single cross fall (3%)
Longitudinal Slope	Minimum: 0.5%
Kerbing	Fig 3 barrier or type Fig 8b Mountable
Pedestrian Walkways	No pedestrian walkway shall be less than 1.2m when paved
Verges	Minimum verge width shall be 2.7m
Access to Erven	Minimum stacking distance at entrances is to be between 4.5m edge of road and gate

The classification of roads is shown in the table below:

TABLE 7.3: CLASSIFICATION OF ROAD		
CLASS NAME	DESIGN TYPOLOGY	CLASS NO.
Collector Street, commercial	Commercial Major Collector	4a
Collector Street, Residential	Residential Minor Collector	4b
Local Street, Commercial	Commercial access Street	5a
Local Street, Residential	Local Residential Street	5b
Walkway Non-Motorised Priority	Pedestrian only	6a and 6b

## 7.5 External Road and Intersection Upgrades Required

There are several existing Major and Minor roads located in close vicinity to the proposed site namely: (N1) to the far western direction of the proposed site, (R553) Golden Highway to the far eastern direction and Randfontein (R28) located to the far southern direction of the proposed site, Moleli Street/Pilansburg Road to the far Southern direction of the proposed site. Information regarding possible Intersection upgrades will be detailed in the Traffic Impact Assessment (TIA).

See Locality Map for external roads in **Annexure A**.

## 7.6 Internal Roads

The internal road network is in fairly bad condition and consists of surfaced roads and gravel roads are Class 4 and Class 5 roads with a road reserve ranging between 10 meters and 30 meters in width. New internal roads and parking for the proposed development will be designed in line with approved site development plan, traffic impact assessment, and Emfuleni Local Municipality Roads and Stormwater guidelines.

## 8 PUBLIC TRANSPORT & NON-MOTORISED TRANSPORT (NMT)

### Existing Public Transport and NMT Facilities

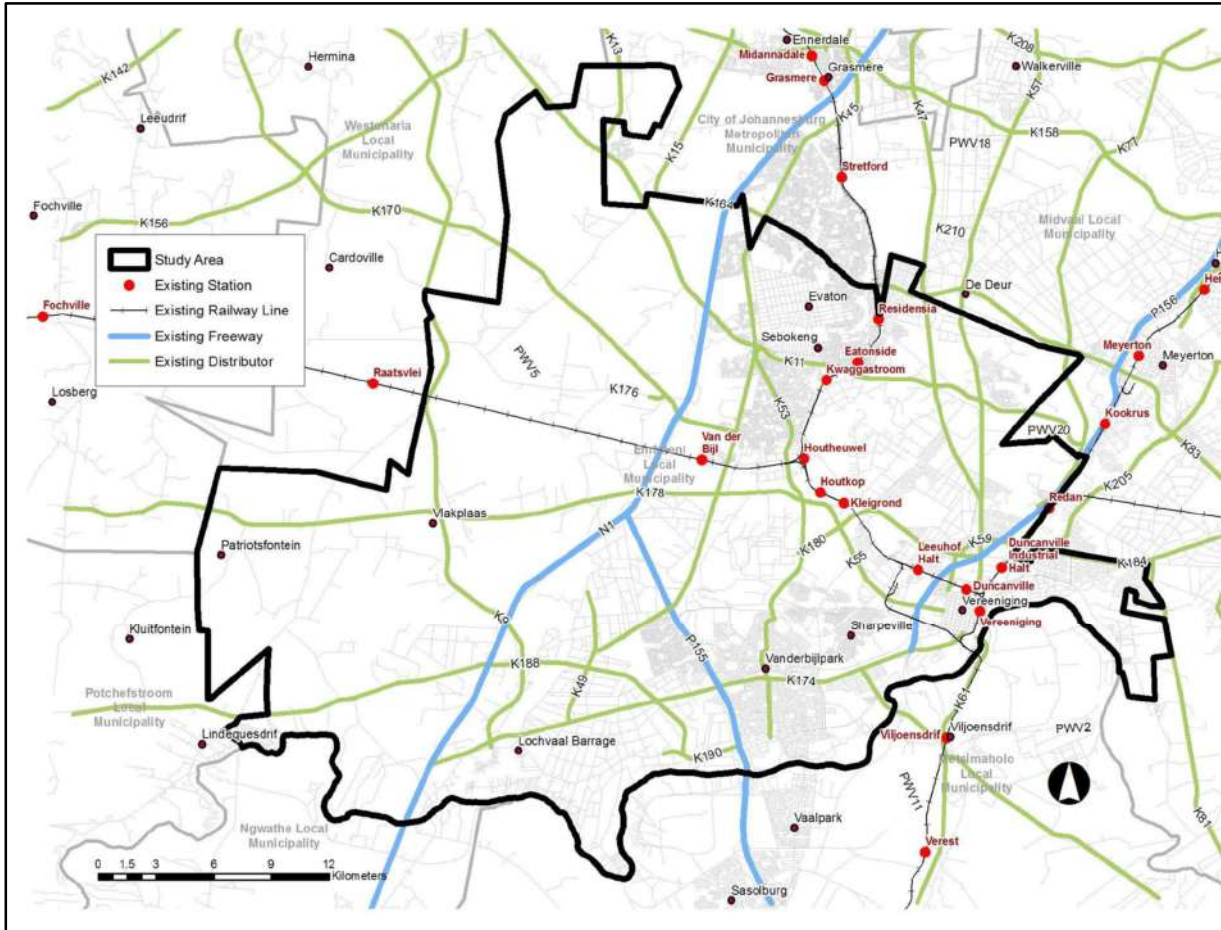
There is 3 formal taxi rank in Evaton 2 (Two) along Adams Road approximately 9.5 km away and one in Sebokeng along Vilakazi street which is 9.3km away from Evaton West – Project F. There are no Public transport lay-bys on roads located along these routes There are no formal pedestrian sidewalks located along the development boundary.

One is mindful of the following:

- The likelihood exists that residents and workers of the proposed development would be making use of public transport for recreational, business, or employment purposes.
- According to the NHTS, 1.5km is the ideal limit that one should expect a pedestrian to walk to a public transport facility.

The information below was obtained from Emfuleni Spatial Development Framework.

Emfuleni is served by a rail network that connects Emfuleni to neighboring areas in Gauteng and the Free State. As depicted by **Figure 8.1**, this rail network consists of 3 lines. The first rail line stretches along with the P156 (R59) freeway and links Sasolburg to Vereeniging, Meyerton, and Germiston. This rail line is primarily a freight line but does contain commuter railway stations along the line. The second railway line stretches from Sasolburg, via Vereeniging towards Sebokeng, Orange Farm, and Johannesburg.



**FIGURE 8.1: TRANSPORT NETWORK**  
(EMFULENI SPATIAL DEVELOPMENT FRAMEWORK 2017-2025)

**METRORAIL**

Emfuleni is served by a commuter rail network that connects Emfuleni to neighbouring areas in Gauteng. This commuter rail network consists of 2 lines. The first rail line stretches from Vereeniging to Meyerton towards Germiston. This commuter railway line contains commuter railway stations, with prominent stations being the Vereeniging Station, the Duncanville Industrial Halt Station, and the Meyerton Station.

The use of this railway line as a commuter railway line is limited due to fragmented urban development and low residential densities along this railway line. The second commuter railway line stretches from Vereeniging towards Sebokeng, Orange Farm, and Johannesburg. Prominent stations along this line



are Houtheuwel Station, Residentia Station, and Stredford Station. This railway line traverses densely built-up urban areas, as is found in Sebokeng and Orange Farm, and it, therefore, fulfills a significant commuter railway line function.

However, the full potential of this railway line to function as a commuter railway line is impeded by the following factors:

- Large undeveloped areas between Vereeniging and Sebokeng, with low residential densities to support commuter rail.
- The lack of urban development on both sides of the railway line, in particular in the Sebokeng and Evaton region.
- Gaps in the spacing of commuter railway stations, in particular on the stretches of the railway line between the Leeuhof Halt and Kleigrond Stations and between the Houtheuwel and Kwaggastroom Stations.

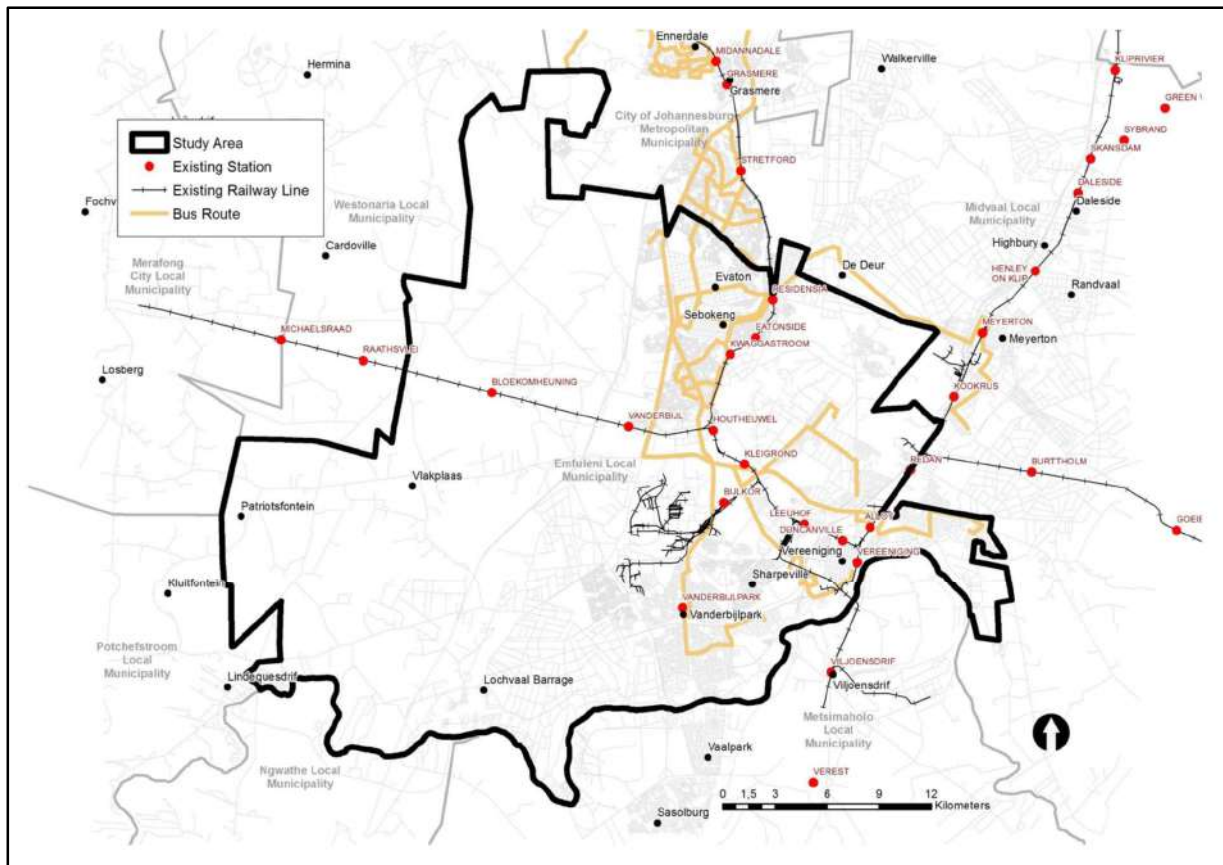
### **BUS NETWORK**

Emfuleni comprises an extensive bus network that serves the municipal area. A prominent bus route is the bus route linking Vereeniging to Sebokeng along with the K53 (Moshoeshoe Road) and the K45 (Golden Highway). This bus route links Evaton and Sebokeng to the Vereeniging CBD and the industrial areas located within Vereeniging. Other bus routes worth mentioning are the bus route linking Vereeniging to Meyerton, the bus route linking Vereeniging to Residentia Station, and the Bus route linking Evaton to Meyerton. Linking the bus network to the commuter rail network will enable the bus network to act as a feeder system to the commuter rail network. This will give Emfuleni access to an integrated hierarchy of public transport modes servicing different parts of the municipal are and it will greatly improve the current public transport network serving Emfuleni.

### **MINI-BUS TAXI NETWORK**

Emfuleni comprises an extensive minibus taxi network. This network largely uses the same routes and serves the same areas within the municipal area that the bus network does. The only significant exception is that a minibus taxi route links the Vanderbijlpark CBD to Sebokeng via Mittal Steel; a route that the bus network does not serve. A disadvantage of the minibus taxi network is that the routes of

this network are not fixed and can, therefore, change in the future. Therefore, the minibus taxi route does not indicate fixed locations where Emfuleni can develop. Bus routes and in particular commuter railway lines provide a much better indication of where to densify Emfuleni.



**FIGURE 8.2: TRANSPORT NETWORK**  
(EMFULENI SPATIAL DEVELOPMENT FRAMEWORK 2017-2025)

### *Public Transport Development*

As was mentioned in the status quo section of this report, Emfuleni is served by a commuter rail network that connects Emfuleni to neighbouring areas in Gauteng. Prominent station along this line is Houtheuwel Station, Resdentia Station, and Stredford Station. Currently, the use of this railway line as a commuter railway line is limited due to fragmented urban development and low residential



densities along this railway line. Urban development along the Vereeniging-Sebokeng-Orange Farm commuter railway line will provide the necessary commuter thresholds needed to ensure the viable operation and expansion of this commuter railway line.

With regard to further developing the Vereeniging-Johannesburg commuter railway line, it is proposed the 2 new stations are developed along this line to better serve envisaged urban expansion areas within Emfuleni. The first proposed station is located at the proposed Sonlandpark Regional Node and will serve the Sonlandpark and Boipatong areas. The second proposed station is located north of Houtheuvel Station and will better serve the envisaged Lethabong extensions. The additional stations along this commuter rail line will provide opportunities for Transit-Oriented Development (TOD). This will involve focusing on new higher density, mixed-use development around these commuter rail stations. The layout of the land uses in relation to the stations is of critical importance because it will determine the level of access that commuters will have to these stations. It should be noted that the station proposals above area Emfuleni SDF proposals and not PRASA proposals at this stage.

In addition to the above, a Strategic Public Transport Network (SPTN) is proposed by the Emfuleni SDF that will serve urban areas within Emfuleni that are not served by the Vereeniging-Johannesburg commuter railway line. Two SPTN routes have been identified. The first route links Vereeniging to Sebokeng along the K53 (Moshoeshoe Road) and the K45 (Golden Highway) and then turns eastward at Evaton towards Residentia Station. This SPTN route links Evaton and the Sebokeng CBD to the Vereeniging CBD. This route can be extended southwards across the Vaal River up to Sasolburg. The second SPTN route utilizes Barrage Road (K147) and links the Vanderbijlpark CBD, the Bedworthpark Regional Node, the proposed River City Node, the Vereeniging CBD, and the Three Rivers Node. This route can be extended northeastwards up to Meyerton.

A Strategic Public Transport Network (SPTN) is proposed by the Emfuleni SDF that will serve urban areas within Emfuleni that are not served by the Vereeniging-Johannesburg commuter railway line. Two SPTN routes have been identified. The first route links Vereeniging to Sebokeng along the K53 (Moshoeshoe Road) and the K45 (Golden Highway) and then turns eastward at Evaton towards Residentia Station. This SPTN route links Evaton and the Sebokeng CBD to the Vereeniging CBD. This route can be extended southwards across the Vaal River up to Sasolburg. The second SPTN route



utilizes Barrage Road (K147) and links the Vanderbijlpark CBD, the Bedworthpark Regional Node, the proposed River City Node, the Vereeniging CBD, and the Three Rivers Node. This route can be extended northeastwards up to Meyerton.

Having a longer-term view of public transport network development will enable municipal planners to develop a land-use structure that can support the envisaged public transport network in the future. Municipal planners can promote the development of activity nodes at commuter railway stations and envisaged SPTN/BRT stations that would (a) apply higher land use densities, (b) a greater land-use mix and (c) a pedestrian-oriented structure.

These are all critical elements needed to support the viable operation of a public transport system and station.

Table 8.1: PROPOSED PUBLIC TRANSPORT ROUTES, STATIONS, AND LAND USE INTEGRATION			
SPTN ROUTE/ RAILWAY LINE	NODAL AREA	STATION OR RANK OR STOP	INTEGRATION PRINCIPLES
Proposed Golden Highway SPTN route	Evaton Regional Node	The proposed bus station and minibus taxi rank within a node	Develop higher-density residential uses to support the proposed bus station and minibus taxi rank Design and construct pedestrian walkways to facilitate access to the proposed bus station and minibus taxi rank
Vereeniging-Johannesburg commuter railway line	Sebokeng CBD	The proposed bus station and minibus taxi rank within a node	Design and locate mixed land use at the proposed bus station and minibus taxi rank Design and construct pedestrian walkways to facilitate access to the proposed bus station and minibus taxi rank

(Source: *Urban Dynamics Gauteng, 2017*)

## 9 STORMWATER MANAGEMENT

### 9.1 Authority and Provider Arrangements

The Emfuleni Local Municipality Roads and Stormwater Department is responsible for the provision and maintenance of roads and stormwater infrastructure in its area of jurisdiction.

### 9.2 Design Norms and Standards

The design criteria will be derived from the following:

- The Guidelines for Human Settlement Planning and Design (Red Book) and
- SANRAL Drainage Manual 5th Edition.

The Rational Method will be used to calculate the stormwater runoff for this site. The stormwater will be drained along the road reserve, mainly in open, unlined V-drain channels, with underground piped systems only where surface drainage is not possible or deemed to be impractical.

Designs will be such that the 1:5-year minor storm and the 1:25 year major storm are accommodated in the canals and the road structure without overtopping.

**TABLE 9.1: DESIGN PARAMETERS AND DESIGN STANDARDS FOR STORMWATER**

Major system design frequency	25 year
Minor system design frequency	5 year
Minimum Pipe size within road reserves	450mm diameter
Maximum manhole spacing	100m
Minimum pipe class for 450mm and 525mm diameter	100D
All other classes to be designed	
Maximum velocity to be not more than	5m/s in pipes 3m/s in road
Slope to be not less than	1% in order to self-clean
No hidden junction box will be allowed	
Pipe Material	Concrete interlocking

### 9.3 Existing Stormwater Systems

There is no existing stormwater infrastructure on existing areas adjacent to the planned development. The new proposed stormwater systems will discharge to the nearest outlets and natural watercourses.

### 9.4 Proposed Internal Stormwater

No existing stormwater exists within the proposed development area. The proposed stormwater reticulation for the site will be designed as per the design criteria described in Section 9.1.

A conceptual stormwater management plan for the development will be required. Stormwater will be managed on the proposed site and outlet onto the roads. Stormwater run-off from the roads will be collected using an underground pipe system and be conveyed into the nearest outlets, and natural watercourses.



Stormwater pipes capacities must be able to cater to minor storms of 1 in 5 years whilst both roads and stormwater pipes should cater to major storms 1 in 25 years. The stormwater master plan must provide for a level of attenuation and pollution control should stormwater outlet to the natural watercourse.

The minimum pipe sizes will be 450mm within the site and 600mm diameter in road reserves. The total pipe length for the proposed stormwater is approximately 0.920 km.

See **Annexure I** for Proposed Stormwater Reticulation layout.

## 10 PROJECT ESTIMATES AND BUDGET

The estimated total construction cost for this project is **R 30 981 887.89** for option 1 and **R 17 725 717.88** for Option 2 which is inclusive of 25% contingencies and exclusive of VAT.

The payment of the Works would be re-measurable and would be done monthly during construction. A detailed bill of quantities would be included in the detailed design report. The table below indicates the preliminary cost estimates:

TABLE 10.1: SUMMARY OF PRICING SCHEDULE (OPTION 1)		
SECTION	DESCRIPTION	AMOUNT
1	Water Network (Internal Reticulation)	R1 912 730,82
2	Sewer Network (Internal Reticulation)	R3 331 209,42
3	Roads	R10 889 617,20
4	Stormwater Network	R1 919 060,22
5	External and Site Works	R3 500 000,00
	<b>Total Schedule of Prices</b>	<b>R21 552 617,66</b>
	25% Contingencies	R5 388 154,42
	<b>Subtotal</b>	<b>R26 940 772,08</b>
	15% VAT	R4 041 115,81
	<b>Estimated Order Magnitude</b>	<b>R30 981 887,89</b>

TABLE 10.2: SUMMARY OF PRICING SCHEDULE (OPTION 2)		
SECTION	DESCRIPTION	AMOUNT
1	Water Network (Internal Reticulation)	R935 664,86
2	Sewer Network (Internal Reticulation)	R1 629 552,66
3	Roads	R5 326 955,60
4	Stormwater Network	R938 761,06
5	External and Site Works	R3 500 000,00
	<b>Total Schedule of Prices</b>	<b>R12 330 934,18</b>
	25% Contingencies	R3 082 733,55
	<b>Subtotal</b>	<b>R15 413 667,73</b>
	15% VAT	R2 312 050,16
	<b>Estimated Order Magnitude</b>	<b>R17 725 717,88</b>



## 11 CONCLUSIONS AND RECOMMENDATIONS

### 11.1 Conclusions

- Additional services (Roads and stormwater, water, and Sewer) would need to be installed to accommodate the new proposed development layout and will have to be designed under municipal guidelines and standards.
- The Langerand Reservoir will supply the newly proposed development. Currently, there is no spare capacity at the Langerand but the introduction of a new supply zone with reservoir TWL 1570 m will remove all pressure on the system.
- The Langerand reservoir will provide storage for the 1570 m supply zone.
- Leeuwkuil wastewater treatment works need to be upgraded and rehabilitated.
- The impact in which this new development will have on the recently constructed addition will have to be addressed on a detailed GLS report.
- Additional capacity analysis of the network pipes will be required with a GLS report to determine if and any upgrades that are required on the network pipes for both the water and sewer pipes. At the time of this report, the time and budget did not allow for this level of investigation.
- A conceptual stormwater management plan for the development will be required. Stormwater will be managed on the proposed site and outlet onto the roads. Stormwater run-off from the roads will be collected using an underground pipe system and be conveyed into the nearest outlets, and watercourse.
- A traffic impact assessment is required to determine any additional capacity required on the roads.



## 11.2 Recommendations

Significant parts of the sanitation system infrastructure, including Leeuwkuil wastewater treatment works, need to be upgraded and rehabilitated. A new water supply zone with reservoir TWL 1570 will need to be introduced to increase the capacity of the Langerand Reservoir.

It is recommended that this report be approved to enable us to proceed to the next stage of Design Development.

# ANNEXURE A

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PROPOSED DRAFT LAYOUT AND LOCALITY MAP



## ANNEXURE B

---

GEO TECHNICAL INVESTIGATION REPORT AND ENGEODE DATA  
REQUEST

# ANNEXURE C

---

EMFULENI LOCAL MUNICIPALITY (METSIA-A-LEKOA)/GLS EXISTING  
WATER MASTER PLAN LAYOUTS

# ANNEXURE D

---

PROPOSED WATER RETICULATION LAYOUT

# ANNEXURE E

---

EMFULENI LOCAL MUNICIPALITY (METSIA-A-LEKOA)/GLS EXISTING  
SEWER MASTER PLAN LAYOUTS

# ANNEXURE F

---

PROPOSED SEWER RETICULATION LAYOUT

# ANNEXURE G

---

PROPOSED ROADS LAYOUT

# ANNEXURE H

---

## ENVIRONMENTAL SCREENING REPORT

# ANNEXURE I

---

PROPOSED STORMWATER RETICULATION LAYOUT



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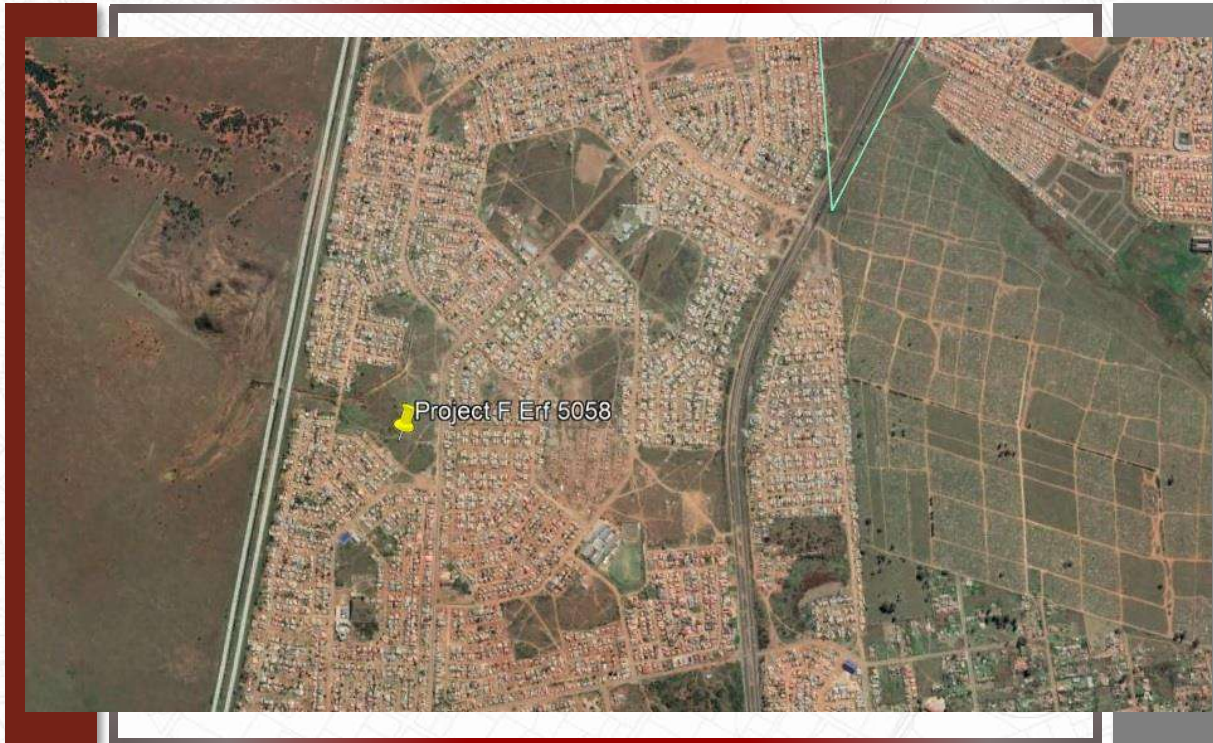
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**APPENDIX D**  
Residential Market Study



REPORT PREPARED FOR:  
Phumaf Consulting Engineers / Phumaf Holdings

February 2020



## GAUTENG RAPID LAND RELEASE PROGRAMME

### Evaton West Project F (Erf 5085, Ext. 7) Residential Market Study



LEADERS IN ECONOMIC & REAL ESTATE MARKET I



#### Market Studies

Retail Studies | Centre  
Repositioning |  
Consumer Surveys



#### Special Projects

Mixed Use Developments |  
Inclusionary Housing Projects |  
Economic Impact Assessments



#### Africa & Far East

Real Estate Feasibility Studies |  
Economic Assessments | Socio-  
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The information contained in this report has been compiled with the utmost care and accuracy within the parameters specified in this document. Any decision based on the contents of this report is, however, the sole responsibility of the decision maker.

## SYNOPSIS – PROJECT F

### KEY INDICATORS

	Sub	Mid	High	Exceptional
<b>LOCATION PROFILE</b>				
Site Rating	Mid			
<b>ECONOMIC PROFILE</b>				
Economic Character	Informal	Developing	Formal	
Sector Orientation	Primary	Secondary	Tertiary	
Economic Growth	Negative	Low	High	
<b>LABOUR PROFILE</b>				
Skills Profile	Low-skilled	Semi-skilled	Skilled/ Highly Skilled	
Labour Absorption	Low	Mid	High	
Labour Character	Informal	Evolving	Formal	
<b>SOCIO-ECONOMIC PROFILE</b>				
Education Levels	None	Primary	Secondary	Tertiary
LSM Profile	Low	Mid	High	
Income Profile	Low	Mid	High	
Population Growth	Negative	Low	High	
Income growth	Negative	Low	High	
<b>REAL ESTATE VALUE AND PRICING PROFILE</b>				
Property Values	Low	Mid	High	
Transaction Pricing	Low	Mid	High	
Area Rental Profile	Low	Mid	High	

### DEVELOPMENT OPTION AND AREA COMPATABILITY

	Option 1: Social Housing
Site rating	Moderate
Economic Base & Drivers	Moderate
Labour Profile	Moderate
Socio-Economic Profile (Demand base)	Moderate
Real-Estate Value & Pricing Profile	High
Tax Base Impact	Positive

### DEVELOPMENT RECOMMENDATION

In terms of the market data contained in the data analysis presented social housing represents a reasonably good fit, considering the affordability and rental profile of the market area. The residential environment is, however, dominated by freestanding freehold houses. No medium to higher density residential developments are located within the market area (specifically 3 to 4 storey walk-up units). Site layout and design considerations need to be sensitive to these realities. A site and service development scheme might be preferred by the consumer market. A case could be made for medium density rental stock in proximity to employment opportunities and commercial developments.

### PREFERRED OPTION: SOCIAL HOUSING UNITS

450 housing units

Market Entry: 2020+

Unit Configuration	Unit Size (sqm)	Rental Bracket (Rand/ month)	% of Stock
Bachelor	30 to 35 sqm	R400 to R700	25% to 30%
1-Bedroom	35 to 40 sqm	R700 to R1 300	30% to 35%
2-Bedrooms	40 to 45 sqm	R1 300 to R2 600	20% to 25%
2 to 3 bedrooms	45 to 60 sqm	R2 600 to R5 500	10% to 15%

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**INTRODUCTION AND  
LOCATION  
ORIENTATION**

**1**

## SECTION 1: INTRODUCTION AND LOCATION ORIENTATION

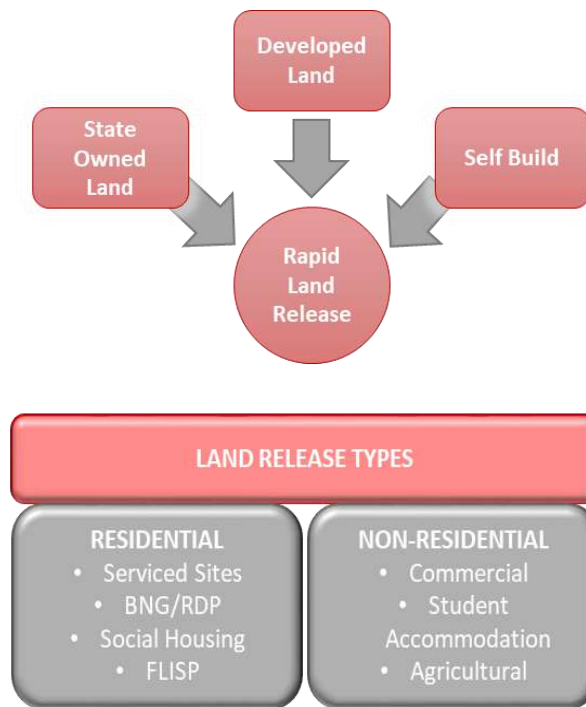
### 1.1 INTRODUCTION & BACKGROUND

**DEMACON Market Studies** was commissioned by Phumaf Consulting Engineers to conduct highest and best use option analysis, including socio-economic impact assessments, for various sites as part of the Gauteng Rapid Land Release Programme (GRLRP), with HAD as the ultimate client.

Evaton West Project F requires the assessment of social housing (residential 4) as development option on a land portion in Evaton West Extension 7 (Erf 5085).

The **GRLRP** originated due to persistent challenges of rapid urbanisation and in-migration facing the greater Gauteng City Region – and ultimately placing enormous pressure on service delivery and housing. Access to land has been a big challenge for Gauteng residents, particularly for the purposes of agriculture, human settlement, economic production and industrialisation.

The GRLRP was therefore developed to coordinate delivery of housing products for the entire Gauteng City Region Housing Demand across all income groups (indigent and non-indigent), with the focus on utilising and repurposing state-owned land as the main source of land for the



programme. The GRLRP also need to ensure that, on top of the housing needs of the region, the City Region is also in need of land for agriculture, economic development and industrialisation and therefore also need to be prioritised. The GRLRP has also resolved to place focus on availing serviced stands for self-build projects and to capacitate beneficiaries to build for themselves.

### 1.2 INTERPRETATION OF PROJECT SCOPE

The purpose of the study is to analyse the development potential of social housing development as an optimum, market-based land use for the proposed development site, taking cognisance of local market area realities in the following steps:



DEMACON's approach is purely market based and we applied our extensive involvement as well as recent research and market intelligence on the subject matter to complement the market study.

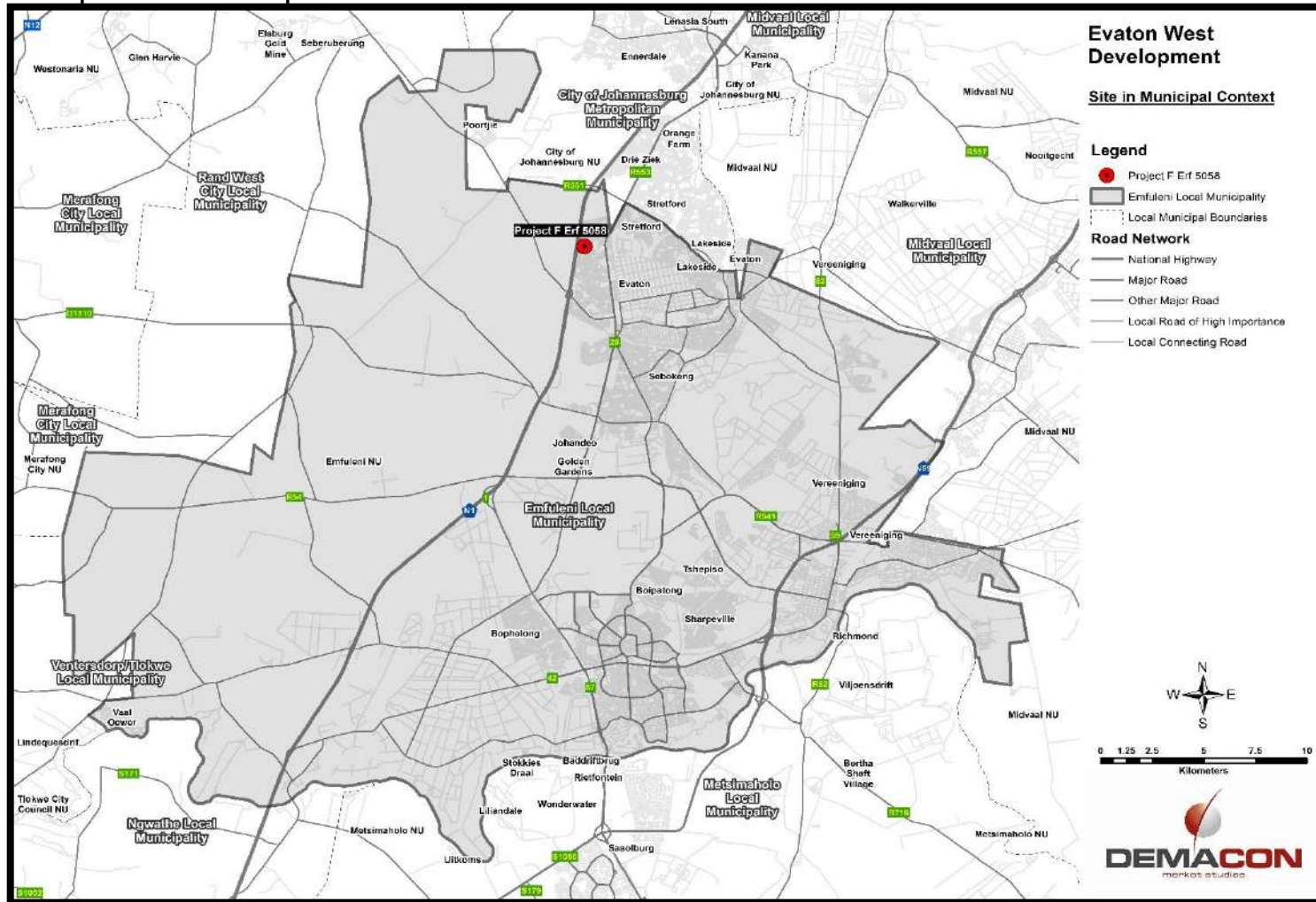


### 1.3 LOCATION ORIENTATION

#### MUNICIPAL CONTEXT

The proposed development site is located within Evaton West Extension 7, within Emfuleni Local Municipality – Refer to Map 1.1. It is located within the northern parts of the local municipal area between the freeway and the Golden Highway.

Map 1.1: Project F - Development site in municipal context



## SITE CONTEXT

Evaton West Extension 7 is located:

- ✓ Within the northern parts of the Emfuleni Local Municipal Area.
- ✓ Within the Sedibeng District, Gauteng Province.
- ✓ In township surrounded by other townships, e.g. Sebokeng, Orange Farm, Boipatong, Sharpeville, Boitumelo, Polokong, Golder Gardens, Palm Springs etc.

The development site is characterised by:

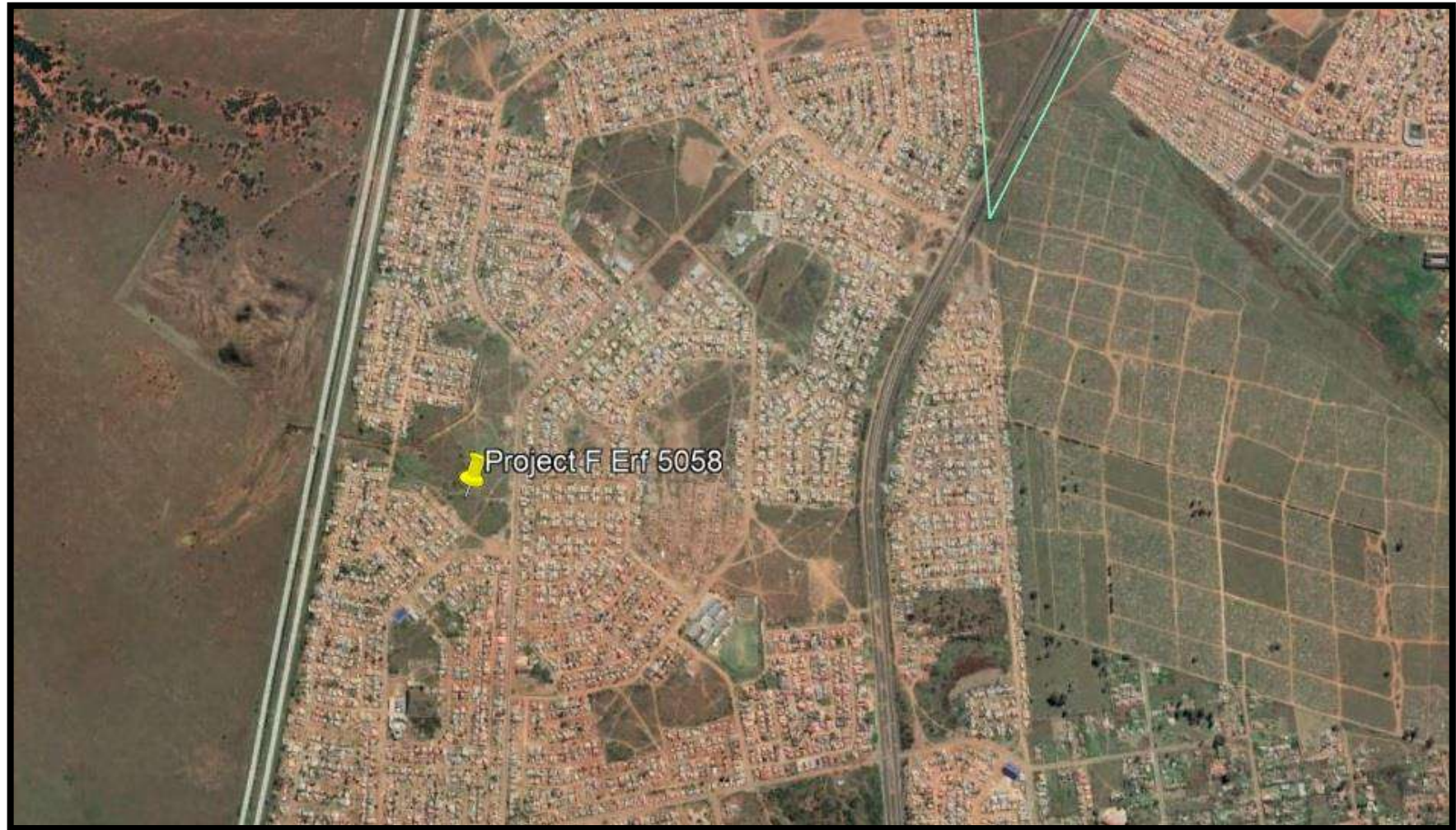
- ✓ The proposed development site measures 3.84 ha
- ✓ The proposed land release is towards 450 high density residential units.
- ✓ Regional access to the area is provided by the N1, Golden Highway (R553) and the R551.
- ✓ Access to the R553 is approximately 1.7km or 4-minutes' drive from the development site.
- ✓ Access to the N1 is approximately 16.3km or 20 minutes' drive from the development site.
- ✓ Local accessibility is enabled by various collector roads.
- ✓ Despite accessibility, the township is remotely located, with vast distances from major employment nodes.
- ✓ The surrounding area is characterised by formal residential units – in the form of freestanding houses on separate stands. Most of these stands have additional houses or backyard rental units.
- ✓ No medium to higher density residential developments occur within the surrounding region.
- ✓ Informal dwelling units are located towards the eastern and south-eastern parts of the delineated trade area.
- ✓ The surrounding region is characterised by moderate levels of residential growth.
- ✓ The surrounding region reflects a lower to lower-middle consumer market and associated house price trends.

- ✓ A number of formal retail centres are located in proximity of the development site.
- ✓ The larger retail formats within the trade area include:
  - Evaton Mall (36 169 sqm)
  - Palm Springs (19 085 sqm)
  - Evagold Centre (12 542 sqm)
  - Mandela Square (9 539 sqm).
- ✓ The smaller retail formats within the trade area include:
  - Spar – Stetford (1 508 sqm)
  - Fair Price (1 750 sqm)
  - Big Save (3 600sqm)
  - Usave (4 500 sqm).
- ✓ Another centre is also proposed within the southern part of the trade area, Sebokeng Mall (6 000 sqm).
- ✓ Residential uses are further supported by a range of educational facilities, medical facilities and other social amenities.

The following set of maps (**Maps 1.2 to 1.8**) illustrates the development site within the local context in terms of:

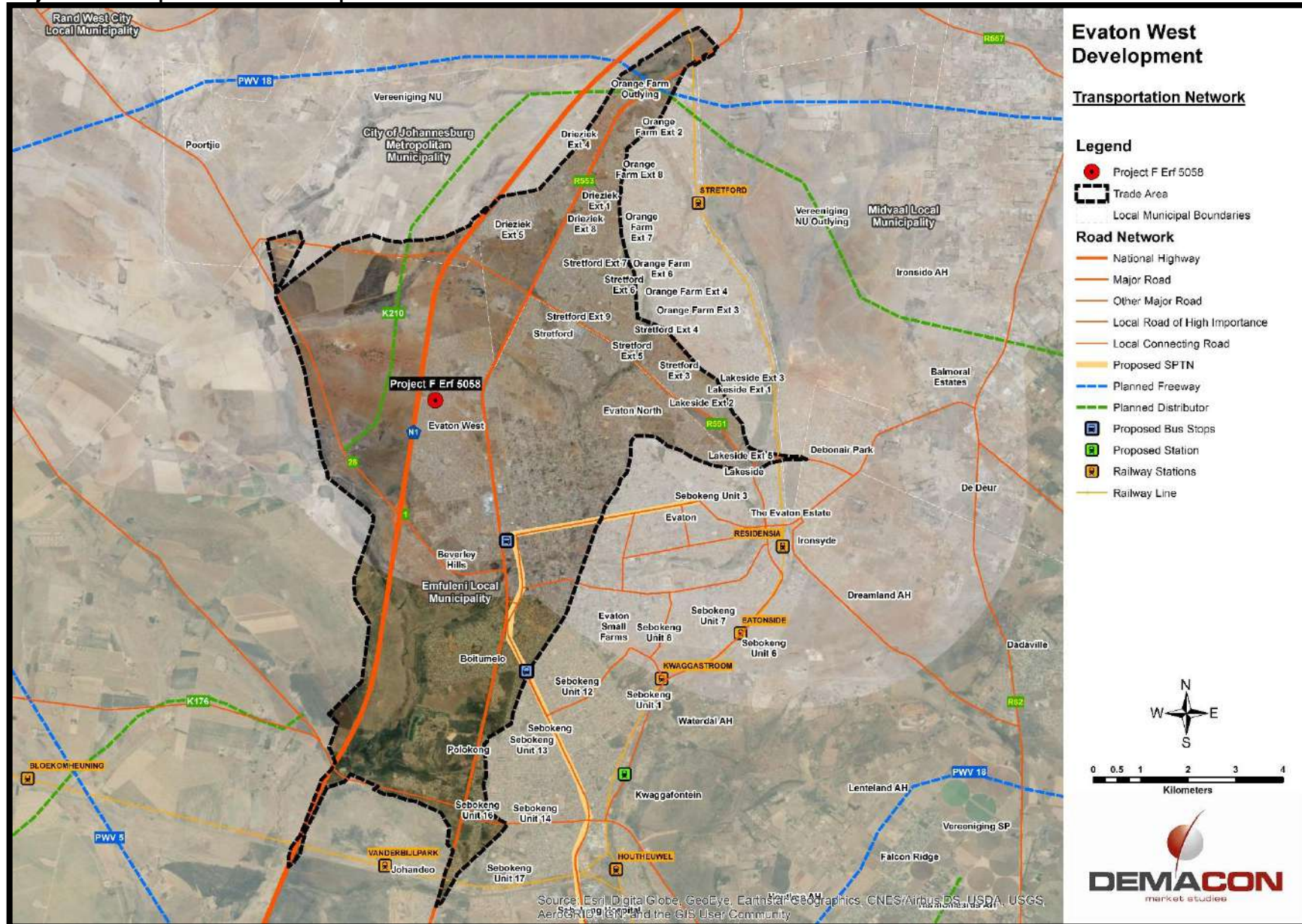
- ✓ Aerial Image of the development site in local context
- ✓ Local contextual overview
- ✓ Transportation network
- ✓ Surrounding employment nodes
- ✓ Residential typology
- ✓ Formal retail centre supply
- ✓ Social and educational facilities.

Map 1.2: Project F - Development Site – Aerial Photograph

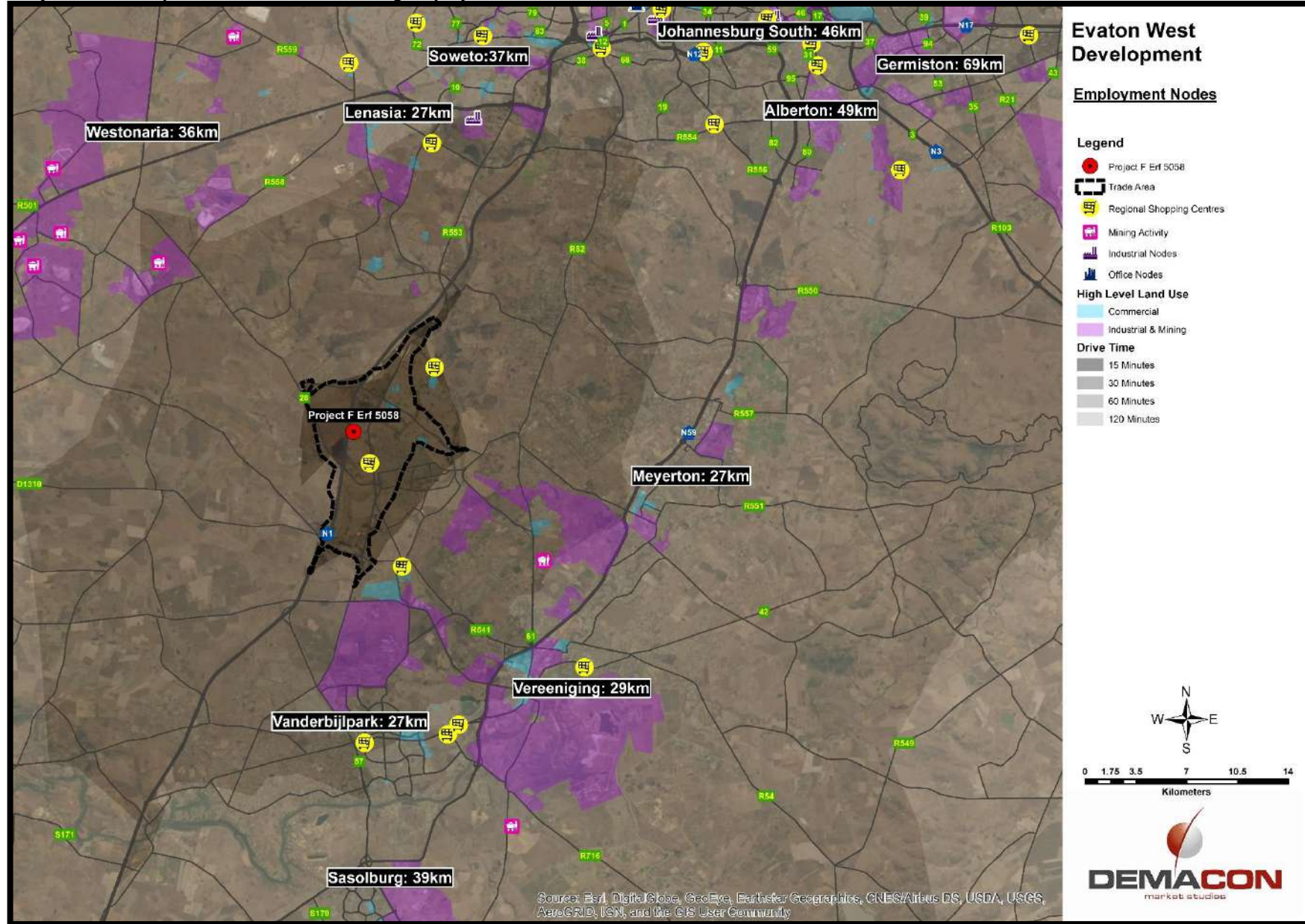




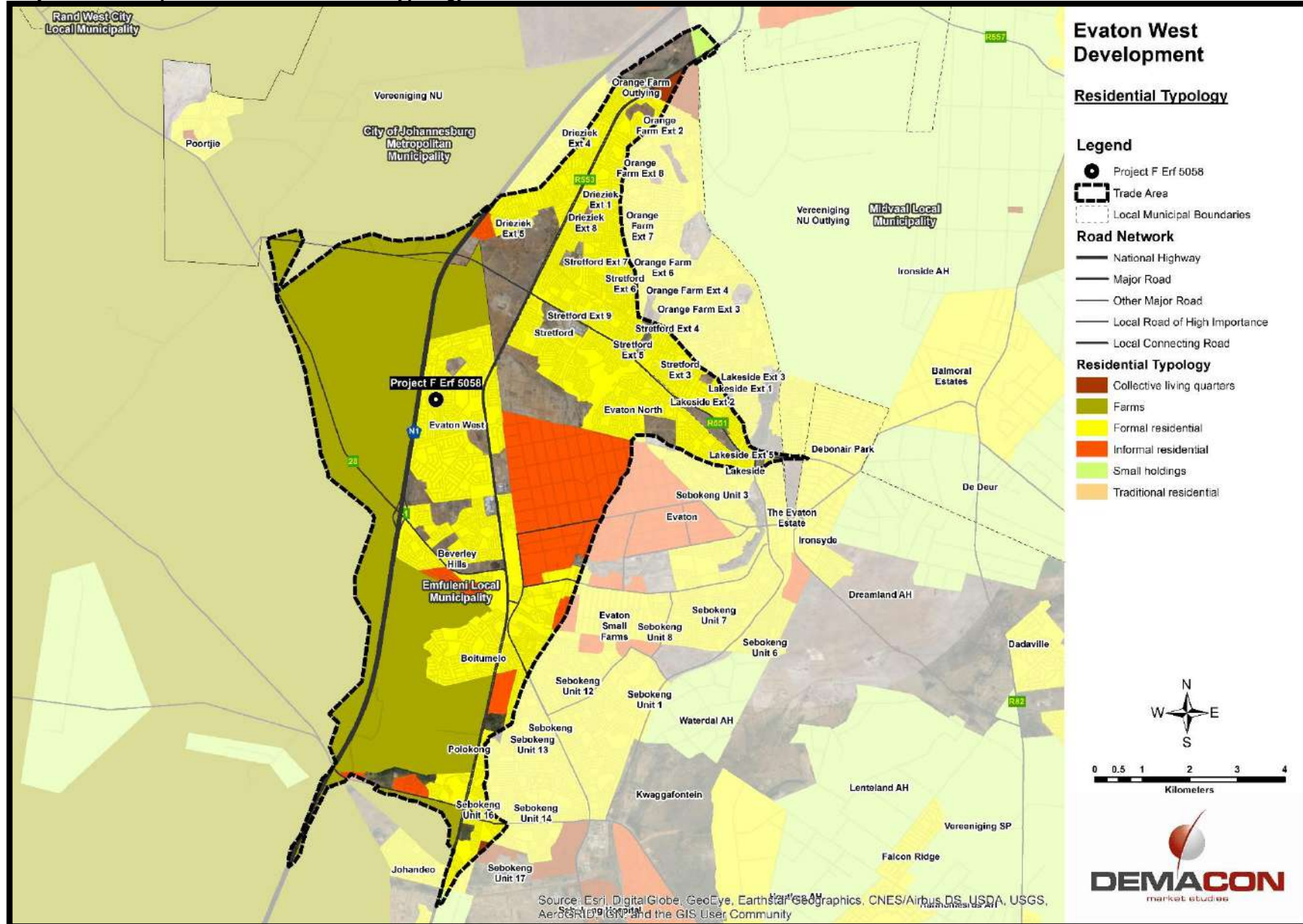
Map 1.4: Project F - Development site with transportation network



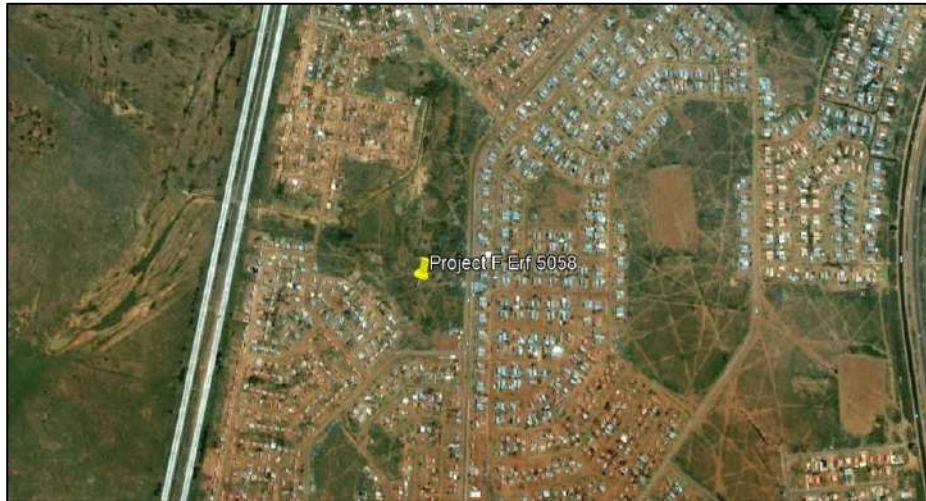
Map 1.5: Project F - Development site with surrounding employment nodes



Map 1.6: Project F - Development site with residential typology



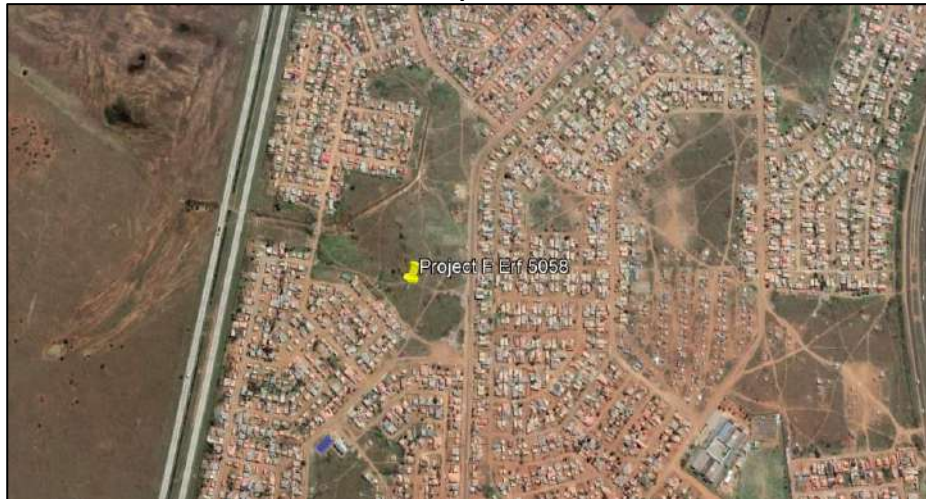
Picture 1.1: Residential Status Quo in 2004



Picture 1.3: Residential Unit Sizes in 2004



Picture 1.2: Growth and Densification up to 2019



Picture 1.4: Residential Unit Sizes in 2019

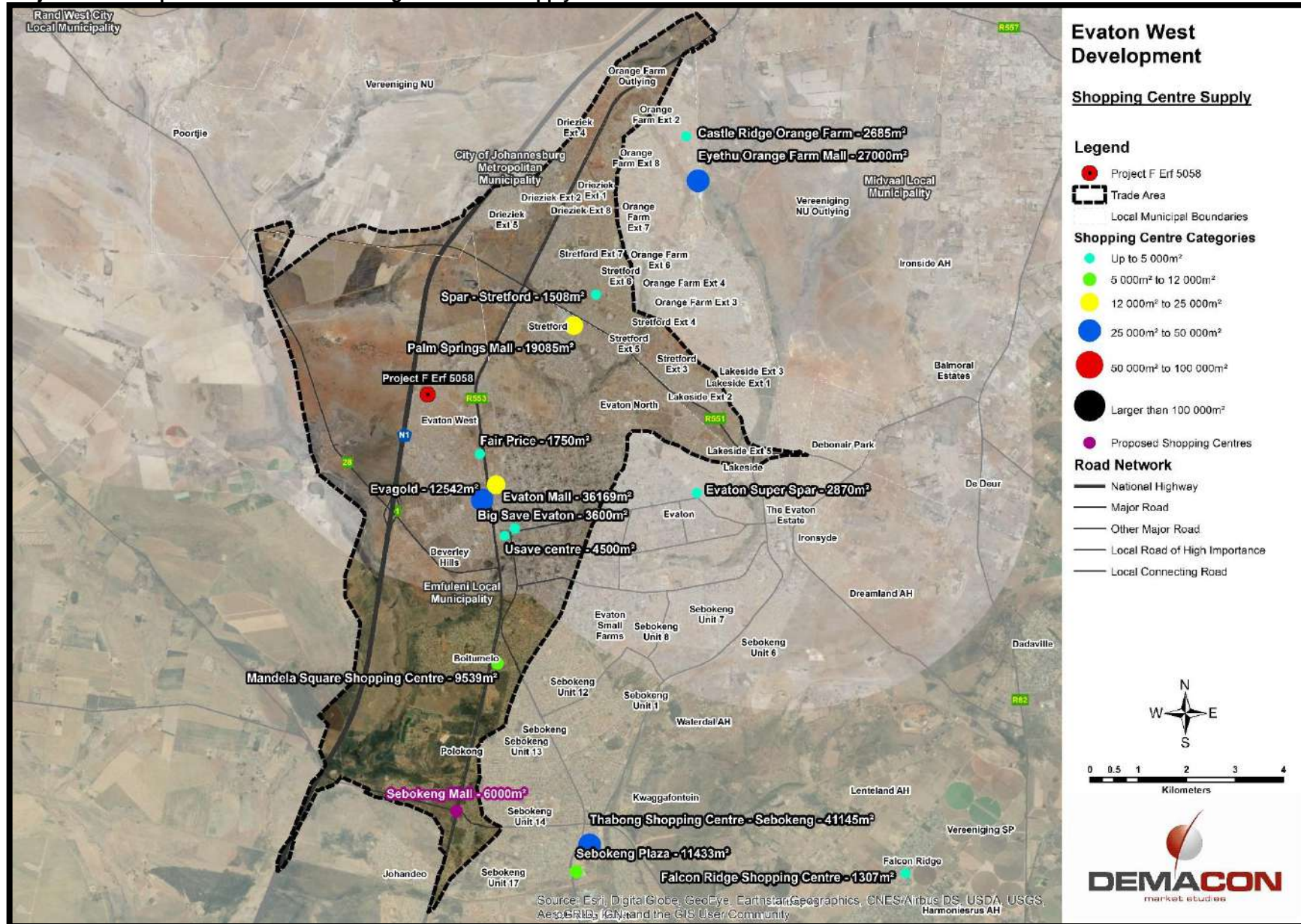


Residential development, infill and densification has taken place.

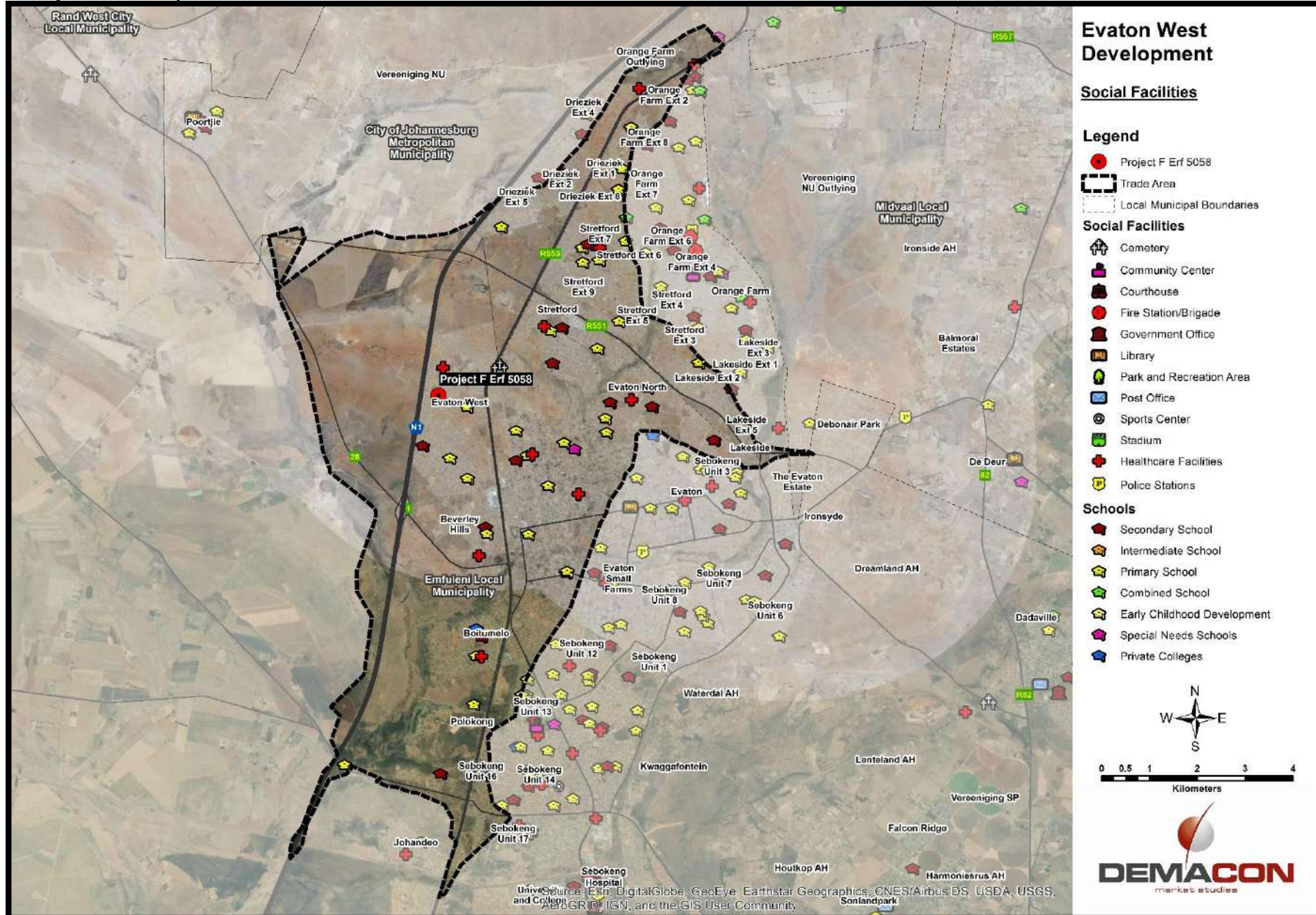
Residential units have expanded, additional houses, flats and backyard rental units have been added and the majority of properties have been fenced / walled off.



Map 1.7: Project F - Development site with surrounding formal retail supply



Map 1.8: Project F - Development site with social and educational facilities



## 1.4 SPATIAL CONSIDERATIONS IN TERMS OF EMFULENI LOCAL MUNICIPAL SPATIAL DEVELOPMENT FRAMEWORK

### 1.4.1 EMFULENI MUNICIPAL CHARACTERISTICS

Emfuleni's land use pattern is broadly divided spatially by the N1 freeway. To the west of the N1 freeway the land use character is largely rural and to the east of the N1 freeway the land use character is largely urban.

The urban component largely comprises the residential, business and industrial land uses of Vanderbijlpark, Sebokeng, Evaton, Sharpeville, Boipatong, Bophelong, Vereeniging and Three Rivers.

The following individual land uses occur within Emfuleni:

**Residential** - Emfuleni is characterised by relatively high residential densities. These high residential densities mostly occur in the northern half of Emfuleni, in areas such as Sebokeng and Evaton, but also in areas to the south, such as Boipatong and Sharpeville. These township areas have average densities of 40 units per hectare. Although these residential densities are too low to sufficiently support public transport, they do provide better support than many other lower-density residential areas found within Emfuleni. Lower-density residential areas are found within Vanderbijlpark and Vereeniging. The residential densities in these areas vary from approximately 10 units per hectare to approximately 20 units per hectare.

**Agricultural Holdings and farmland** - The western half of Emfuleni, west of the N1 freeway, comprises a mixture of intensive farms, extensive farms and agricultural holdings. The intensive farms and agricultural holdings are largely used for small-scale farming or rural residential purposes. Many of the farms used for rural residential purposes are found near the Vaal River and other river environments, such as Loch Vaal Barrage. The Mantevrede agricultural holdings, situated near Loch Vaal Barrage, and the Unitas Park agricultural holdings, situated in the Sonlandpark area, are increasingly under urbanisation pressure as Vanderbijlpark expands south-westwards and Vereeniging expands north-westwards. Extensive farms are mostly found within the north-western quadrant of Emfuleni. These farms are mostly used for commercial agricultural purposes.

**Business** - Emfuleni has 3 Central Business Districts serving the municipal area. These are the existing Vanderbijlpark CBD, the existing Vereeniging CBD and the emerging Sebokeng CBD. The Vanderbijlpark CBD has access to the

K174 Barrage Road, which links it to the Vereeniging CBD, as well as the K53 (Moshoeshoe Road), which links it to Sebokeng and the Sebokeng CBD.

The Vereeniging CBD has access to the P156 (R59 freeway), which links it to Meyerton and Ekurhuleni, as well as the K178 (Boy Louw Road), which links it to Sebokeng and the Sebokeng CBD. The Vereeniging CBD also has access to the Vereeniging-Johannesburg commuter railway line, which connects it via rail to Sebokeng, Evaton, Orange Farm and Johannesburg. Both the Vanderbijlpark CBD and the Vereeniging CBD have large concentrations of retail and office space. Much of this retail and office space has become vacant in recent years due to the decentralization of retail and office space to suburban areas of Emfuleni.

The **Sebokeng CBD** is an emerging Central Business District within Emfuleni. It is located at the Houtheuwel commuter railway station, which is situated on the Vereeniging-Johannesburg commuter railway line. The CBD is located within walking-distance of this commuter railway station. The Sebokeng CBD has access to the K53 (Moshoeshoe Road), which links it to Evaton in the north and the Vanderbijlpark CBD in the south. It also has access to the K178 (Boy Louw Road), which links it to the Vereeniging CBD. From a land use perspective, the Sebokeng CBD contains the Sebokeng Hospital, municipal offices, the Sebokeng Teachers Training Collage, the Sebokeng Police Station, the Sebokeng Sports Stadium, a regional shopping centre and a partly developed light industrial area. It also contains a community retail centre and a small regional retail centre. These land uses provide a strong platform for the further development of the CBD. The Sebokeng CBD requires further strengthening through the development of addition retail and office space within this CBD, as well as the development of high-density housing.

Apart from the abovementioned Central Business Districts, Emfuleni contains an existing **regional business node** structure, comprising a total of 5 regional business nodes. The existing regional business nodes include, amongst others, the business node located in Three Rivers, the business nodes on the K174 (Barrage Road) located at the Vaal Mall and the Bedworthpark Shopping Centre, and the business node located west of Evaton situated on the K45 (Golden Highway). The land use composition of these existing regional business nodes needs to be diversified by adding uses such as office, community facilities and high-density housing to its land use mix.

**Industrial and commercial** - Emfuleni has 10 existing industrial and commercial areas. The largest industrial area within Emfuleni is Mittal Steel, which is situated between Vanderbijlpark and Sebokeng. This facility contains an industrial dump located on its northern boundary, which has buffer zones that may impact on development in the Cyferpan area and the Sebokeng CBD area. Other significant industrial areas include Leeuwkuil, Powerville, Peacehaven and Duncanville. These industrial areas are all located in Vereeniging and have access to the P159 (R59 freeway). Powerville and Peacehaven are heavy industrial oriented areas and Leeuwkuil and Duncanville are commercial and light industrial areas.

#### 1.4.2 DEVELOPMENT GUIDELINES: RESIDENTIAL DEVELOPMENT

Emfuleni has large tracts of land that are potentially available for residential expansion, as well as a number of infill sites that can be utilised for residential purposes. There are basically 4 residential expansion areas that have been identified within Emfuleni.

**Johandeo, Golden Gardens and Cyferpan** - Johandeo and Golden Gardens are townships that are currently being planned. These townships, including the planned Cyferpan development, is located west of the Sebokeng CBD and the K45 (Golden Highway) and basically constitute the westward expansion of Sebokeng up to the N1 freeway. Johandeo, Golden Gardens and Cyferpan are affordable housing developments. The first phases of Johandeo and Golden Gardens have been completed with the following phases in its planning stages. Golden Gardens will provide approximately 7 000 housing units once completed. The first phase of Johandeo yielded approximately 2 000 housing units. Because the first stages of these townships have been implemented, bulk services have already been constructed to service these townships.

**Lethabong and Tshepiso** - Lethabong and Tshepiso is a residential expansion area that straddle the Vereeniging-Johannesburg commuter railway line. The primary advantage of this residential expansion area is that it has excellent access to road and rail infrastructure. This transportation network includes the K180 arterial, which links the expansion area to Moshoeshoe Road (K53). Moshoeshoe Road that traverses Sebokeng and the Sebokeng CBD. In addition, the Vereeniging-Johannesburg commuter railway line links this residential expansion area to Sebokeng, Orange Farm and Johannesburg to the north, and to the Vereeniging CBD in the south. Logically, this transportation network will provide good accessibility and modal choice to the

residents that will reside in this residential expansion area. This makes the Lethabong and Tshepiso residential expansion area highly suitable for higher-density housing typologies (such as duplex housing and walk-ups) linked to public transport. Higher-density housing typologies can be located at the planned railway stations of the Vereeniging-Johannesburg commuter railway line, as well as next to the K180 arterial. In particular, future intersections between the K180 and collector roads can be utilized for higher-density residential purposes.

Another advantage of the Lethabong and Tshepiso residential expansion area is that it is currently the focus area for affordable housing development within Emfuleni. Some of these developments are already at implementation stage, such as the Tshepiso Extensions, and others are already at a detailed planning stage, such the Lethabong extensions. The Lethabong extension will provide approximately 6 000 affordable housing units once completed. The Tshepiso extension will provide approximately 4 000 affordable housing units once completed. The first phase of Tshepiso (Extension 3) yielded approximately 1 500 housing units. Bulk municipal services infrastructure has already been constructed to service the Tshepiso affordable housing development.

**Sonlandpark** - The Sonlandpark residential expansion area is located north of the K180 and comprise the parcels of land situated west and east of Sonlandpark. This expansion area includes the Unitas Park Agricultural Holdings, which can be densified by converting these agricultural holdings into cluster housing. This expansion area is largely earmarked for the longer-term expansion of Vereeniging and Sebokeng. The K180 will be the central spine serving this residential expansion area, linking this residential expansion area to Sebokeng in the north and the Vereeniging CBD in the south. This transportation spine can become the primary focus area for higher-density residential development (such as cluster housing), because of the good accessibility that this spine will provide. The Sonlandpark residential expansion area will most likely be developed with a mixture of bonded and affordable housing developments.

**Bophelong** - The Bophelong residential expansion area straddles the P155, which intersects with the N1 freeway. The expansion area comprises two parcels of land; the one located north of Bophelong and the other located on the disused airfield located west of Bophelong. The primary advantages of this residential expansion area are that it has excellent access to road infrastructure, and it is located in close proximity to the Vanderbijlpark CBD and the Mittal Steel industrial area. This locality will thus give the future residents of this

expansion area good access to economic and social opportunities. Higher-density housing typologies (such as walk-ups) can be located next to the P155 arterial. In particular, future intersections between the P155 and collector roads within the expansion area can be utilised for higher-density residential purposes.

**Lochvaal and Mantevrede** - The Mantevrede Agricultural Holdings is situated on the P155 freeway. Lochvaal Barrage is situated west of these Agricultural Holdings along the Vaal River up to the N1 freeway. This is a sought-after weekend holiday area associated with the recreation value of the Vaal River. Consequently, this predominantly agricultural holdings area is coming under increasing pressure for redevelopment at higher residential densities. Development of this area will not only provide for the development of the Vaal River waterfront, but it will also enable the densification of the corridor that is emerging along the P155 freeway.

**Infill sites** for residential development have been identified within the existing residential areas of Vanderbijlpark and Vereeniging. An advantage of developing these infill sites are that most of them already have access the bulk municipal services infrastructure, thus only requiring limited infrastructure upgrading to develop these sites. There are primarily 3 residential infill sites that can be identified within Emfuleni.

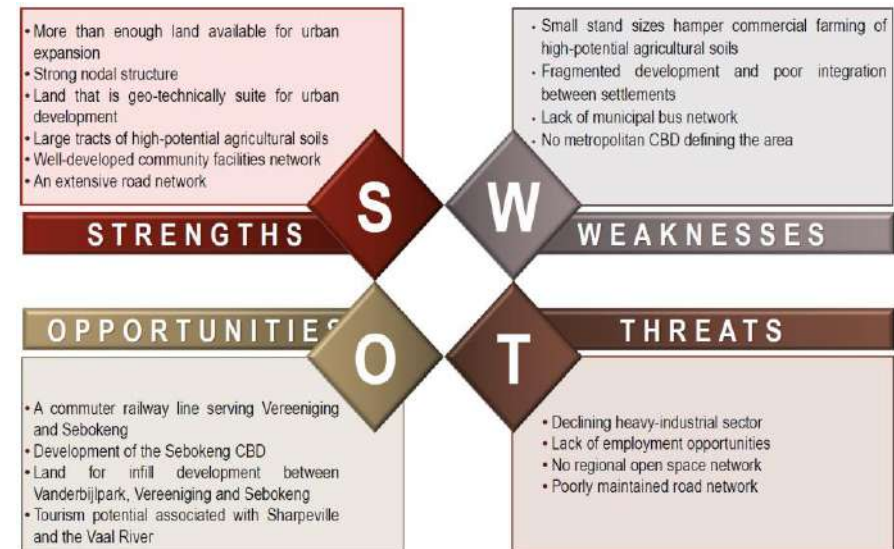
**Vanderbijlpark and Boipatong** - The undeveloped strip of land situated between Vanderbijlpark and Boipatong has for a long period remained undeveloped, despite it being well-located land. However, various parcels of land on this strip have been developed in recent year, with few parcels of land still remaining for development. The development of the remaining parcels of land will contribute to a more compact and integrated urban structure and the development thereof should thus be encouraged. This infill land has good access to Westinghouse Boulevard and the road linking this land to Boipatong and Sharpeville.

**Emerald Casino** - A vacant land parcel is located northeast of the Emerald Casino, which stretches up to the K174 (Barrage Road). This land is located near the Vaal River and will most likely be developed as higher density, bonded and rental housing. As such, these housing units can become rental housing for students attending the Vaal University of Technology. Part of the land is owned (and partly used) by the North-West University and will therefore be reserved for tertiary educational purposes in future. This land has access to Hendrik van Eck Boulevard and Ascot on Vaal Road, which integrates this infill

land parcel with the surrounding residential areas of Vanderbijlpark. This land parcel also has access to the emerging Secondary Urban Activity Node situated at Marco on the intersection of Barrage Road and Ascot on Vaal Road.

**Tshepong and Roshnee** - to obtain a measure of consolidation, it is proposed that the land that is available between Roshnee and Tshepong be filled in. This proposed infill development is located on, and will have access to, the K47 and K11 intersection.

### 1.4.3 SWOT ANALYSIS AND DEVELOPMENT CHALLENGES



#### Key Challenges:

The primary threat to Emfuleni is most likely the lack of employment opportunities within Emfuleni. This is largely associated with a decline in industrial and commercial activities within Emfuleni. Emfuleni has a large population and it is therefore imperative that Emfuleni reaches a growth level where it can sustain most of its population through industrial and business activities located within Emfuleni. This can partly be addressed on a spatial level by making enough land available for industrial and business development. But it also requires an effective Local Economic Development (LED) strategy.

Another major threat involves the poorly maintained road network and the expansion of the municipal services network capacity to cater for future urban densification and expansion. If these infrastructural issues are not dealt with in a proactive manner, it will stifle economic growth and housing development within Emfuleni. In addition, the absent of a regional open space lattice needs to be addressed to ensure the environmental integrity of Emfuleni is maintained in the midst of urban development and expansion.

### Development Guidelines for Development Site

The proposed development site is located within the Medium-Density Residential Zone.

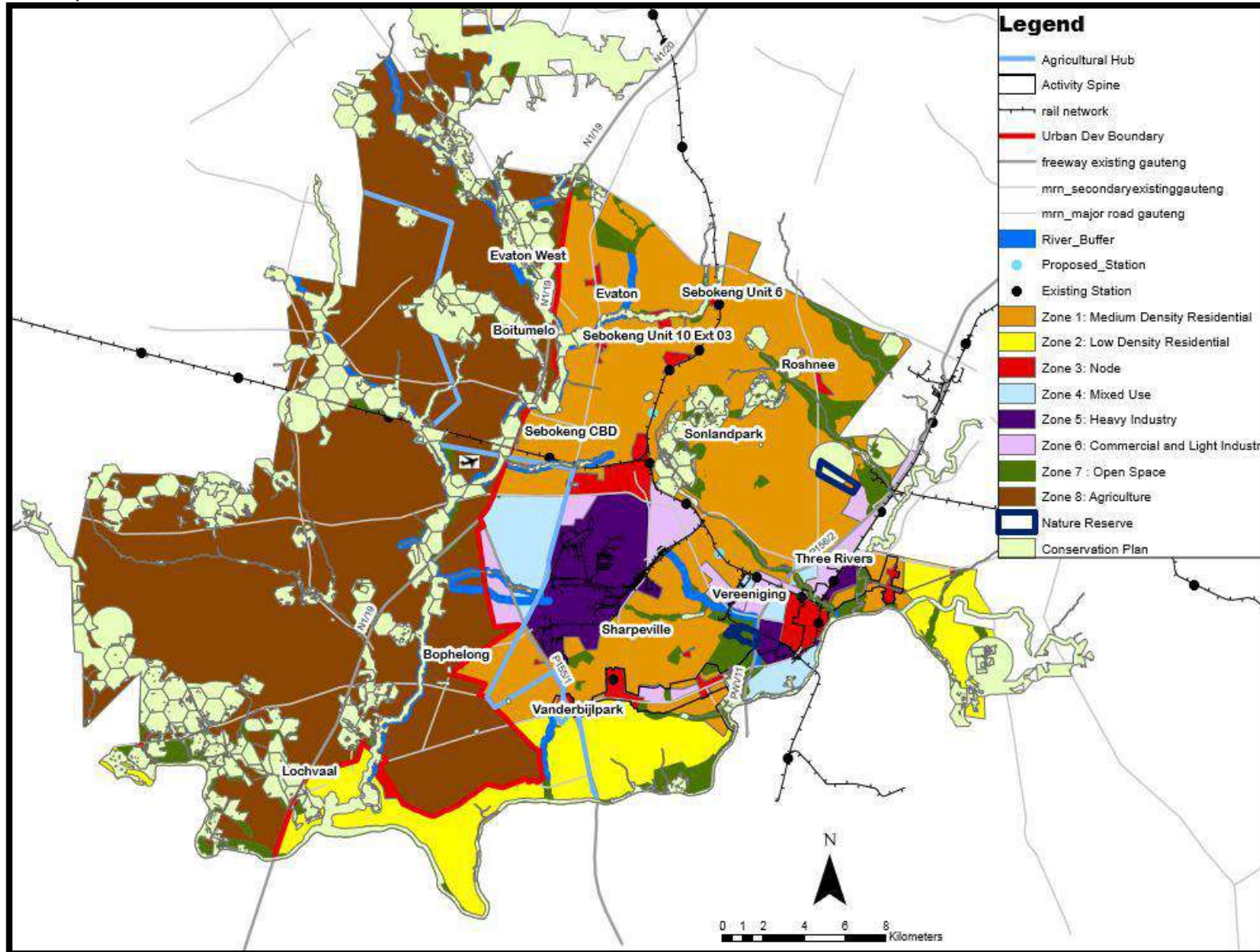
#### Zone 1: Medium-density residential zone

- ✓ Zone 1 aims to encourage residential densities that allows affordable housing development and supports road-based public transport.
- ✓ A maximum residential density of 60 units per hectare is allowed within Zone 1.
- ✓ Such densities typically allow for the development of a range of affordable housing typologies within this zone:
  - Group housing
  - Second dwelling units
  - Backyard rental units
  - Semi-detached housing
  - Commune
  - Children’s home
  - Hostel.
- ✓ Other accommodation also allowed:
  - Boarding house
  - Hotel
  - Resort
  - Guesthouse.
- ✓ Residential-supporting land uses to be accommodated within Zone 1 include:
  - Educational facilities
  - Religious facilities
  - Social facilities
  - Cemetery

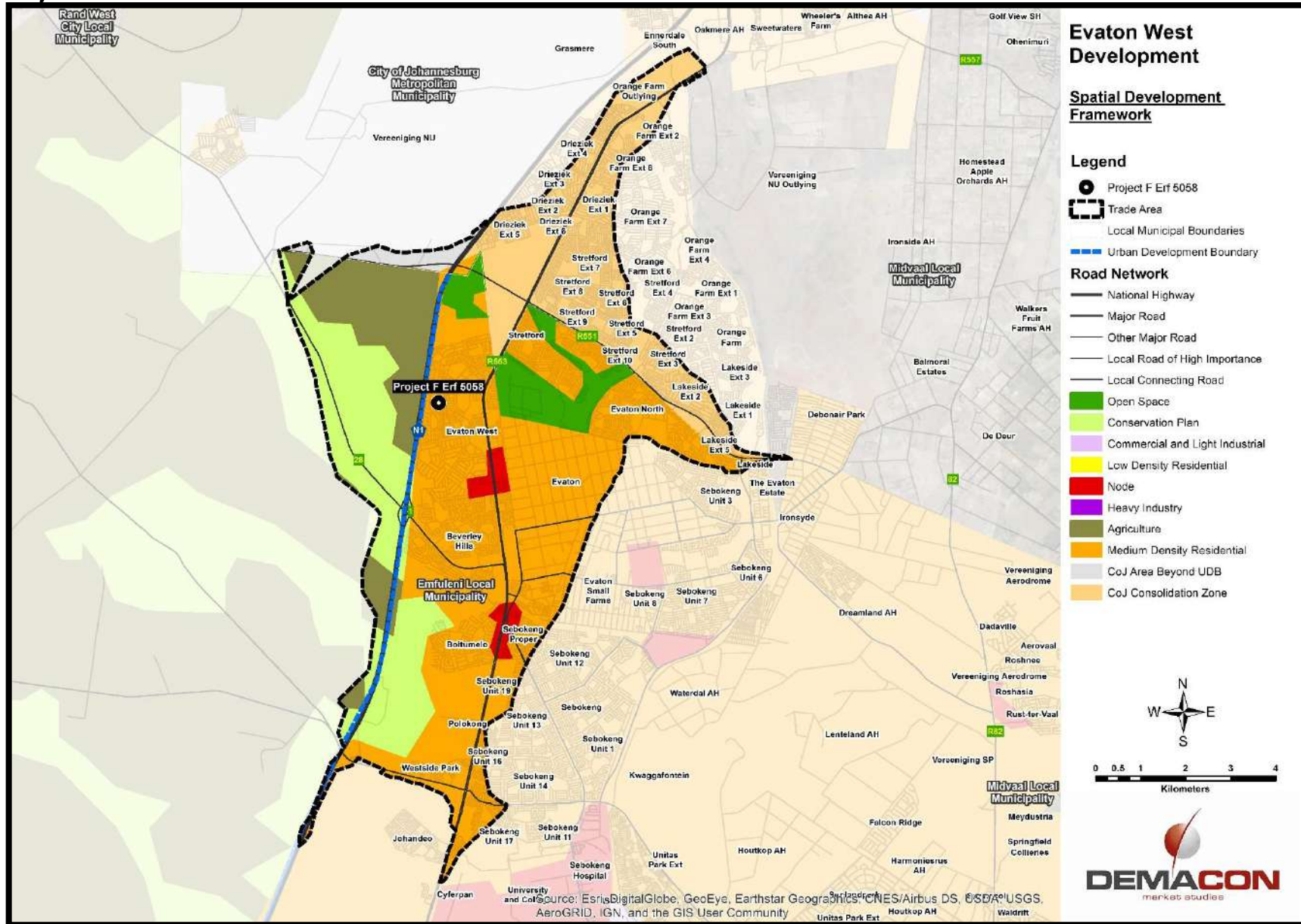
- Active and passive open space.
- ✓ Zone 1 also allows for the establishment of micro enterprises with the aim to support and promote SMMEs within this zone. These enterprises can include:
  - Home office
  - Home based medical consulting rooms
  - Non-disturbing home enterprises (hairstylist, etc)
  - Farm stall.

*Note:* The proposed development of residential 4 land use (social housing) requires higher densities than recommended in the SDF.

Map 1.9: Emfuleni SDF, 2019/2020



Map 1.10: Project F – SDF Guidelines





## 1.5 BUILDING STATISTICS

On average, the historical trends of the Emfuleni Local Municipal Area show that the following residential and non-residential floor space have been completed on an average annual basis. This is then reflected as a segment of the average annual Sedibeng District development. Development between 2008 and 2018 are included in the analysis.

Table 1.1: Emfuleni Municipal Growth Trends, 2008 to 2018

Type of Development		Average Annual Growth	% of Average Annual District Growth
 <b>Residential Buildings</b>	 Dwelling-Houses	657 units	50.6%
	 Flats & Townhouses	142 units	57.2%
	 Other Residential (incl. Tourism Accommodation)	1 unit	10.0%
 <b>Non-Residential Buildings</b>	 Shopping Space	2 549 m <sup>2</sup>	37.2%
	 Office and Banking Space	2 993 m <sup>2</sup>	72.5%
	 Industrial and Warehouse Space	3 959 m <sup>2</sup>	17.5%

Source: DEMACON ex StatsSA, 2020

Figure 1.1: Emfuleni Residential Buildings Completed, 2008 to 2018

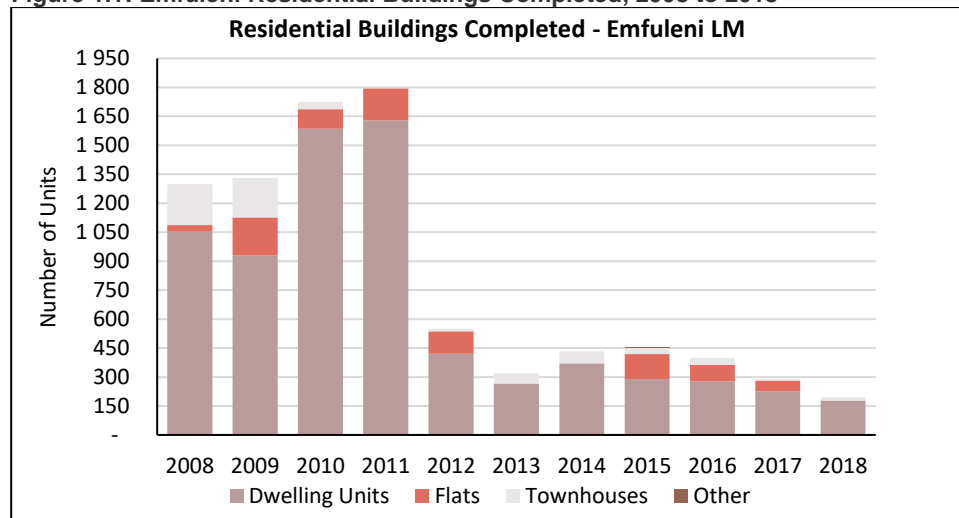
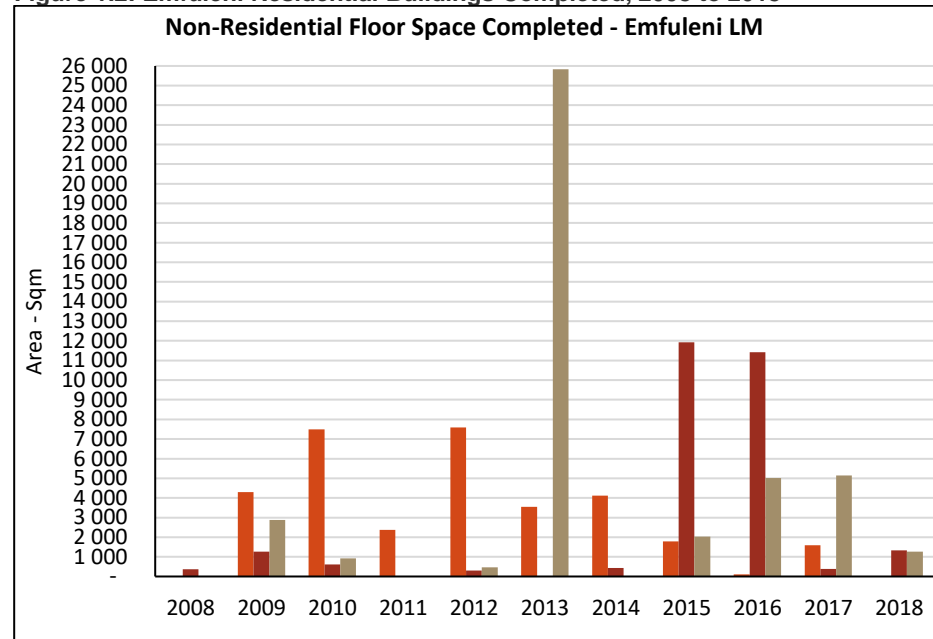


Figure 1.2: Emfuleni Residential Buildings Completed, 2008 to 2018

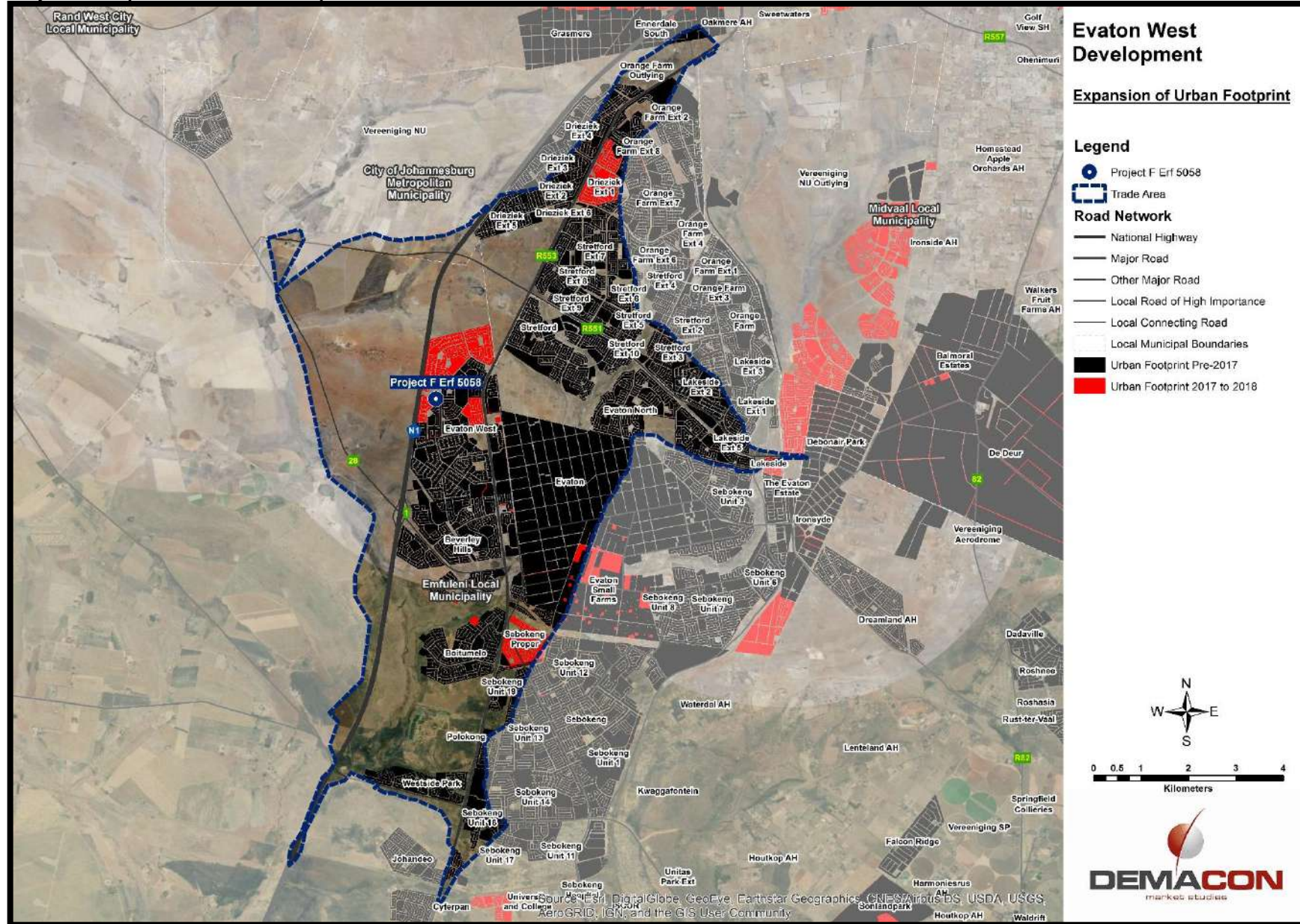


## 1.6 CURRENT HOUSING BACKLOG AND RESIDENTIAL EXPANSION AREAS

### CURRENT HOUSING BACKLOG – Emfuleni Local Municipality

Up to 2020:	2020-2025:	Residential Expansion Areas:
<b>31 380 units</b> <ul style="list-style-type: none"> <li>Bonded – 10 100 unit</li> <li>Affordable units – 21 281 units</li> </ul>	<b>30 210 units</b> <ul style="list-style-type: none"> <li>Bonded – 7 021 units</li> <li>Affordable units – 23 189 units</li> </ul>	<ol style="list-style-type: none"> <li>Johandea, Golden Gardens &amp; Cyferpan</li> <li>Lethabong &amp; Tshepiso</li> <li>Sonlandpark</li> <li>Bophelong</li> <li>Lochvaal &amp; Mantevrede</li> </ol>
<b>Land Requirement:</b> <b>1 337.7 ha</b>	<b>Land Requirement:</b> <b>1 113.7 ha</b>	

Map 1.11: Project F – Expansion of Urban Footprint

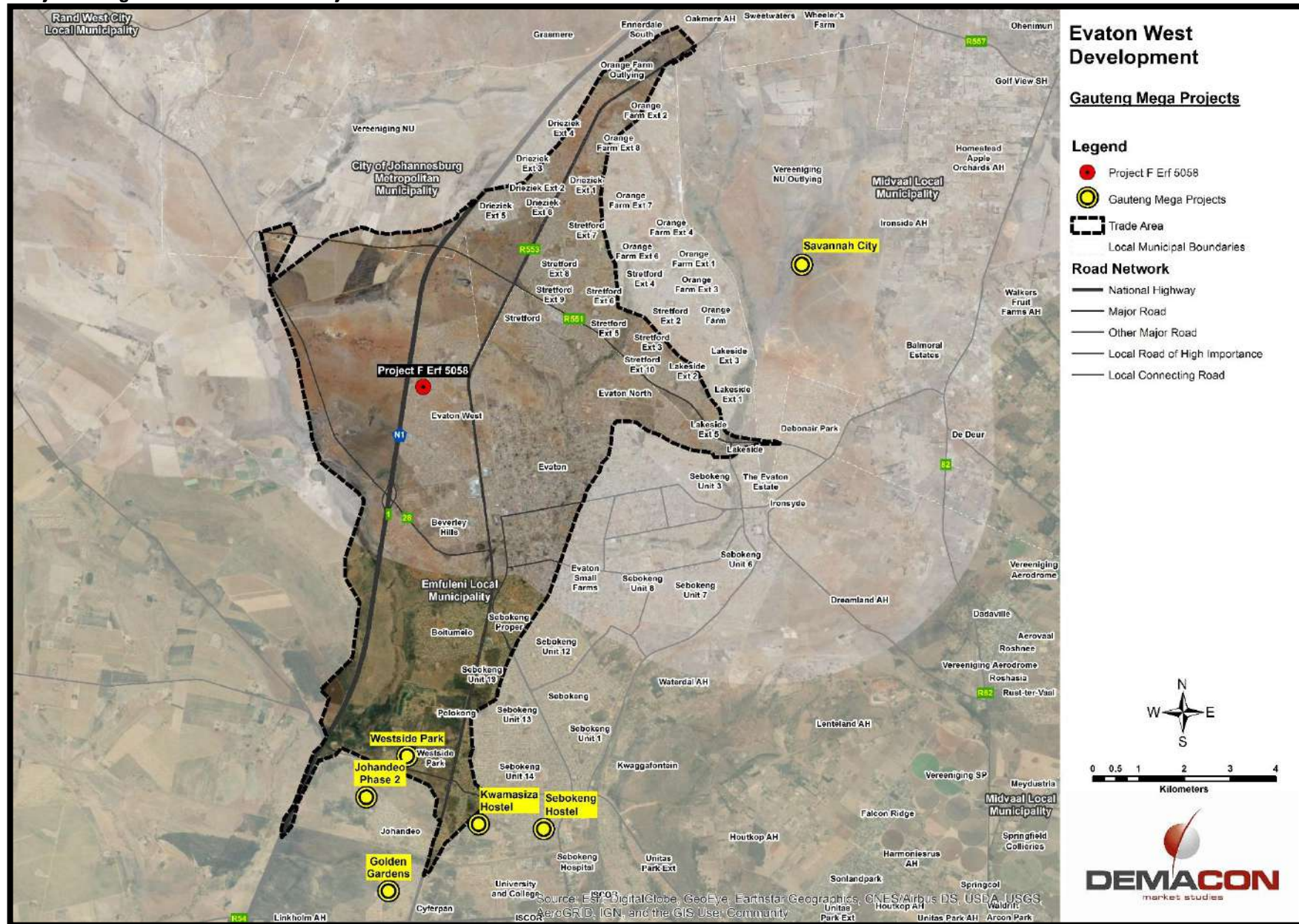


## 1.7 HUMAN SETTLEMENT PROJECTS

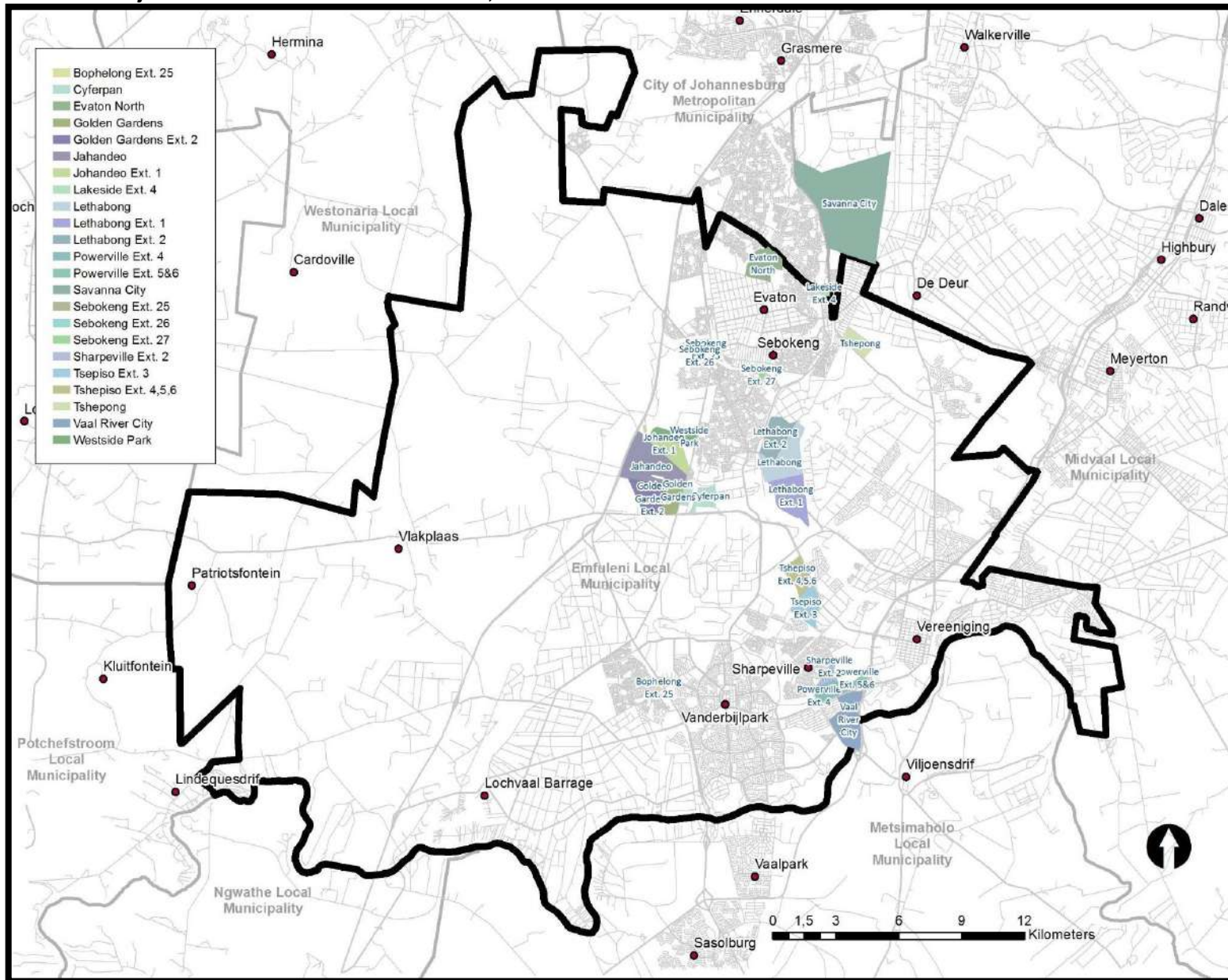
Table 1.2: Surrounding Human Settlement Projects

Project Name	Type of Development	Land Parcel (ha)	Estimated Number of Units	General Description
Savanna City  Walkerville, 20-minutes from Johannesburg CBD.	Mixed Housing	1 447.48	18 399	<p>Cosmopolitan is involved with the Banks' bonded and partly subsidised homes (10 247 units).</p> <p><u>Amenities:</u></p> <p>16 schools, 400 hectares of conservation area, Public open spaces, Clinics, churches and other social facilities, commercial and retail shops.</p> <p>Reinforced perimeter wall around development.</p> <p><u>Home Info:</u></p> <p>Prices start at R412k Plans range from 40 m<sup>2</sup> (2 bed and 1 bath) to 80 m<sup>2</sup> (3 beds and 2 baths). Homes comply with new energy efficient standards (SANS). Full house includes: floor tiles, stove, 1.2 mesh fence sides and back.</p>
Westside Park	Mixed Housing	106.48	1 248	Planning Phase
Johandeo Phase 2	Mixed Housing	433.86	14 500	Planning Phase
Kwamasiza Hostel	CRU Units	25.24	672	Planning Phase
Sebokeng Hostel	CRU Units	98.64	Under Planning	Planning Phase
Golden Gardens  On the Golden Highway, 45-minute drive south from Sandton and Soweto.	Mixed Housing	167.75	5 748	<p>Golden Gardens Estate will be a new suburb with its own schools, churches, community facilities and much more.</p> <p>2 Bedroom - R390k 3 Bedroom - R600k.</p> <p>40 square metres, pitched and tiled roof, all the walls are painted and plastered and windows fitted with blinds.</p>

Map 1.12: Project F Mega Human Settlement Projects



Map 1.13: Human Settlement Projects reflected within the Emfuleni SDF, 2019/2020



## 1.8 PROJECT LOCATION ASSESSMENTS

Market potential is influenced not only by consumer income and expenditure, but in particular also by the characteristics of the site/location where future development activities are to take place. To this effect, a DEMACON Site Evaluation Model © is utilised. The DEMACON model is pragmatic and based on the assignment of values to various location factors. Firstly, the site is evaluated on a ten-point scale, with ten being the highest. Secondly, weights are attached to these factors, in order of importance (1 to 5, with 5 being the most important).

**Table 1.3: RESIDENTIAL – Social Housing Units**

Locational Factors	Grade 1-10	Score
Perceived Level of Safety and Security	7 ▶	<b>35</b>
Area Price Profile Compatibility	7 ▶	<b>28</b>
Address Value	6 ▶	<b>24</b>
LSM Profile	6 ▶	<b>30</b>
Perceived Quality of Residential Environment	6 ▶	<b>24</b>
Tempo of Residential Growth	6 ▶	<b>30</b>
Within direction of Current & Future Growth	6 ▶	<b>30</b>
Perceived investment value & Impact	6 ▶	<b>24</b>
Access to main roads	7 ▶	<b>21</b>
Proximity to workplace	6 ▶	<b>18</b>
Proximity to schools	7 ▶	<b>28</b>
Proximity to retail facilities	7 ▶	<b>28</b>
Proximity to social amenities	7 ▶	<b>21</b>
Proximity to public transport	7 ▶	<b>21</b>
Availability of Land	7 ▶	<b>21</b>
<b>Total Score</b>		<b>383</b>
<b>Score Rating</b>		<b>64.9%</b>

\* Note: 80%+ indicates an exceptional site rating; a site rating of 70 – 80% is high and indicates that most important fundamentals for a successful social housing development is in place; a rating of 60

– 70% indicates some critical factors may be lacking but could possibly be addressed; projects with a sub 60% rating are not recommended for consideration.

The site assessment reflects on the suitability of the site for the specific use under consideration. The site assessment is sensitive to aspects such as area 'fit'. This relates to the prevailing residential character and price profile of the area, as well as, the potential impacts on real estate prices, price growth and rateability.

The site scored 64.9% as suitable location for social housing indicating that critical factors might be lacking but could potentially be addressed.



**ECONOMIC PROFILE  
AND DRIVERS**

**2**

## SECTION 2: ECONOMIC PROFILE AND DRIVERS

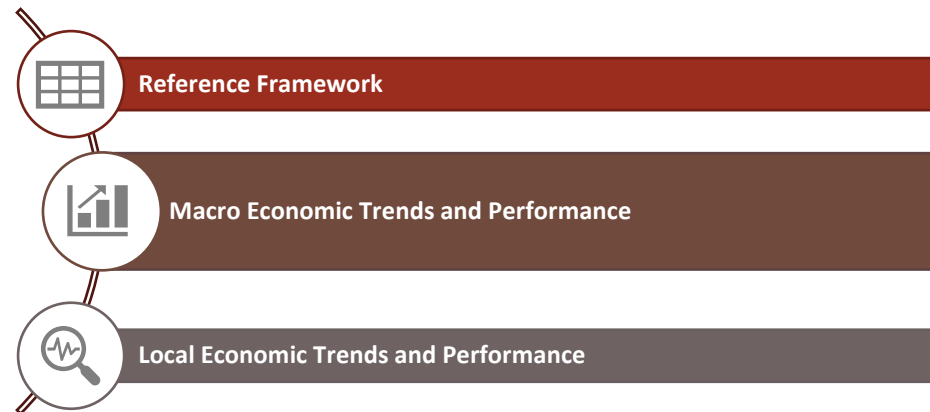
### 2.1 INTRODUCTION

An intricate, though well-defined relationship exists between the economy and urban real estate markets. The performance of specific economic sectors serves as proxy for the performance of these real estate markets.

The purpose of this section is to outline the salient features of the study area economy (reference is made to the Roodepoort local economy) in terms of selected time series economic indicators; most notably the economic profile and growth trends within the local economy.

As such, this section provides insight into the composition and stability of the local economy and hence, provides a more comprehensive assessment of medium- to long-term investment prospects than the conventional demographic analysis.

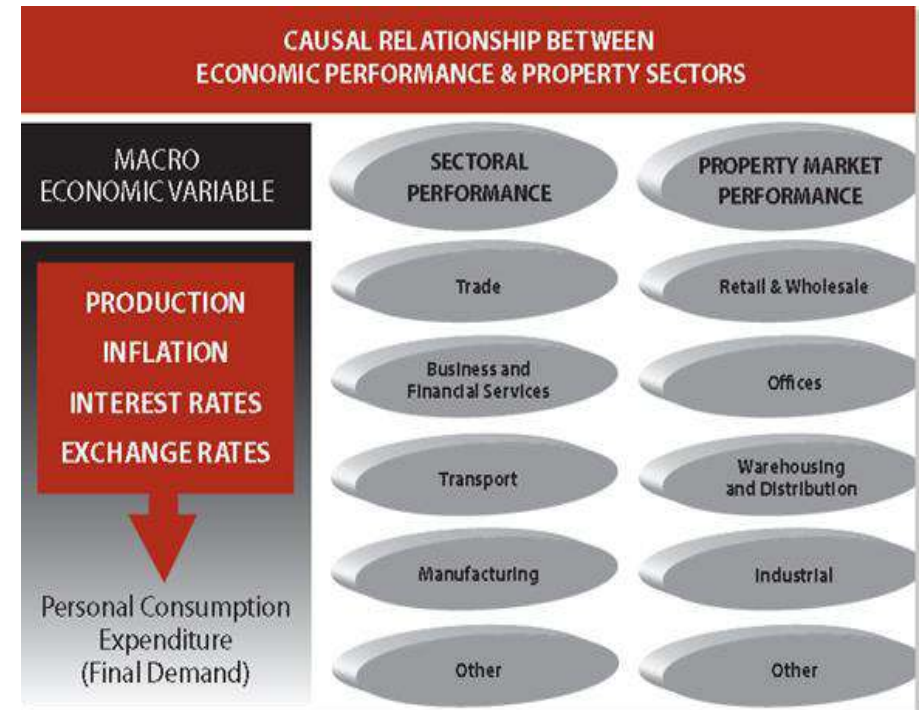
The economic profile is outlined in terms of the following headings:



### 2.2 REFERENCE FRAMEWORK

The casual relationship between economic sector performance and property market performance is illustrated in Diagram 2.1.

Diagram 2.1: Casual Relationship Between Economic Performance and Property Sectors



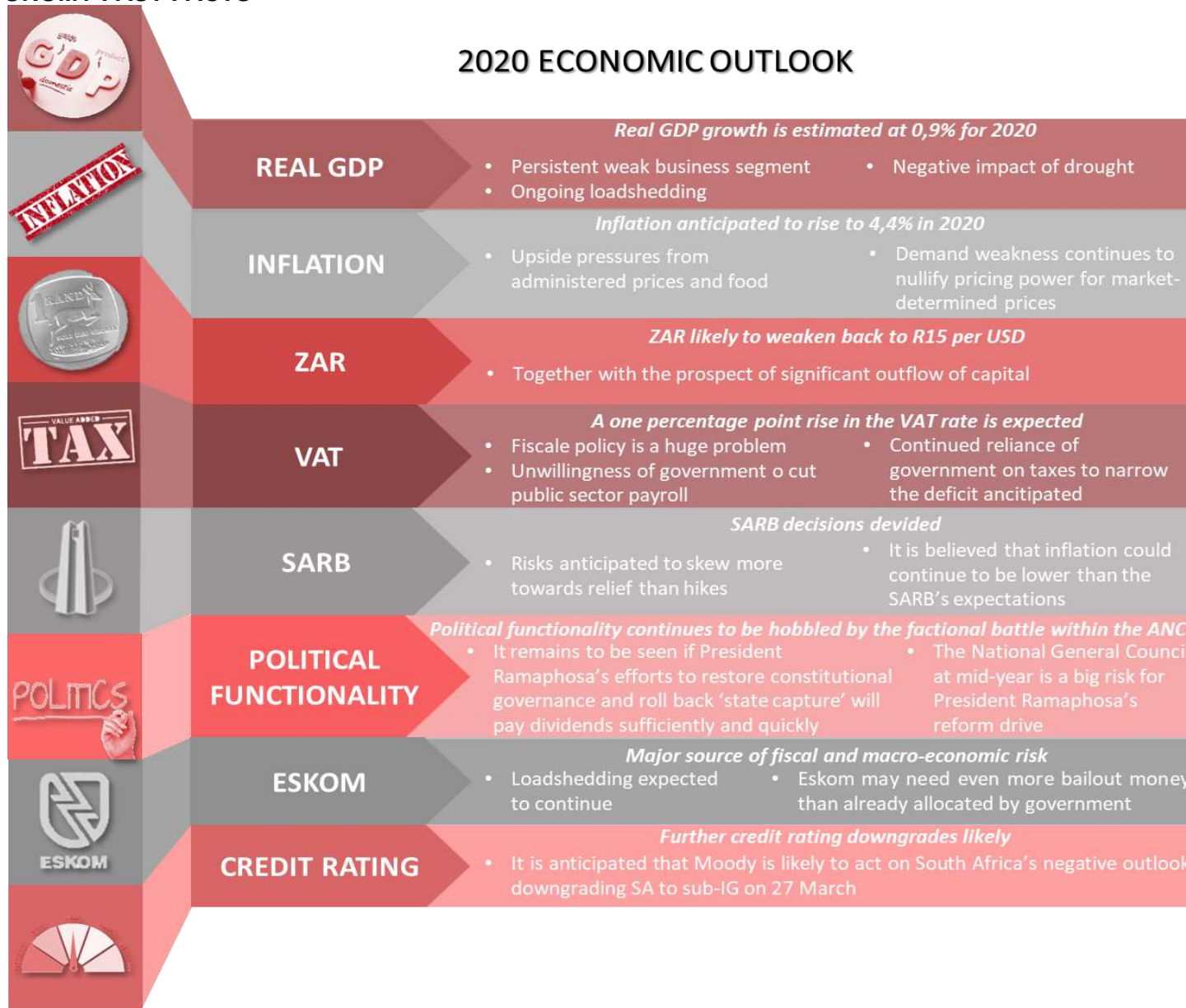
© 2019 H du Toit, MSc, PhD

### 2.3 MACRO-ECONOMIC TRENDS AND PERFORMANCE

The economic indicators of an area form the basis for current demand for residential and commercial product offering and serve as drivers for future growth in demand. Subsequent paragraphs highlight the main indicators for the macro-economy.

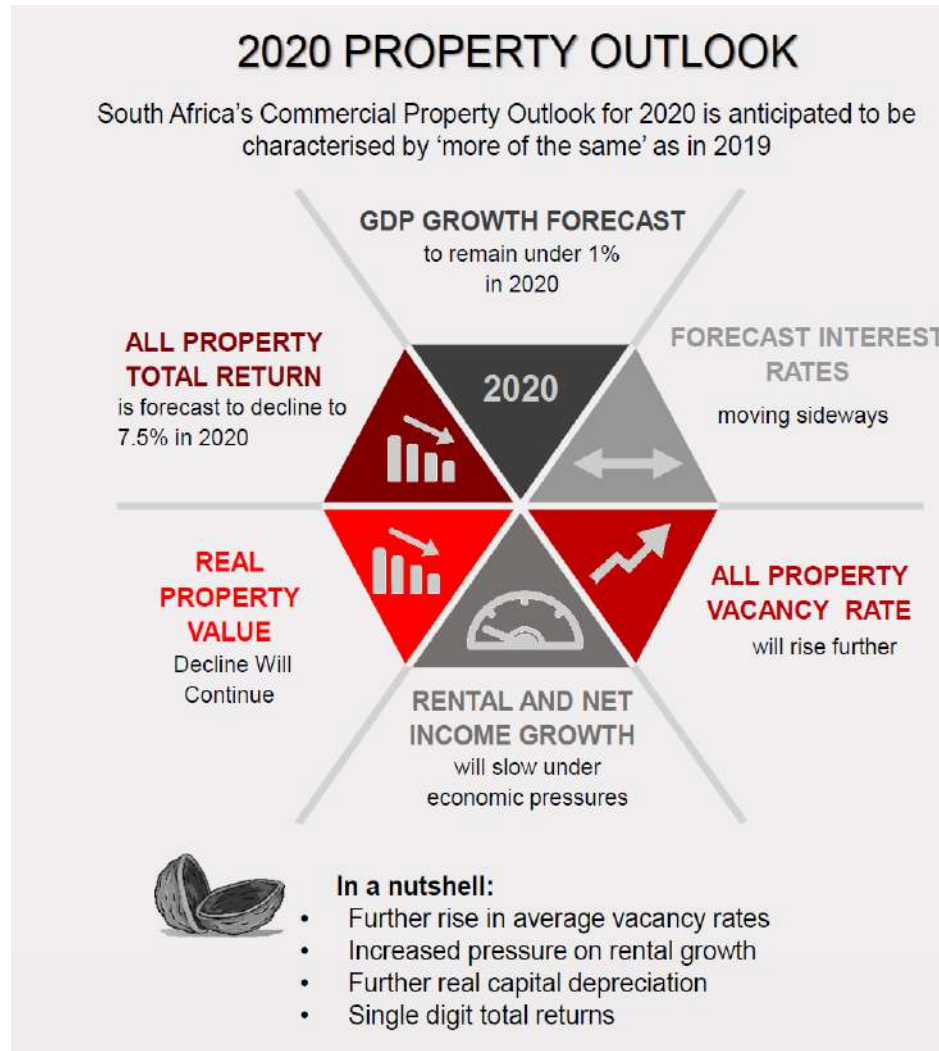


2.3.1 MACRO-ECONOMY FAST FACTS



### 2.3.2 PROPERTY MARKET OUTLOOK

South Africa' Commercial Property Outlook for 2020 is anticipated to be characterised by 'more of the same' as in 2019.



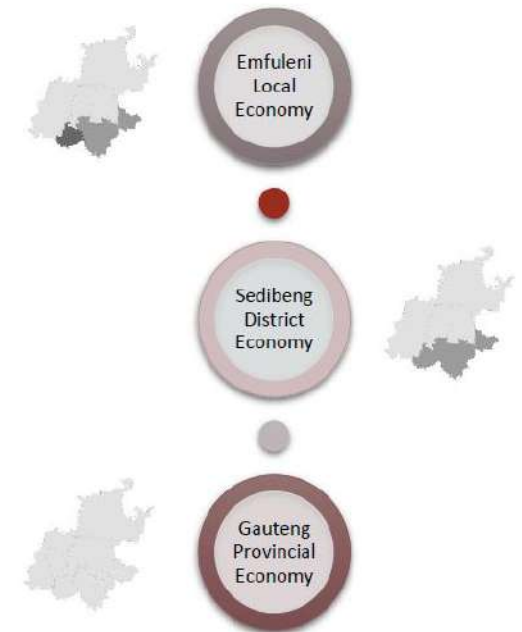
### 2.4 LOCAL ECONOMIC TRENDS AND PERFORMANCE

The following sub-section is focused on the salient features that define and characterise the local and district economies. The section seeks to geographically define the local economy, analyse the size and composition of the local economy compared to the district economy, outline growth trends and changes, the size and participation of the labour force, and the composition of the labour force as an indicator to current and future skills demand.

#### 2.4.1 GEOGRAPHICALLY DEFINING THE LOCAL AND REGIONAL ECONOMY

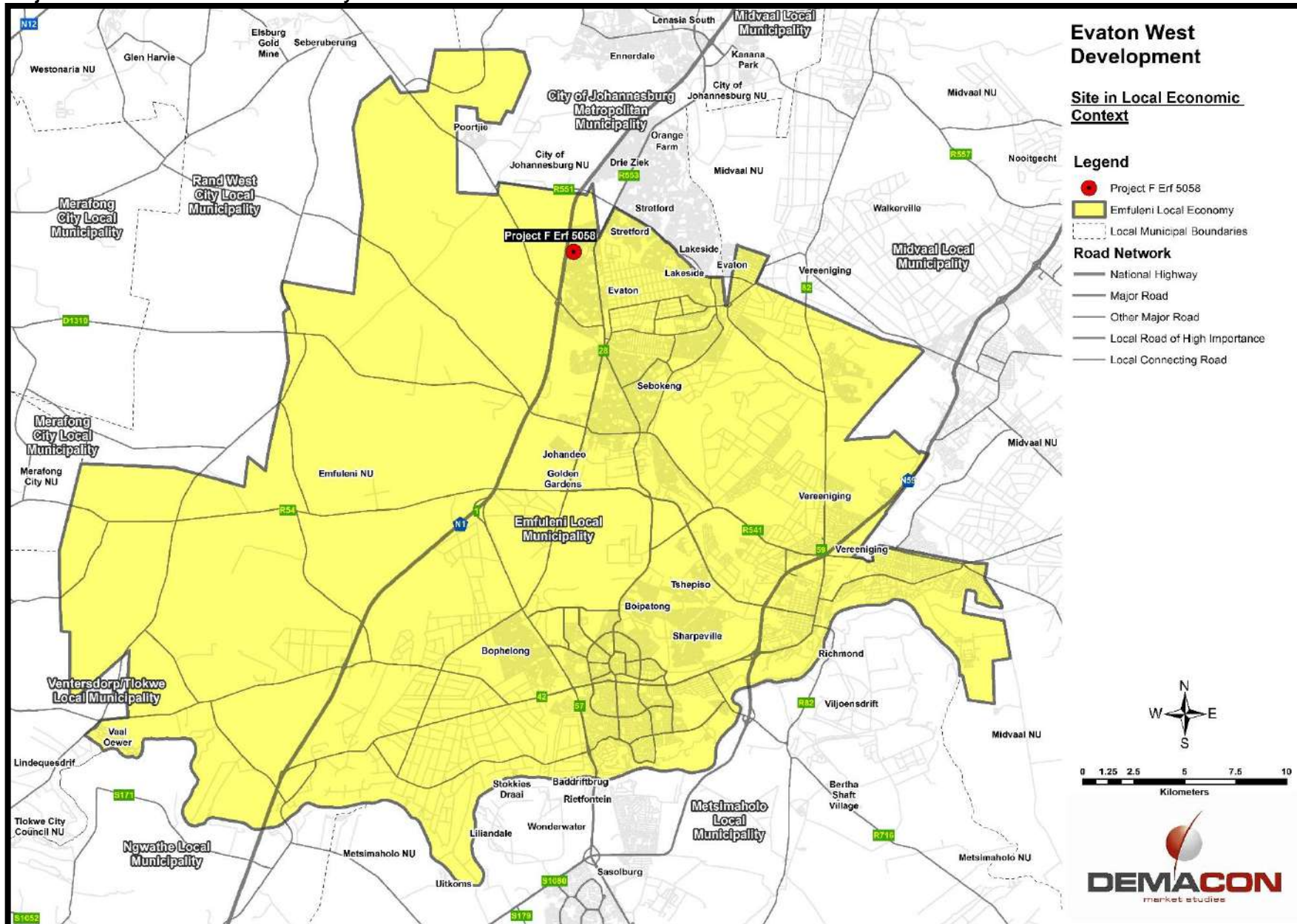
The geographic context of a local or regional economy is an important characteristic that should be defined. The importance of defining the geographic extent of local or regional economies relate to:

- ✓ Clearly defining the geographic area which is incorporated as part of a local/regional economy.
- ✓ Understanding the extent of economic functions that contribute to a local/regional economy and
- ✓ Clearly understanding the spatial context and inter-relations between a local/regional economy and its surrounding areas.

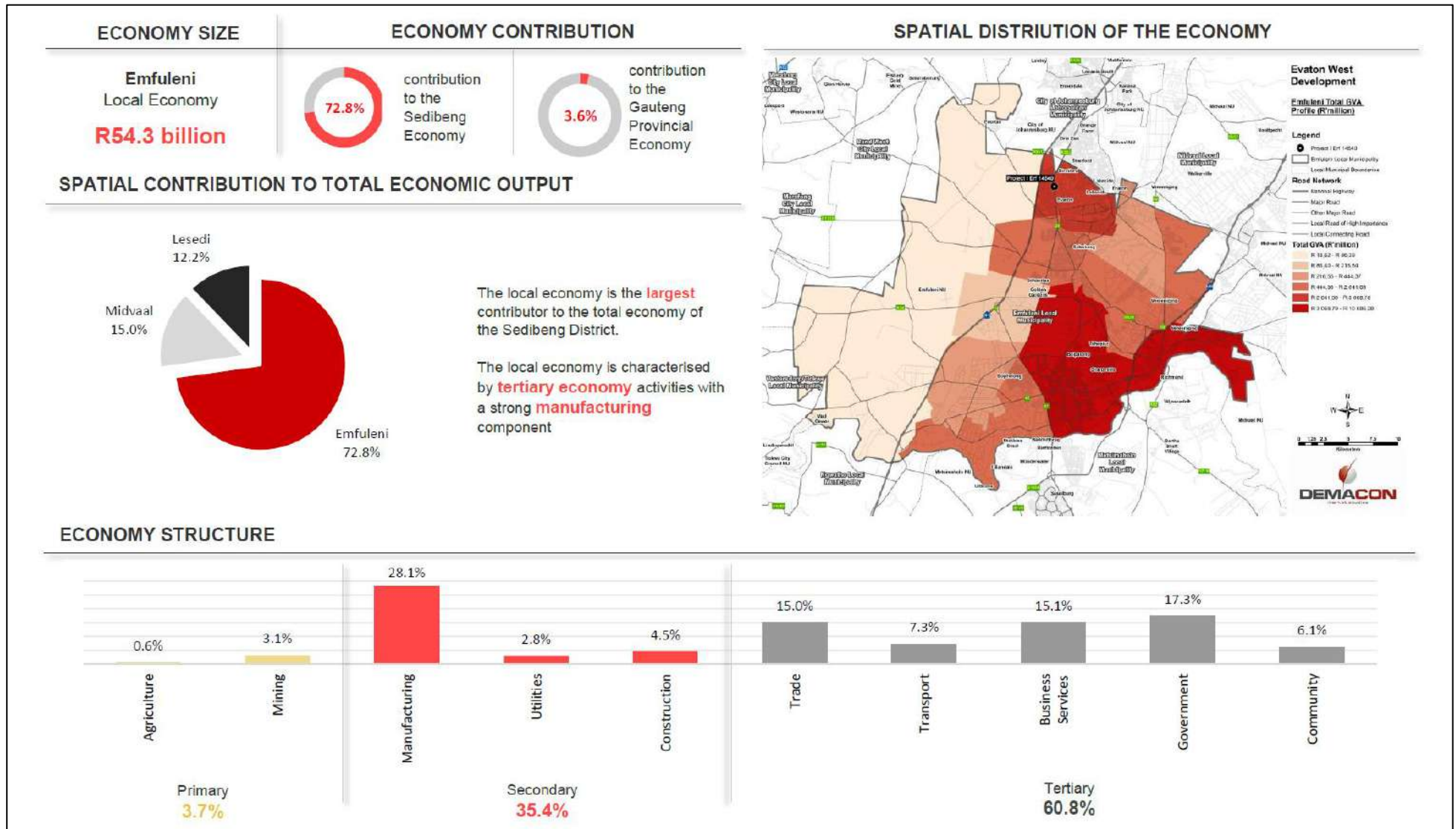


Defining the geographic context of a local or regional economy thus enables targeted analysis and a clear understanding of how a local or regional economy could impact/influence the proposed development.

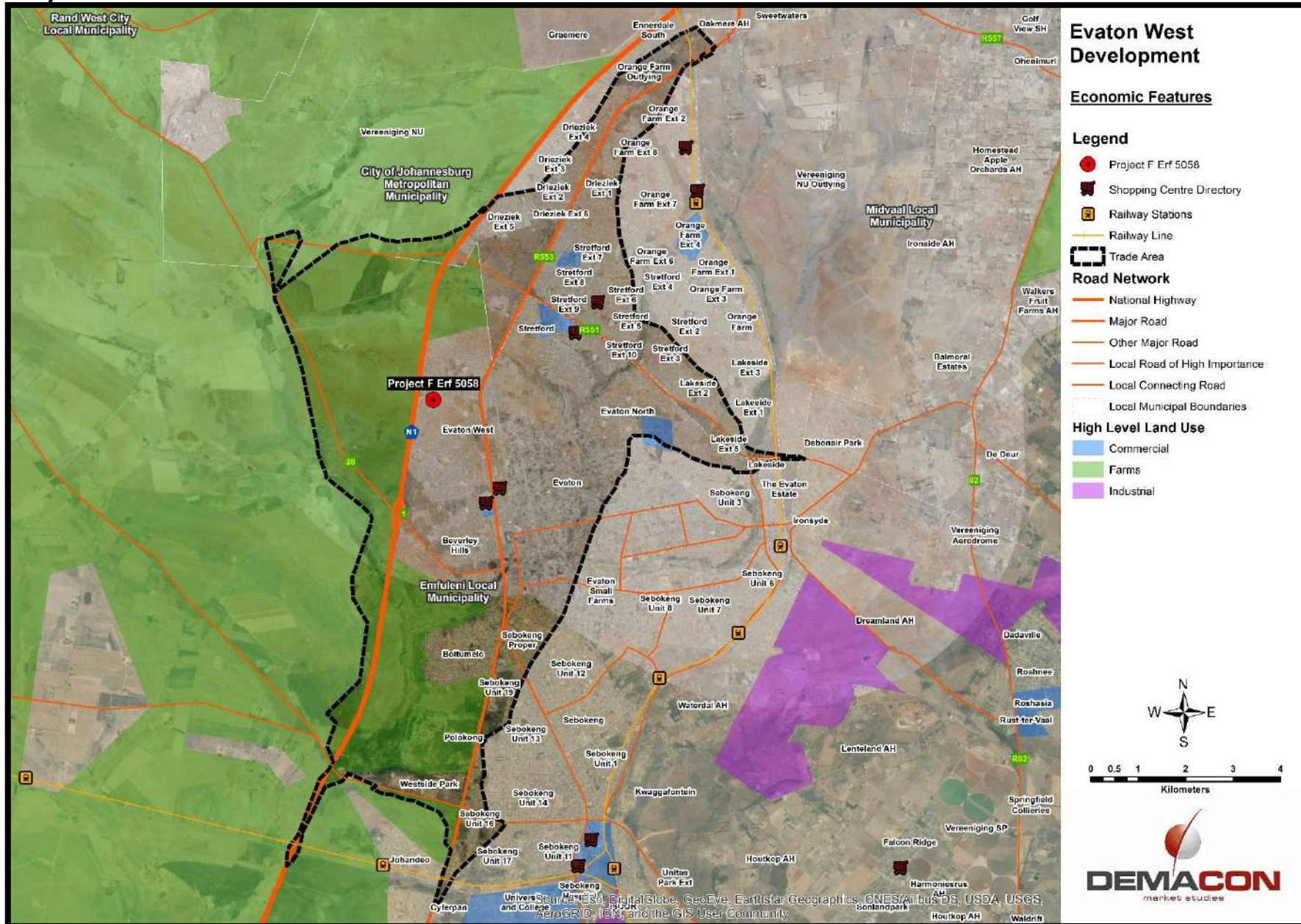
Map 2.1: Project F within Emfuleni Local Economy



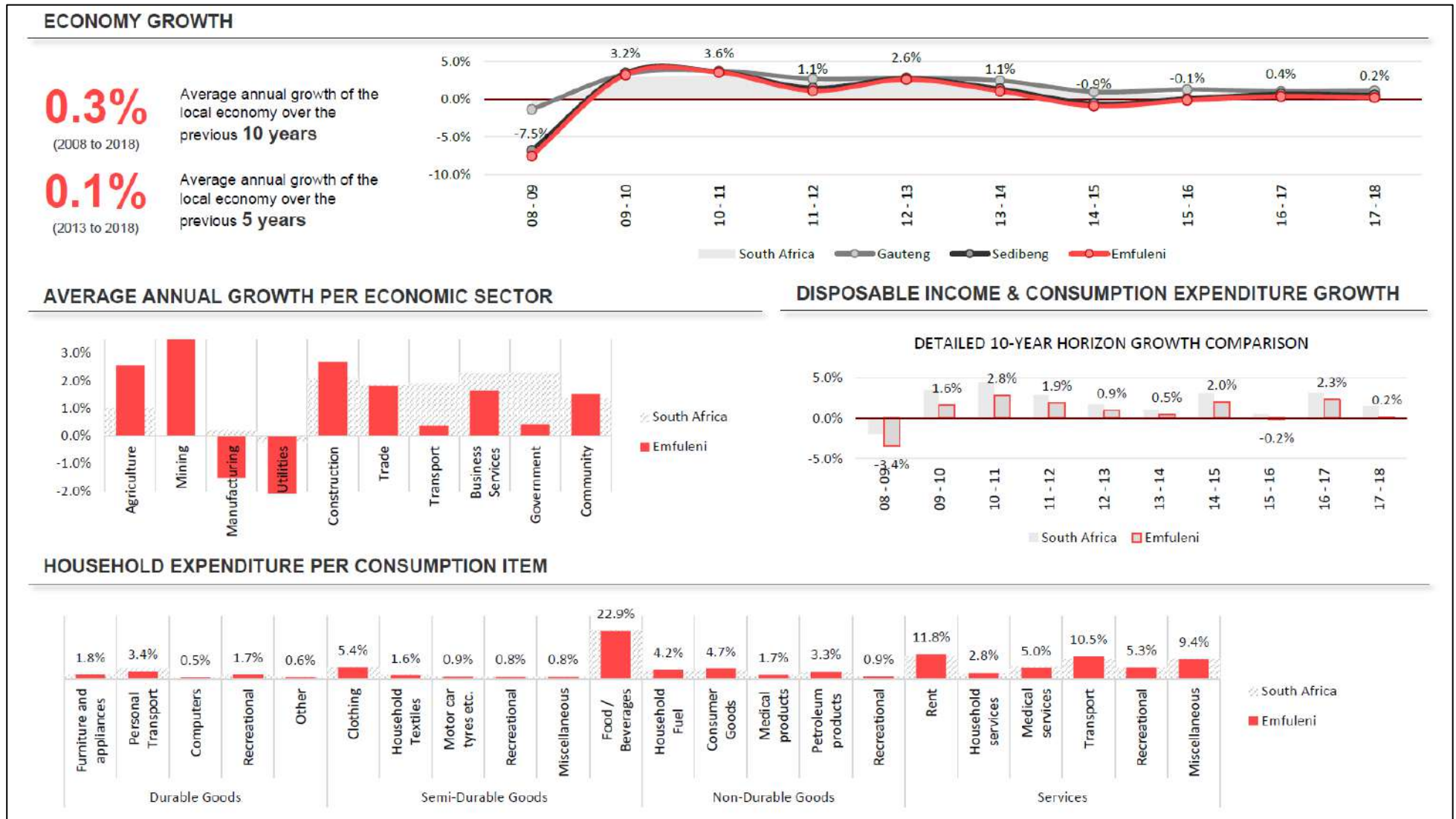
## 2.4.2 ECONOMY SIZE AND STRUCTURE



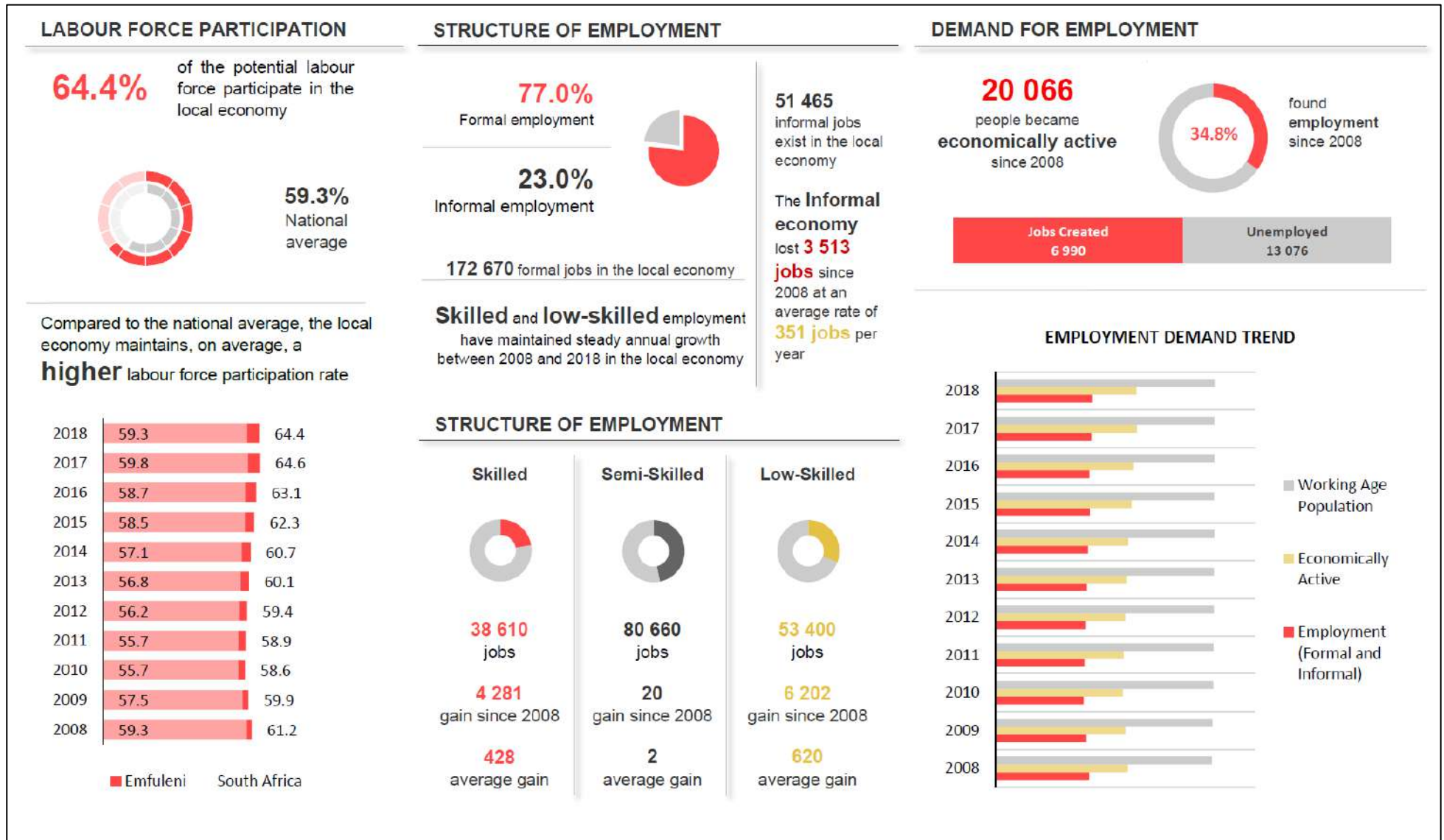
Map 2.2: Project F with Local Economic Features



## 2.4.2 ECONOMIC GROWTH AND HOUSEHOLD CONSUMPTION AND EXPENDITURE



### 2.4.3 LABOUR FORCE PARTICIPATION





**TRADE AREA &  
DEMOGRAPHIC  
PROFILES**

**3**

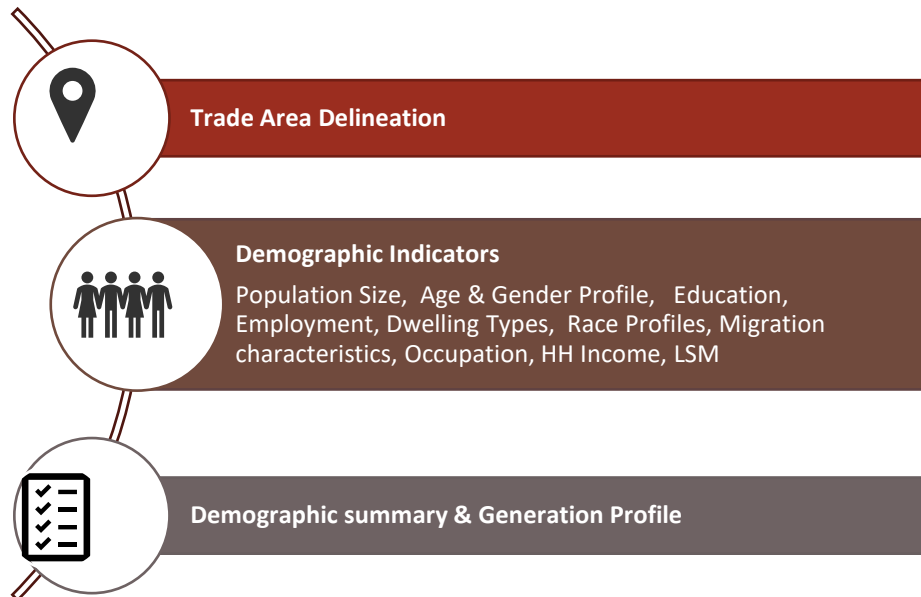


## SECTION 3: TRADE AREA & DEMOGRAPHIC PROFILES

### 3.1 INTRODUCTION

The demand for economic/non-economic activities is, in part, based on demand generated by the demographic component of a specific market area or catchment. The current demographic composition in a market area coupled with past trends and future potential growth, impact on the current and future demand for economic activities.

The consumer market profile is outlined in terms of the following headings:

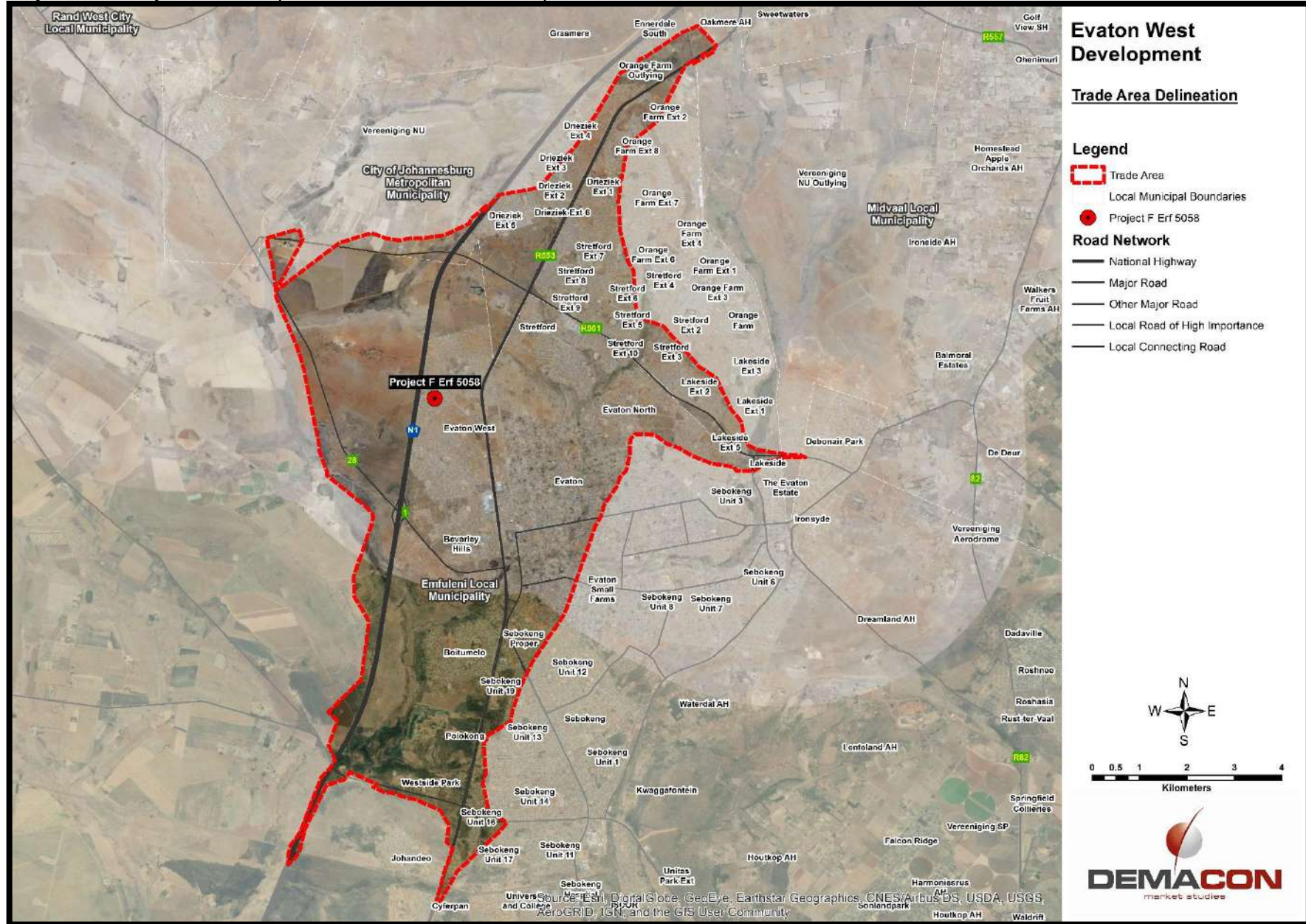


### 3.2 TRADE AREA DELINEATION

A market area assists with determining the main socio-economic market characteristics affecting the proposed development. The primary market area for the project is based on a **15-minute drive time isochrone**.

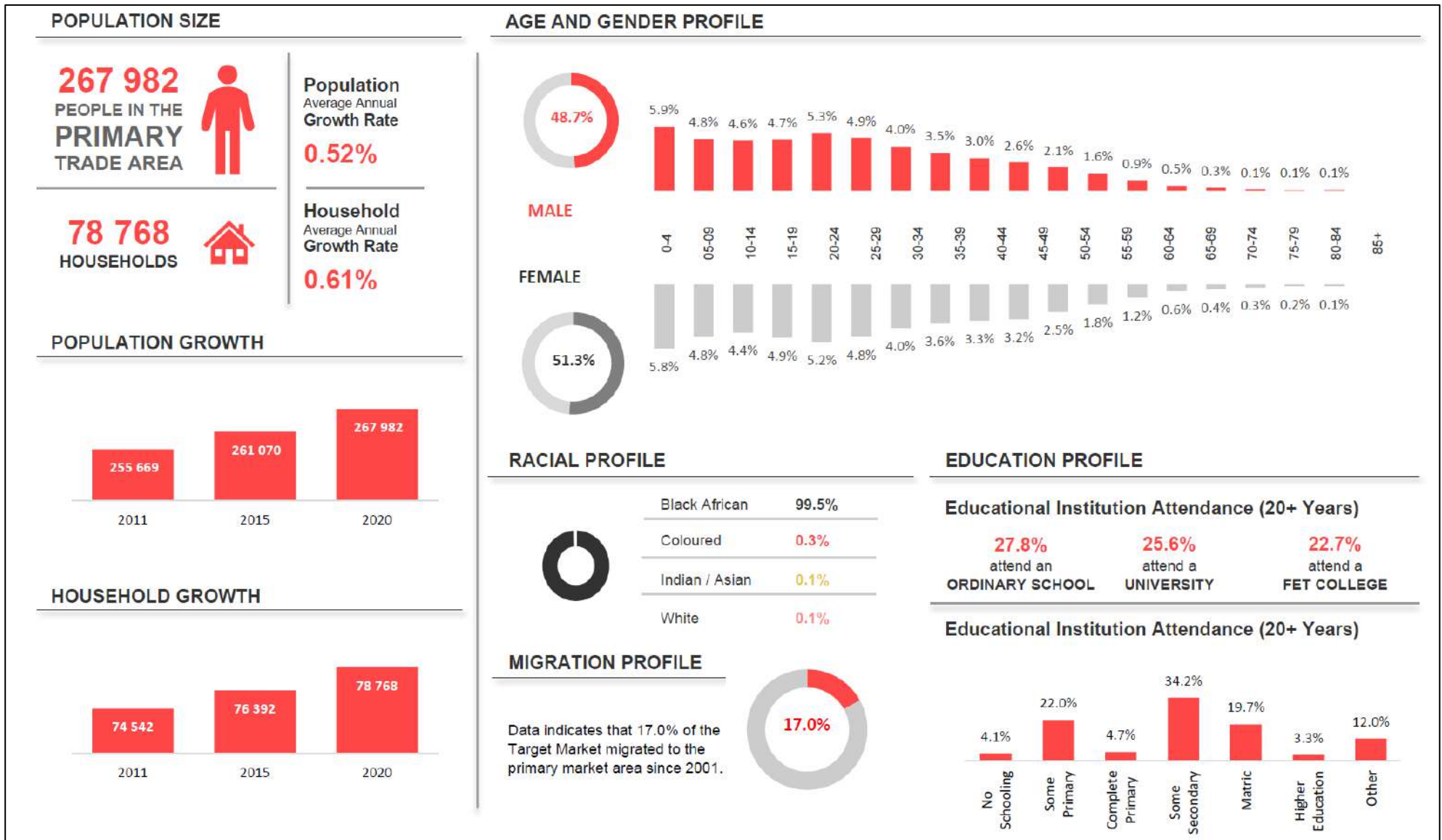
The trade area, as shown in the map, illustrates that the primary trade is mostly urbanised and consists of formal residential suburbs and supporting amenities and facilities.

Map 3.1: Project F - Primary Market Area (15-minute drive time isochrone)

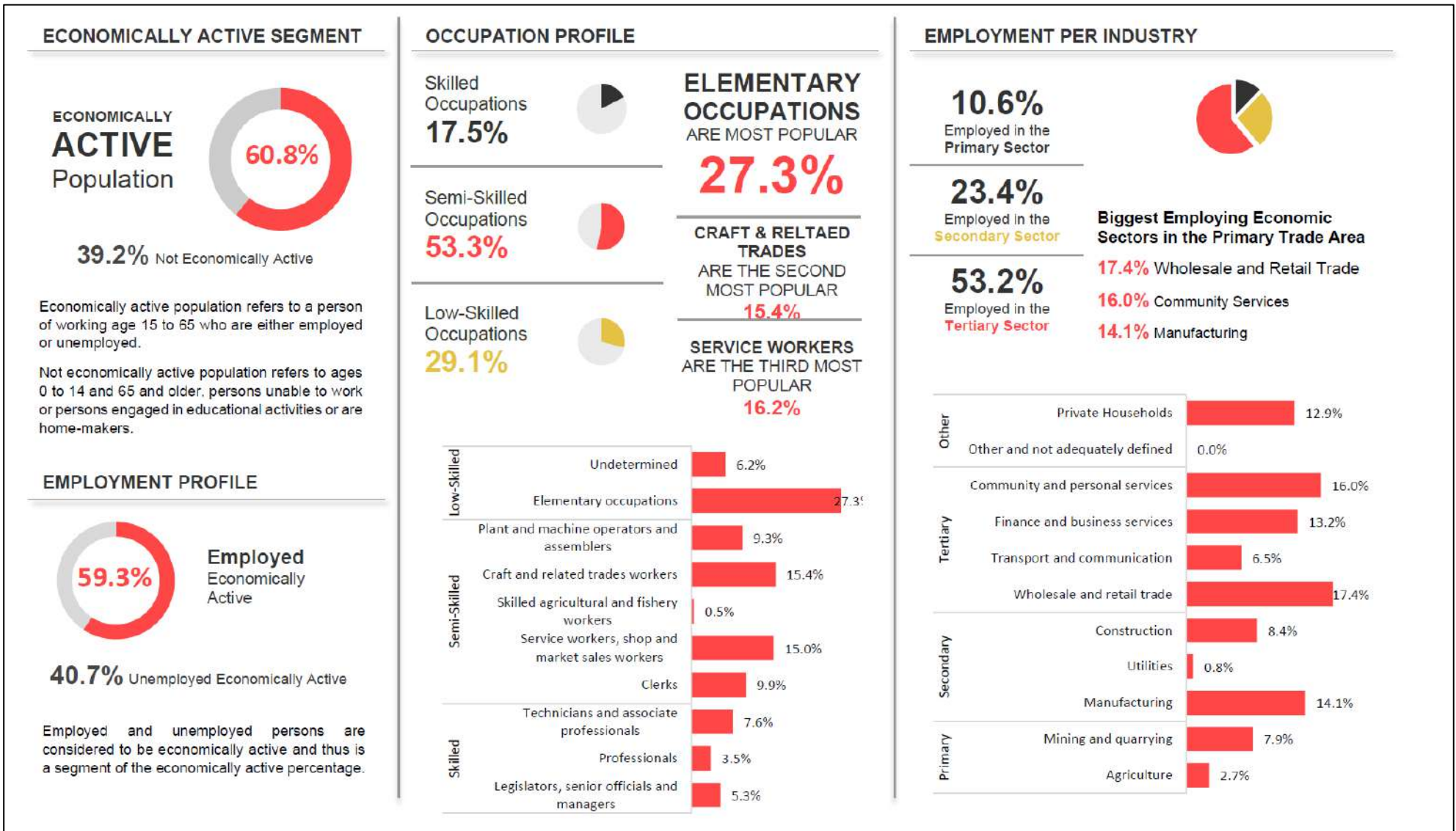


Source: DEMACON, 2020

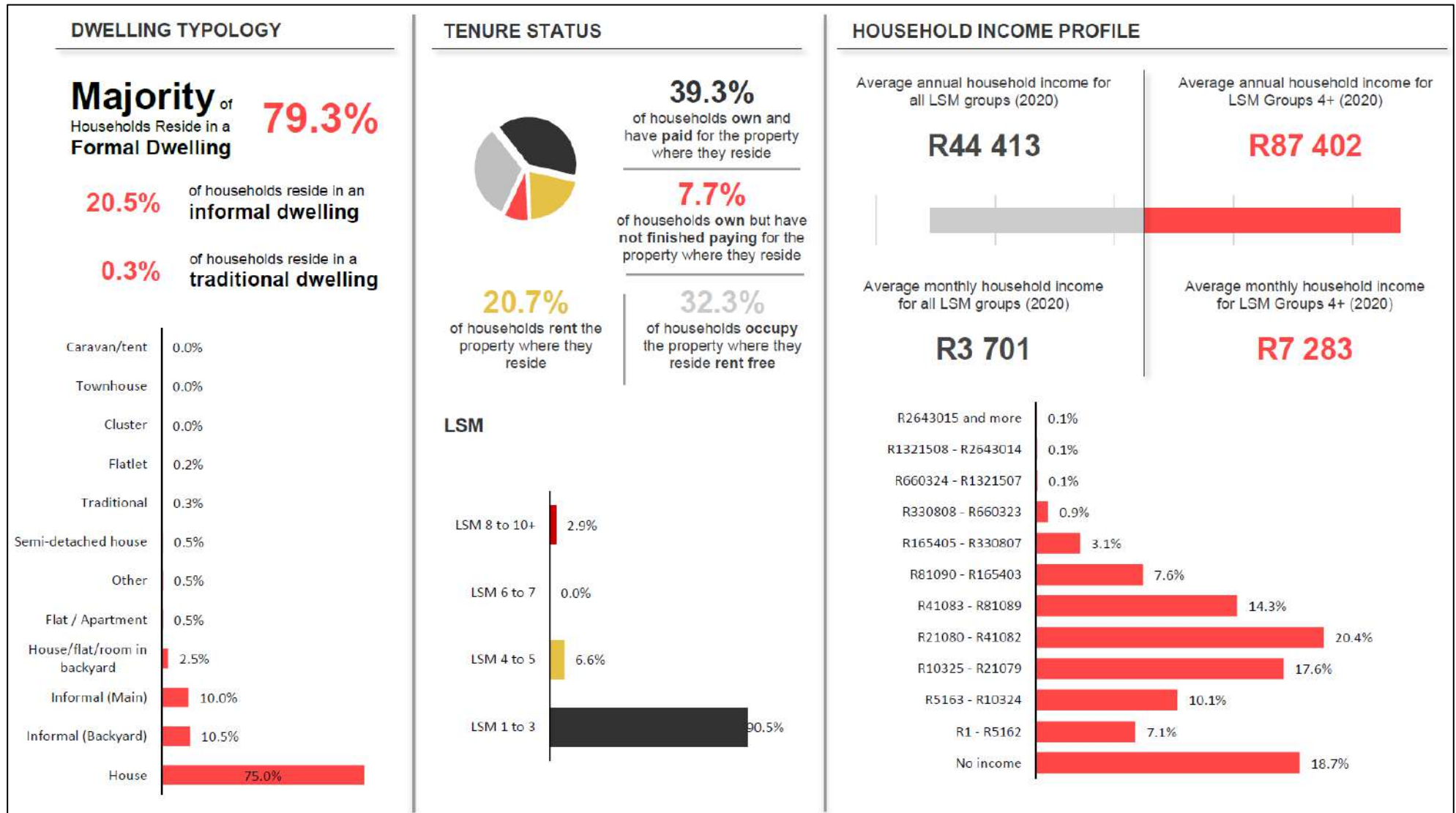
### 3.2.1 DEMOGRAPHIC SIZE AND COMPOSITION



### 3.2.2 EMPLOYMENT PROFILE



### 3.2.3 HOUSEHOLD PROFILE



### 3.2.4 LSM TO SEM

The discontinuation of the All Media Products Survey (by the South African Audience Research Foundation (SAARF)), on which the Living Standard Measure (LSM) classifications were based, gave way to a new measurement system called The Socio-Economic Measure model (SEM). The newly released SEM model is a more accurate reflection of South African society in terms of how people live and is not dependent solely on durables, as the historical LSMs have been. The new SEM offers marketers a statistical and technical solution that depicts how our citizens are living, not only what they have in their homes.

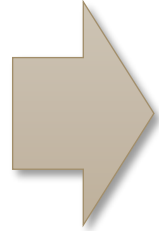
# LSM

# VS

# SEM

#### LATEST VARIABLES:

- Hot running water
- Fridge/freezer
- Flush toilet in house/on plot
- VCR in household
- Vacuum cleaner/floor polisher
- Have a washing machine
- Have a computer at home
- Have an electric stove
- Have TV set(s)
- Have a tumble dryer
- Have a Telkom telephone
- Hi-Fi or music centre
- Built-in kitchen sink
- Home security service
- Have a deep freeze
- Water in home/on stand
- Have M-Net and/or DSTV
- Have a dishwasher
- Metropolitan dweller
- Have a sewing machine
- DVD player
- House/cluster/townhouse
- 1/more motor vehicles
- No domestic worker
- No cellphone in household
- 1 cellphone in household
- None or only one radio
- Living in a non-urban area



#### FINAL VARIABLES:

- Post office nearby
- Police office nearby
- Built-in kitchen sink
- Home security service
- Motor car
- **Deep freezer which is free standing**
- **Microwave oven**
- **Floor polisher or vacuum cleaner**
- **Washing machine**
- Floor material
- Water source
- Type of toilet



Focus on structural items



Low reliance on durables



No reliance on technology items



Short and easy to use

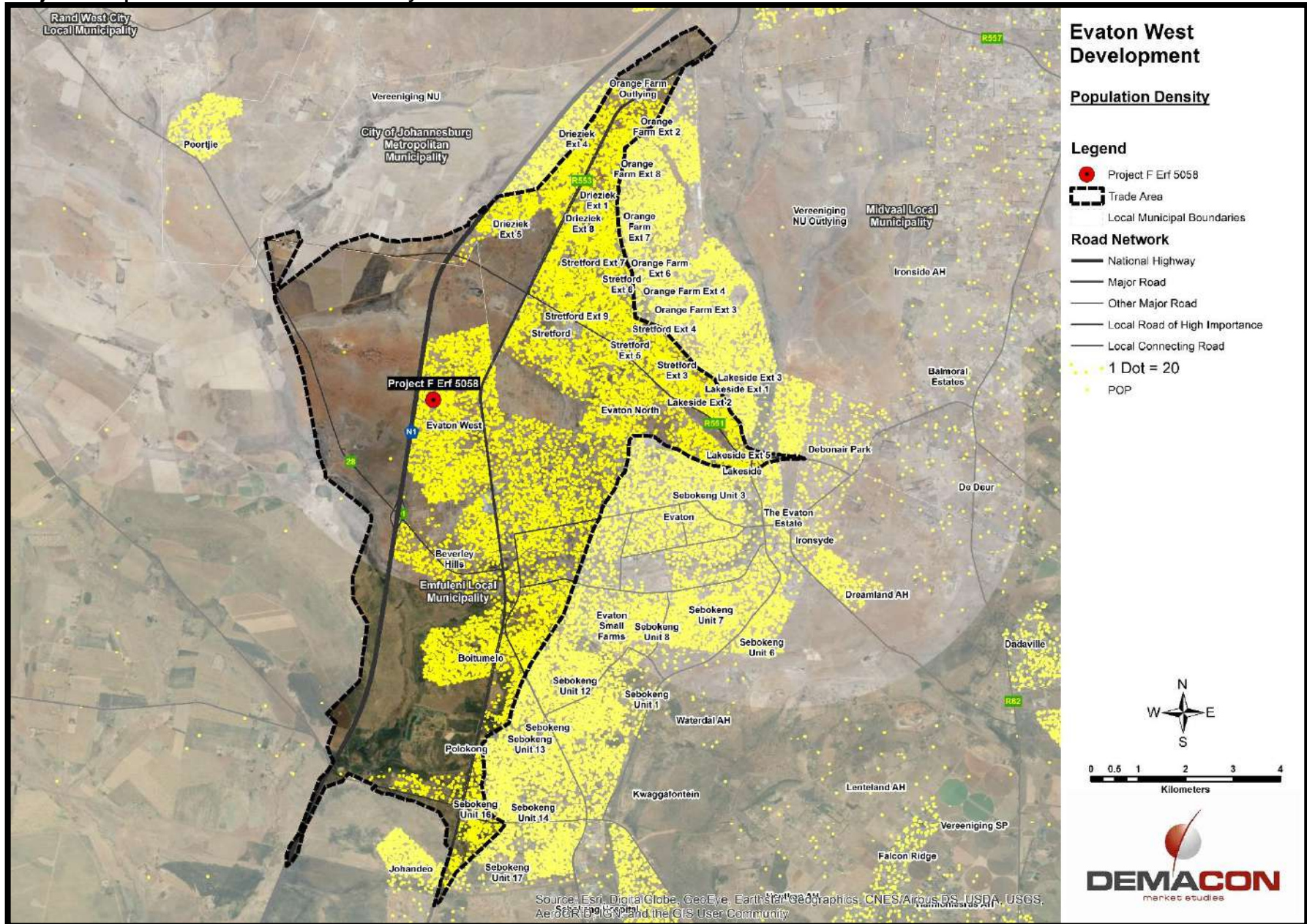
#### LIMITATIONS OF LSM:

- **LSM is not related to any specific brand or category**
- **LSM cannot accurately determine spending power**
- **Consumers have changed, LSM hasn't**

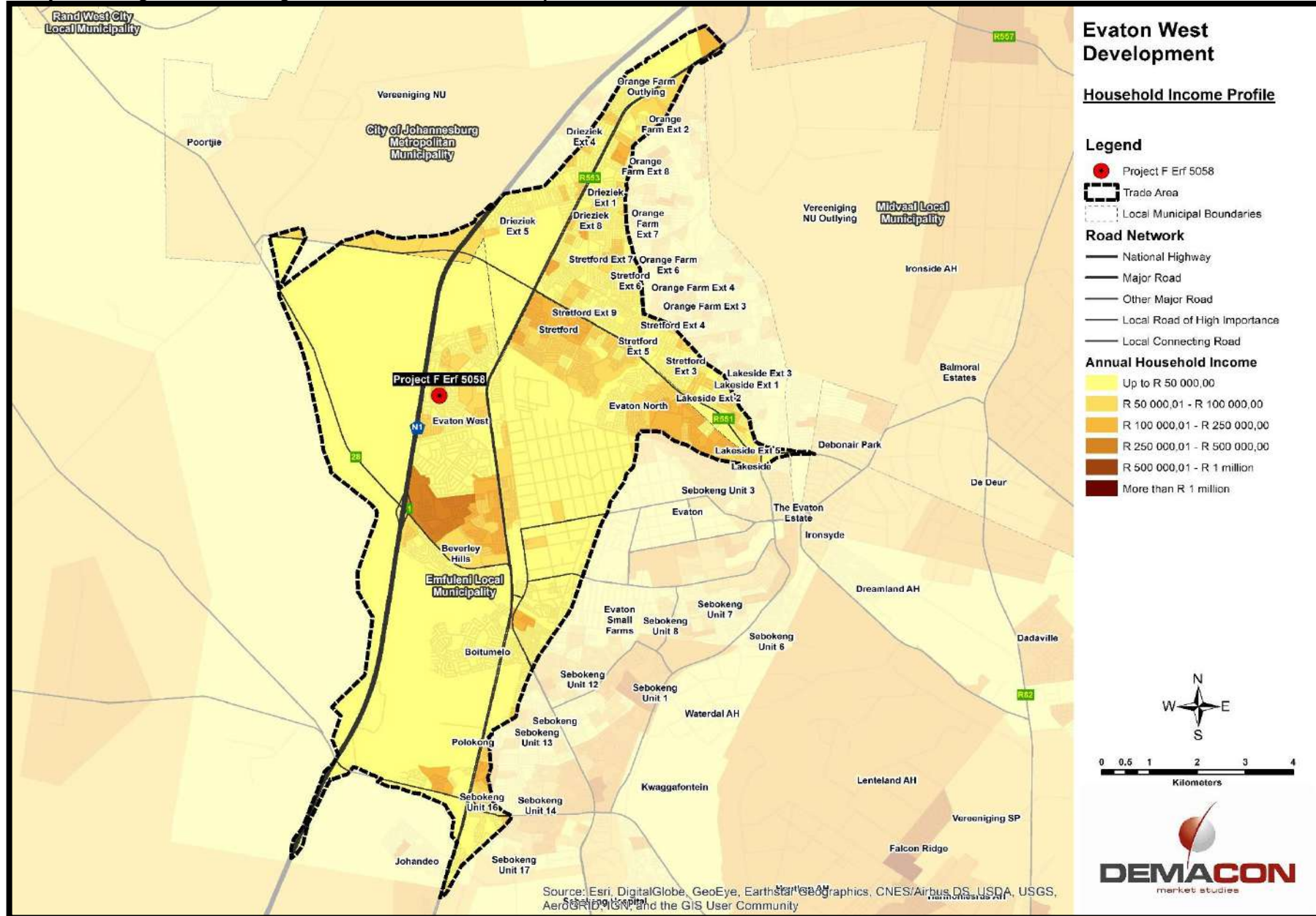
SEM CLASSIFICATION - EVATON WEST PROJECT F



Map 3.2: Project F - Population Distribution in the Primary Market Area

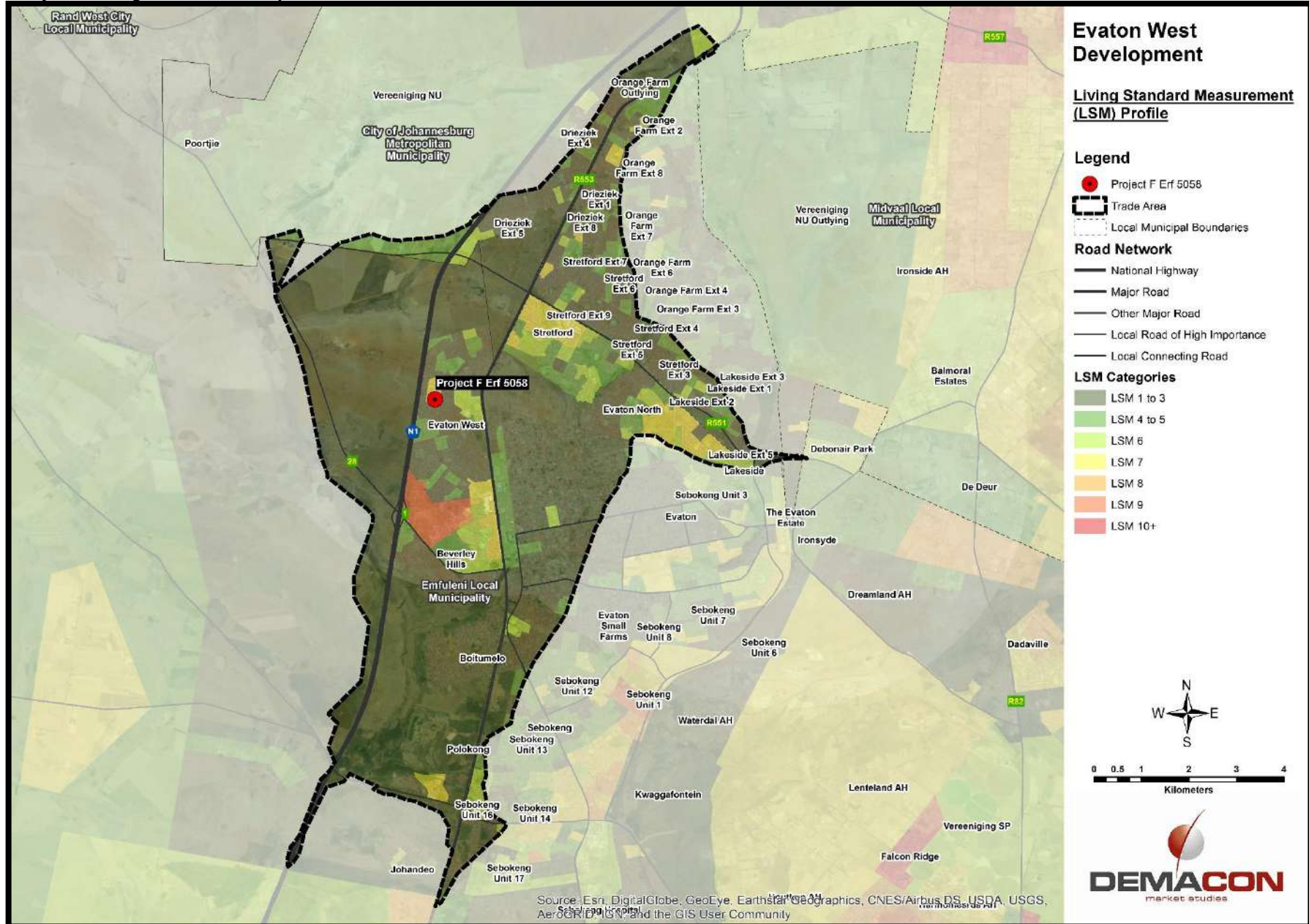


Map 3.3: Project F - Target Market Average Annual Household Income Spatial Distribution

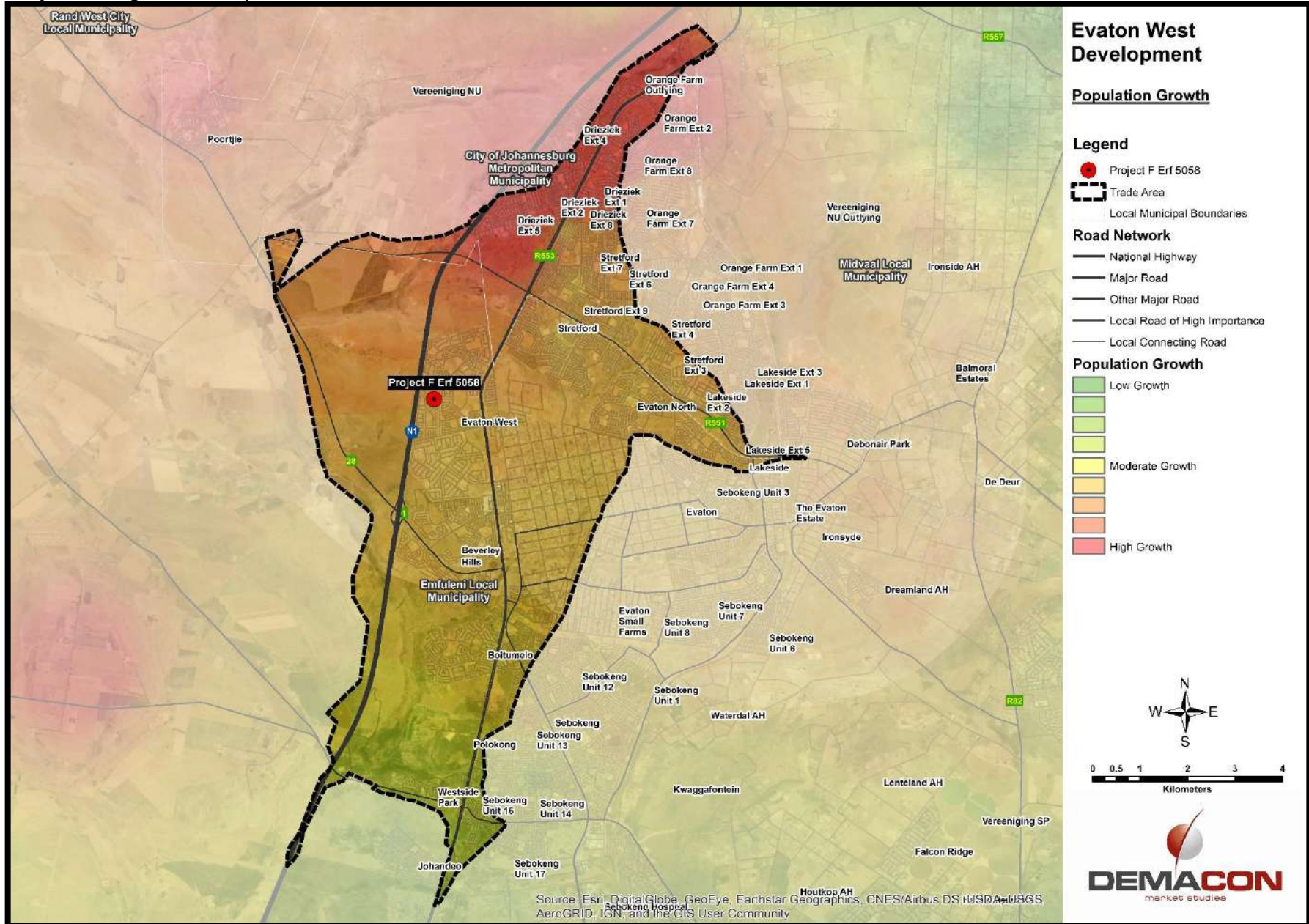




Map 3.4: Project F - Target Market LSM Spatial Distribution

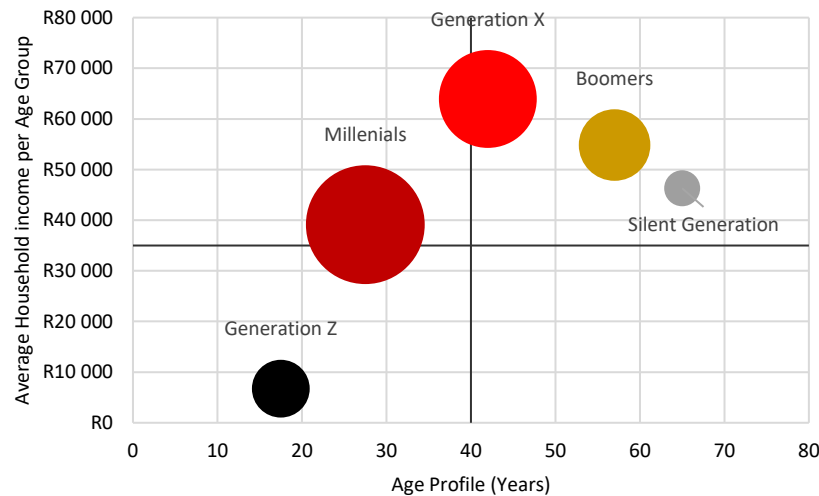


Map 3.5: Project F - Target Market Population Growth

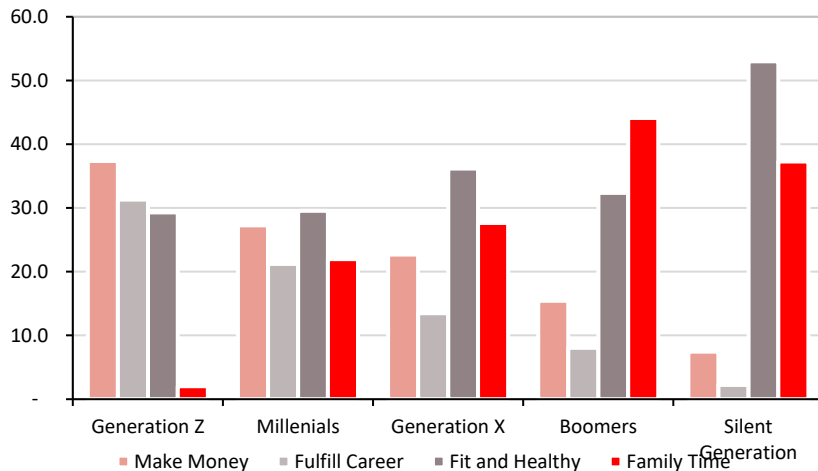


### 3.2.4 GENERATION CONSUMER SEGMENTS

#### GENERATIONAL CONSUMER SEGMENTS



#### MAIN ASPIRATIONS OF CONSUMER SEGMENTS



#### CONSUMER SEGMENTS AND AGE PROFILE

##### GENERATION Z



##### Aged 15 To 20

The labels being attached to this generation include 'realistic', 'highly connected' and 'digital natives'. Generation Zs are seen to be wary with their money, having seen their parents lose jobs and their older siblings move back home because housing is so expensive. Via expert use of social media and the internet, they have already become demanding purchasers. They research diligently, are marketing savvy and are much less likely to make impulse purchases. They will find the best deals and will expect to test out products physically or virtually before they commit to buy. Generation Z will, apparently, want brands to show their long-term value.

##### MILLENNIALS



##### Aged 21 To 34 Years

The majority of this generation has never known a world without mobile phones, laptops and cable television. This cohort is the one that tends to cop most criticism at the moment, with labels such as 'used to instant everything', 'believe they can separate effort from reward', 'do not live to work but work to live'. This segment is the most formally educated and most sophisticated of all the generations before it. Detailed research has shown that they are looking for brands that resonate with their peers. They are very image driven and so value, for example, electronic toys, piercings and tattoos. Other research shows that they pay less attention to quality than other generations.

##### GENERATION X



##### Aged 35 To 49 Years

A bridging generation, which joined the workforce generally during periods of economic prosperity (the mid to late 1980s onwards). Generation X's are highly educated but more questioning of convention than the Baby Boomers. They are also generally more interested in balancing family, life and work, and much less inclined to sacrifice time, energy and relationships for career advancement like the Baby Boomers did.

##### BOOMERS



##### Aged 50 & 64

Now aged between 50 and 64 years. Influenced in their upbringing by strong economic growth and generally full employment, they are generally considered to be adaptive and flexible. Baby Boomers are regarded as having defined themselves largely by their careers, with a high proportion considered to be workaholics. They are increasingly moving into the retirement phase of their life, but many plan to continue working..

##### SILENT GENERATION



##### Aged 65 & older

Shaped by major influences including the Great Depression and two world wars. Not surprisingly, this cohort values savings, morals and ethics, and tends to be very patriotic. Family togetherness and conformity are also very important attributes for them.



**RESIDENTIAL  
DEVELOPMENT  
POTENTIAL**

**4**

## SECTION 4: RESIDENTIAL DEVELOPMENT POTENTIAL

### 4.1 INTRODUCTION

This section of the report focuses on the residential market, with the objective of estimating the development potential within the designated area. In order to reach this objective, the supply and demand for residential facilities within the market area should be identified and assessed in terms of current trends. Subsequent paragraphs highlight the following main headings in order to identify the aforesaid beneficiaries:



### 4.2 LOCAL RESIDENTIAL MARKET ACTIVITY IN EVATON WEST

The following section reflects on residential market activity within the suburb of Evaton West over the past nine to ten years.

#### RESIDENTIAL TRANSACTIONS WITHIN EVATON WEST

The following section reflects on residential **transaction data** within Evaton West between 2009 and 2019.

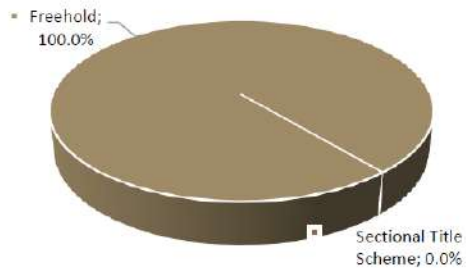
#### RESIDENTIAL SALES TRENDS WITHIN EVATON WEST

The following section reflects on residential **sales trends** within the suburb between 2010 and 2019.

### 4.2.1 LOCAL TRANSACTION DATA – EVATON WEST (2009 - 2019)

#### LOCAL TRANSACTION DATA – EVATON WEST

##### RESIDENTIAL MARKET STOCK



##### Average Annual Registrations:

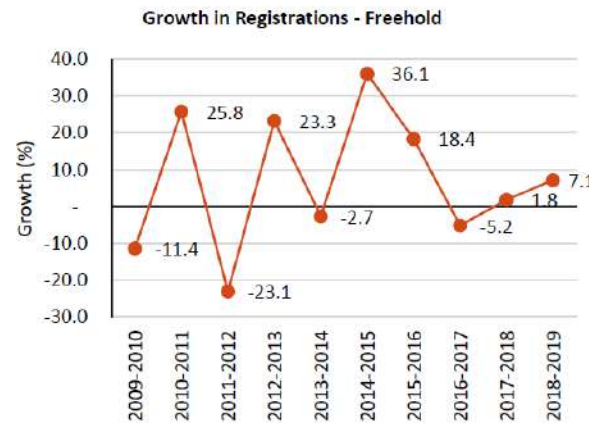
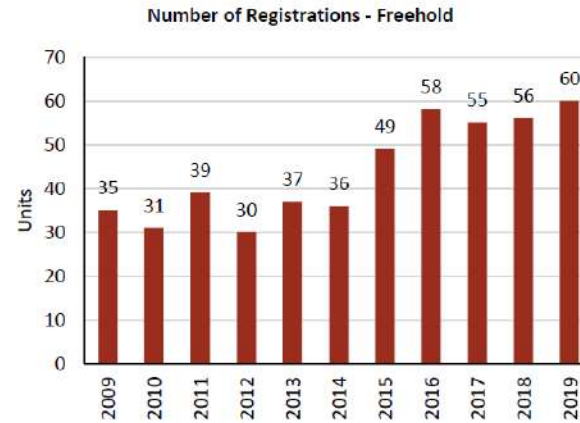
- Freehold: **44 units**
- Average Annual Growth: **7.0% growth.**



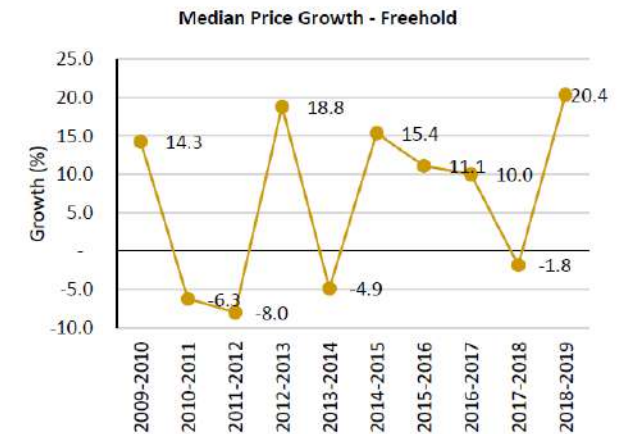
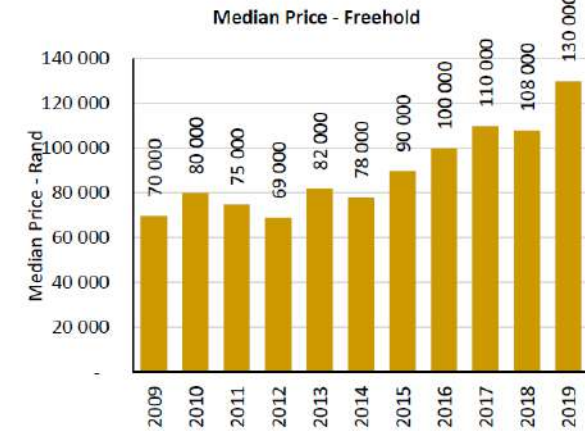
##### Average Median Prices:

- Freehold: **R90 182**
- Average Annual Growth: **6.9% growth.**

##### RESIDENTIAL REGISTRATIONS & GROWTH






##### MEAN RESIDENTIAL PRICES & GROWTH

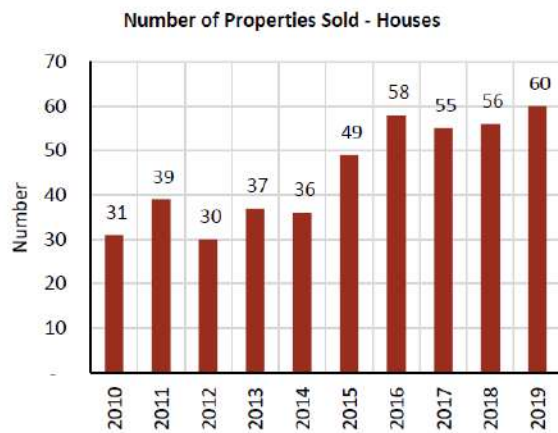
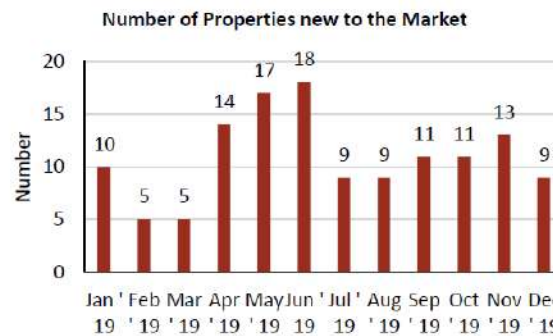
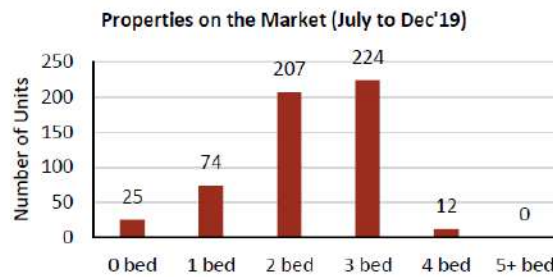


### 4.2.2 LOCAL RESIDENTIAL MARKET ACTIVITY – EVATON WEST (2010 - 2019)

#### LOCAL RESIDENTIAL MARKET ACTIVITY – EVATON WEST

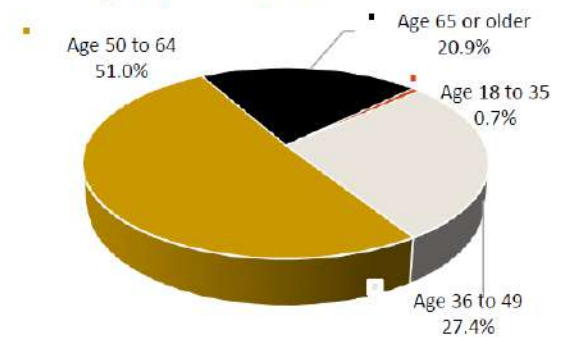
##### AVERAGE ASKING PRICE

<b>1</b> 	R 159 900
<b>2</b> 	R 387 522
<b>3</b> 	R 526 533
<b>4</b> 	R 550 000

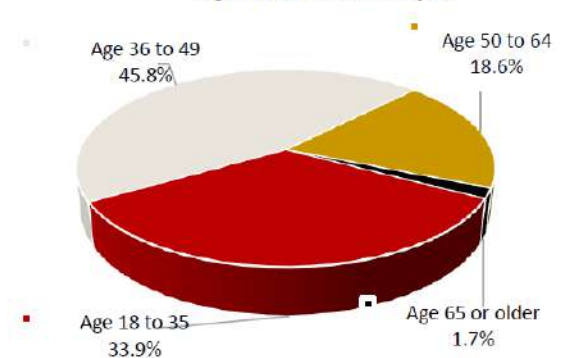


- Average number sold per annum **45 units** (9.1% growth).
- Average sales price **R92 159** (2.6%)
- **60** houses sold in 2019 at an average price of **R130 000**.

##### Age Profile of Stable Owners



##### Age Profile of Recent Buyers



## 4.3 LOCAL RESIDENTIAL MARKET ACTIVITY IN SURROUNDING REGION

### RESIDENTIAL SALES LISTED IN THE MARKET AREA

The following table and graphs provide information on residential sales activity within selected surrounding suburbs within the trade area. Information covers data in terms of bedroom units, quantity, average prices, standard deviation and classification.

The suburbs that were selected for the analysis includes:

- ✓ Johandeo
- ✓ Boitumelo
- ✓ Drieziek
- ✓ Polokong
- ✓ Evaton West
- ✓ Sebokeng Zone 8
- ✓ Orange Farm
- ✓ Lakeside
- ✓ Westside Park
- ✓ Sebokeng Zone 12
- ✓ Evaton North
- ✓ Stretford
- ✓ Sebokeng Zone 13
- ✓ Sebokeng Zone 3
- ✓ Sebokeng Zone 11
- ✓ Evaton
- ✓ Beverley Hills
- ✓ Sebokeng Zone 7
- ✓ Sebokeng Zone 6
- ✓ Kwaggafontein
- ✓ Ironsyde
- ✓ Sebokeng Zone 10
- ✓ Debonair Park.

With reference to sales data within these suburbs, only houses were offered as sales options.

### RESIDENTIAL RENTALS LISTED IN THE MARKET AREA

Extremely limited rental listings were found for these suburbs. A mere four houses were listed between Beverley Hills and Drieziek. These properties included two bedrooms and a single bathroom. Monthly rentals varied between R2 500 and R4 650 (average of R3 895 per unit per month).



4.3.1 RESIDENTIAL MARKET ACTIVITY - HOUSE SALES

**RESIDENTIAL MARKET ACTIVITY IN TERMS OF HOUSE SALES – SURROUNDING SUBURBS**

Size	Minimum	Maximum	STD Deviation	Average price	#	%
<b>Houses</b>						
1 Bedroom	R110 000	R250 000	R33 795	R159 219	29	5.4%
2 Bedrooms	R115 000	R720 000	R120 346	R375 037	283	52.2%
3 Bedrooms	R125 000	R980 000	R151 870	R539 757	212	39.1%
4 Bedrooms	R350 000	R2 200 000	R633 583	R852 692	12	2.2%
5 Bedrooms	R1 980 000	R1 980 000	R0	R1 980 000	2	0.4%
6+ Bedrooms	R470 000	R3 000 000	R1 193 967	R1 217 500	4	0.7%
<b>Average price</b>				<b>R449 797</b>	<b>542</b>	<b>100%</b>



542 Properties Listed

Average Sales Price:



**R449 797**

Average Stand Size:



**269 sqm**

Average Unit Size:

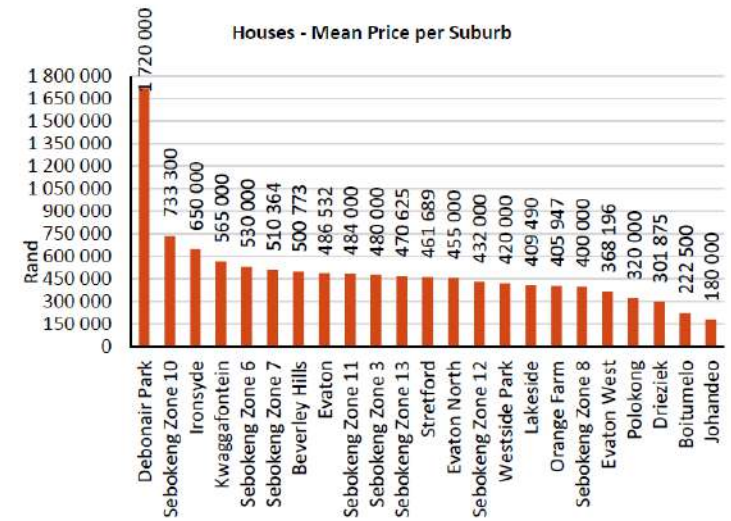
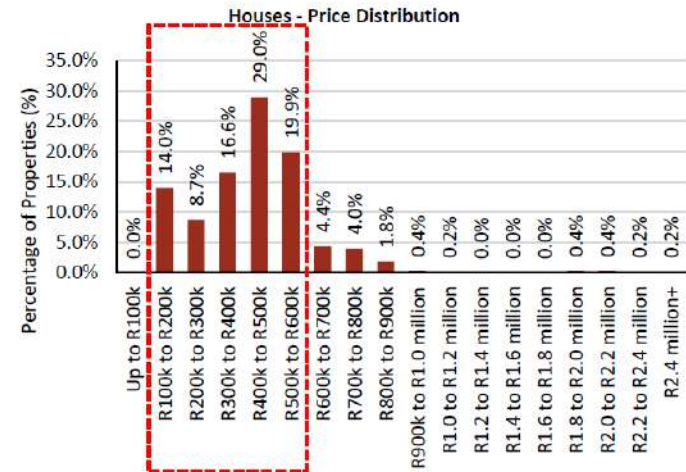
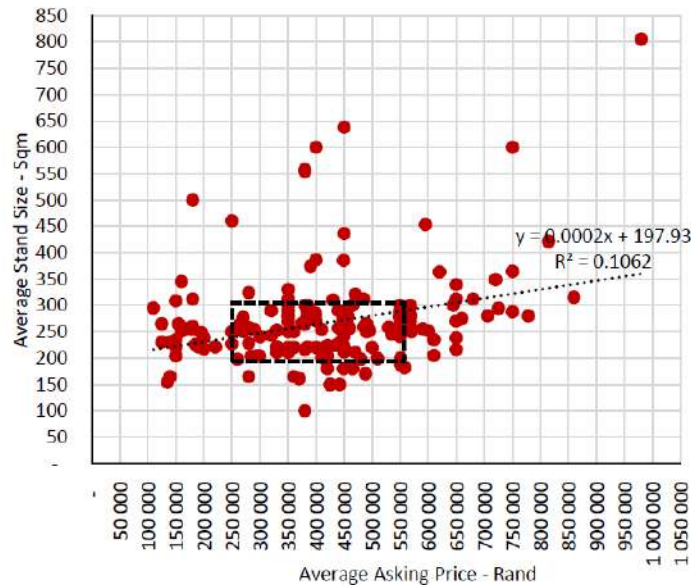
**61 sqm**

Most prominent:



**2- and 3-Bedroom Units**

Houses: Average Stand Size versus Average Asking Price



Evaton West houses priced between R100k to R200k:



Evaton West houses priced between R200k to R300k



Evaton West houses priced between R300k to R400k:



Evaton West houses priced between R400k and R500k:



Evaton West houses priced between R500k and R600k:

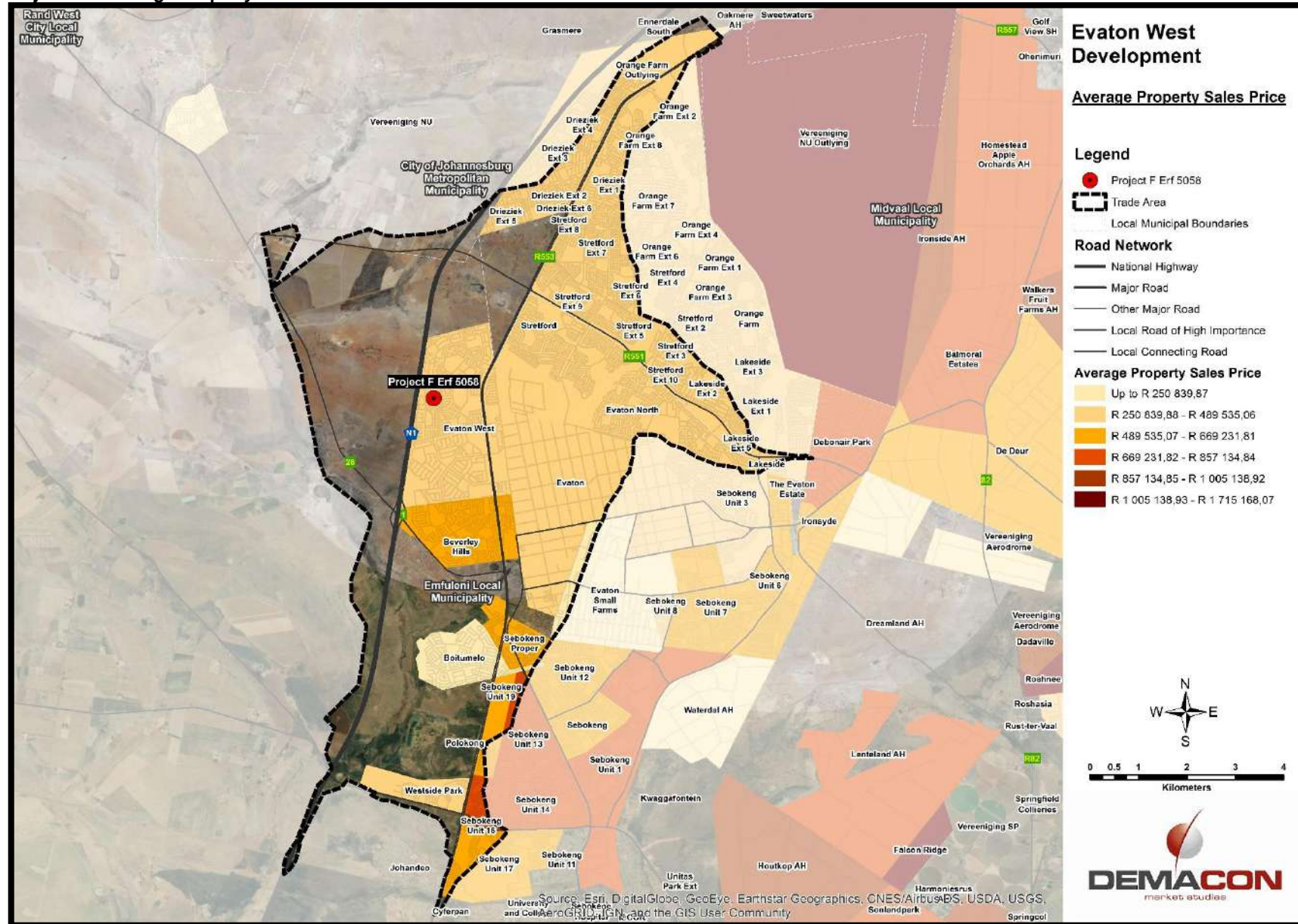




Evaton West houses priced above R600k:



Map 4.1: Project H – Average Property Sales Price



#### 4.4 KEY INDICATORS INFLUENCING DEMAND



- ✓ The threshold for the secondary market’s household income limit has been increased from R7 500 to R15 000 per month.
- ✓ Definitions are as per latest SHRA requirements.
- ✓ Beneficiary must be a SA citizen or have legitimate work permit and associated papers.

Demand for residential units can be stated as follows:

##### Definition

The residential market refers to land uses associated with human habitation such as housing or dwelling units. Residential use can vary in typology, density, tenure, structure, layout and affordability. ‘Residential’ does not include hotels or guesthouses, which are defined as being ‘short-stay’ accommodation.

##### Defining demand

Residential demand depends on a variety of factors. In this context, residential demand can be conceptualised as follows:

$$Dres. = f \{Po; P\%; Q; Pr; Pr\%, ROI, I, Tx; Y; Hs; R; Ci; Hs; Hp\}$$

Where:

Po	=	Population Size
P%	=	Population growth rate
Q	=	Existing quality of residential environment
Pr	=	House prices
Pr%	=	Growth in house prices
ROI	=	Return on investment
I	=	Interest rates
Tx	=	Rates and Taxes
Y	=	Household income
Hs	=	Household size
R	=	Rent
Ci	=	Cap Rates
Hs	=	Housing shortage
Hp	=	Housing preferences

#### 4.5 RESIDENTIAL DEMAND MODELLING

This section of the report focuses on the residential market, with the objective of estimating the development potential within the market area. In order to reach this objective, the supply and demand for residential facilities within the market segment should be identified and assessed in light of current trends.

**Table 4.1: Social housing and monthly income brackets**

Type of Housing	Monthly Household Income Brackets
Social Housing	Primary Beneficiaries – R1 500 to R5 500 (at least 30% of social housing project)
	Secondary Beneficiaries – R5 501 to R15 000

Source: Centre for Affordable Housing Finance in Africa

- ✓ The threshold of the primary market’s household income limit has been increased from R3 500 to R5 500 per month.

### 4.5.1 SOCIAL HOUSING

#### Income and Housing Affordability

Table 4.2 indicates a range of income midpoints, midpoint house prices and classifications attainable by the source market area.

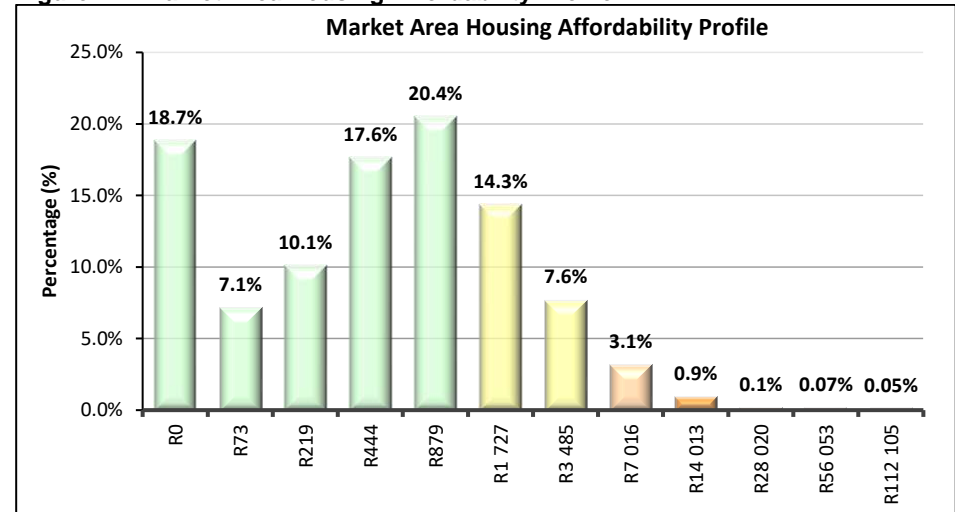
Table 4.2: Residential Affordability Profile

Income Midpoint 2020 (R)	House Price (Midpoint)	Generic Indicative Unit Size	(%)	Classification
R 0	R 0	40m <sup>2</sup> - 50m <sup>2</sup>	73.9%	Subsidy / Social Housing
R 2 581	R 7 300	40m <sup>2</sup> - 50m <sup>2</sup>		Subsidy / Social Housing
R 7 743	R 21 897	40m <sup>2</sup> - 50m <sup>2</sup>		Subsidy / Social Housing
R 15 700	R 44 401	40m <sup>2</sup> - 50m <sup>2</sup>		Subsidy / Social Housing
R 31 077	R 87 888	50m <sup>2</sup> - 60m <sup>2</sup>		Subsidy / Social Housing
R 61 078	R 172 733	60m <sup>2</sup> - 70m <sup>2</sup>	14.3%	FLISP / Gap
R 123 231	R 348 506	80m <sup>2</sup> - 90m <sup>2</sup>	7.6%	FLISP / Gap
R 248 074	R 701 571	120m <sup>2</sup> - 140m <sup>2</sup>	3.1%	Middle to Higher Income
R 495 502	R 1 401 317	140m <sup>2</sup> - 400m <sup>2</sup>	0.9%	Middle to Higher Income
R 990 789	R 2 802 024	420m <sup>2</sup> - 750m <sup>2</sup>	0.1%	Higher Income
R 1 982 007	R 5 605 262	780m <sup>2</sup> - 1000m <sup>2</sup>	0.1%	Top-End
R 3 964 012	R 11 210 520	1 000m <sup>2</sup> +	0.1%	Top-End

Source: DEMACON Demand Modelling, 2020

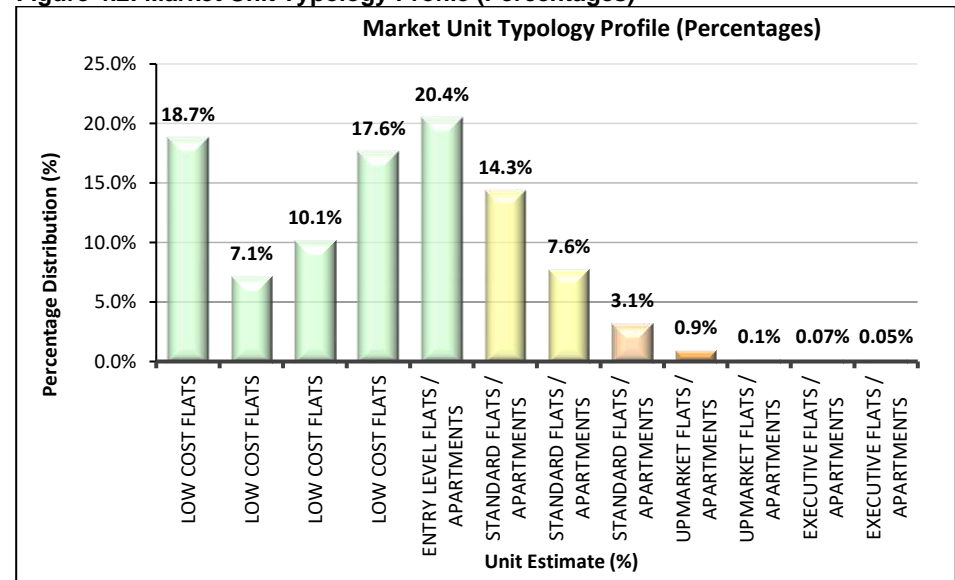
Figure 4.1 indicates the target market housing profile based on the affordability analysis within the delineated source market.

Figure 4.1: Market Area Housing Affordability Profile



Source: DEMACON Demand Modelling, 2020

Figure 4.2: Market Unit Typology Profile (Percentages)



Source: DEMACON Demand Modelling, 2020

### Social Housing Development Potential – Project G

Social housing draws from an immediate catchment. Demand is also infused by households in the wider regional source market that could potentially qualify for subsidised rentals – based on *inter alia* income considerations, official housing backlogs and informal household counts from surrounding markets. Foreign nationals with legitimate work permits and residency papers could also potentially qualify.

Table 4.3 indicates the potential demand for social housing in the primary trade area and the potential market share that the proposed development project could attract.

**Table 4.3: Evaton West Project F - Demand Modelling – Social Housing Residential Products**

Variable	Value
<b>Total Market</b>	
Market growth (annual new households - total) <sup>1</sup>	873
Social Housing Market Segment <sup>2</sup>	59.9%
Social Housing Annual Take-up	524
Annual Social Housing Secondary Market Contribution (units / annum) <sup>3</sup>	283 to 472
Total annual new demand for bonded units	807 to 995
<b>Project Specific – Evaton West Project F</b>	
Project Social Housing Units	<b>450</b>
Forecast market share of total market sales	10% to 15%
Project forecast total annual take-up rate (units / annum)	81 to 149
Years to take-up (social housing units)	3.0 to 5.6
Average Years to take-up (social housing units)	4.3

<sup>1</sup> – Total Annual take-up of Target Market

<sup>2</sup> – Reflects the percentage of the local population with incomes and affordability levels aligned to social housing units

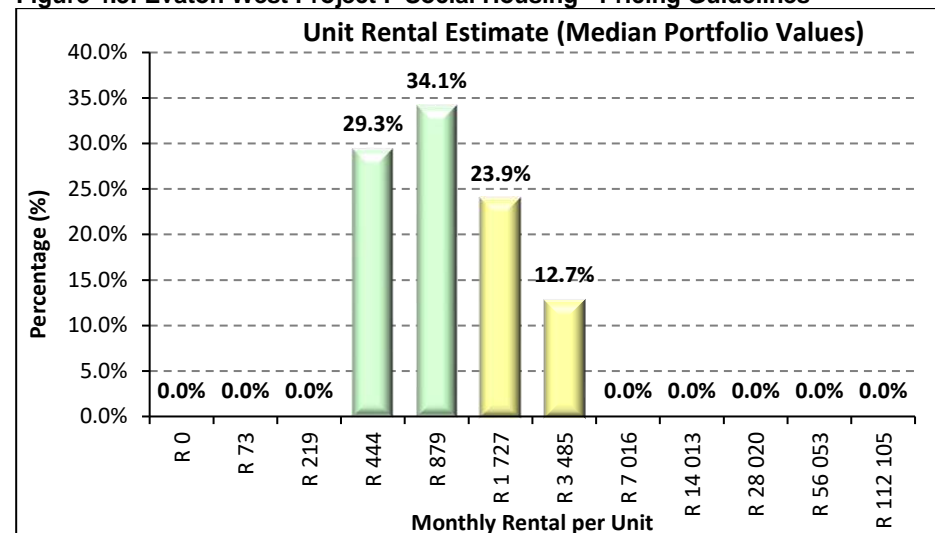
<sup>3</sup> – Number of potential buyers through local secondary market transactions, e.g. qualifying local potential buyers selling existing homes to move to new project.

- ✓ Under present market conditions, the social housing segment (59.9%) will yield a take-up rate of 524 social housing units per annum.
- ✓ The proposed project size of 450 units could be accommodated by the primary trade area within an average time period of 4.3 years, given a market share of 10% to 15%.

### Pricing Guidelines

The following pricing distribution could be applied to the social housing units if developed.

**Figure 4.3: Evaton West Project F Social Housing - Pricing Guidelines**



Source: DEMACON, 2020

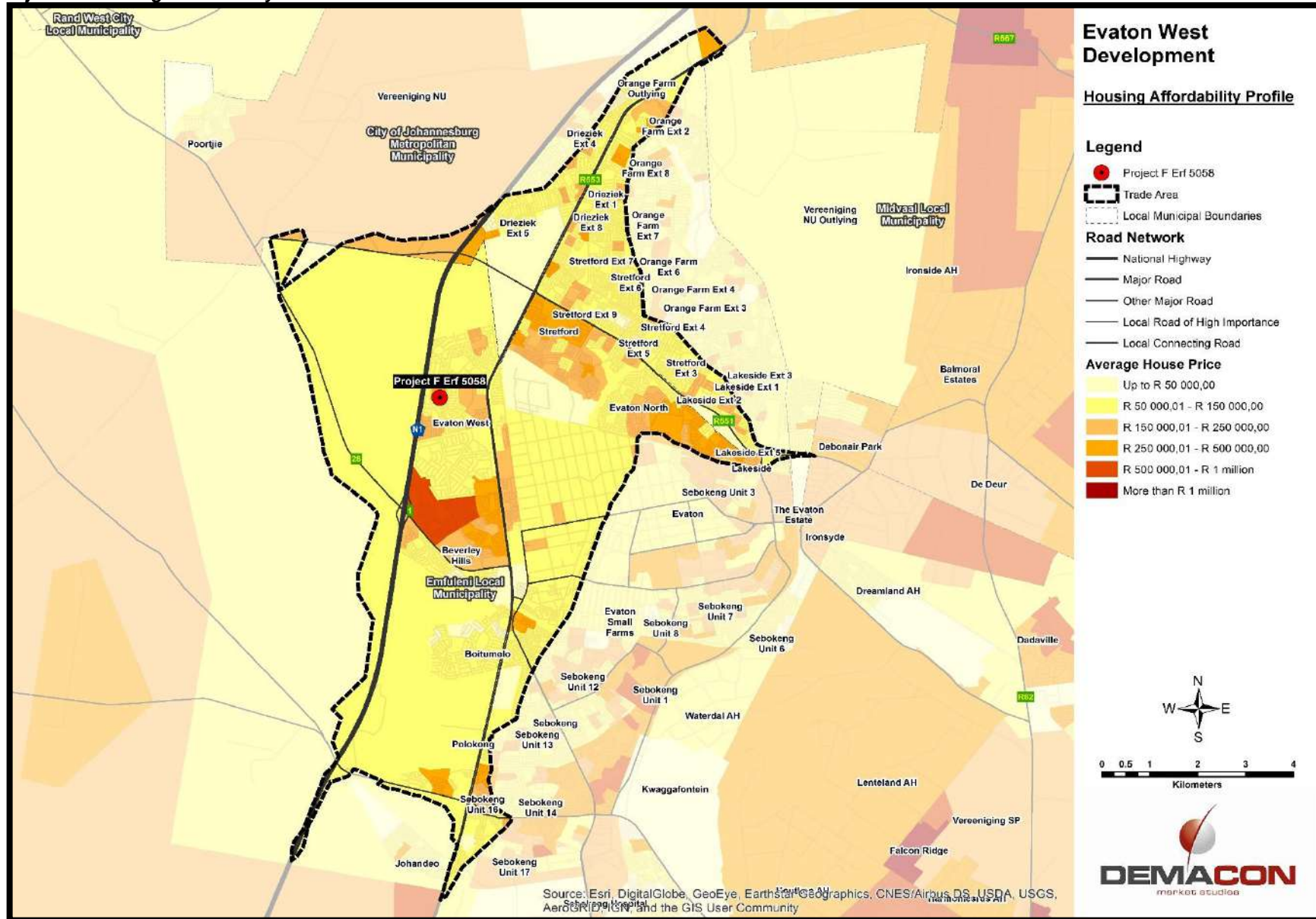
**Table 4.4: Evaton West Project F - Social Housing Rental Guidelines**

Unit Configuration	Unit Size (sqm)	Rental Bracket (Rand/month)	% of Stock
Bachelor	30 to 35 sqm	R400 to R700	25% to 30%
1-Bedroom	35 to 40 sqm	R700 to R1 300	30% to 35%
2-Bedrooms	40 to 45 sqm	R1 300 to R2 600	20% to 25%
2 to 3 bedrooms	45 to 60 sqm	R2 600 to R5 500	10% to 15%

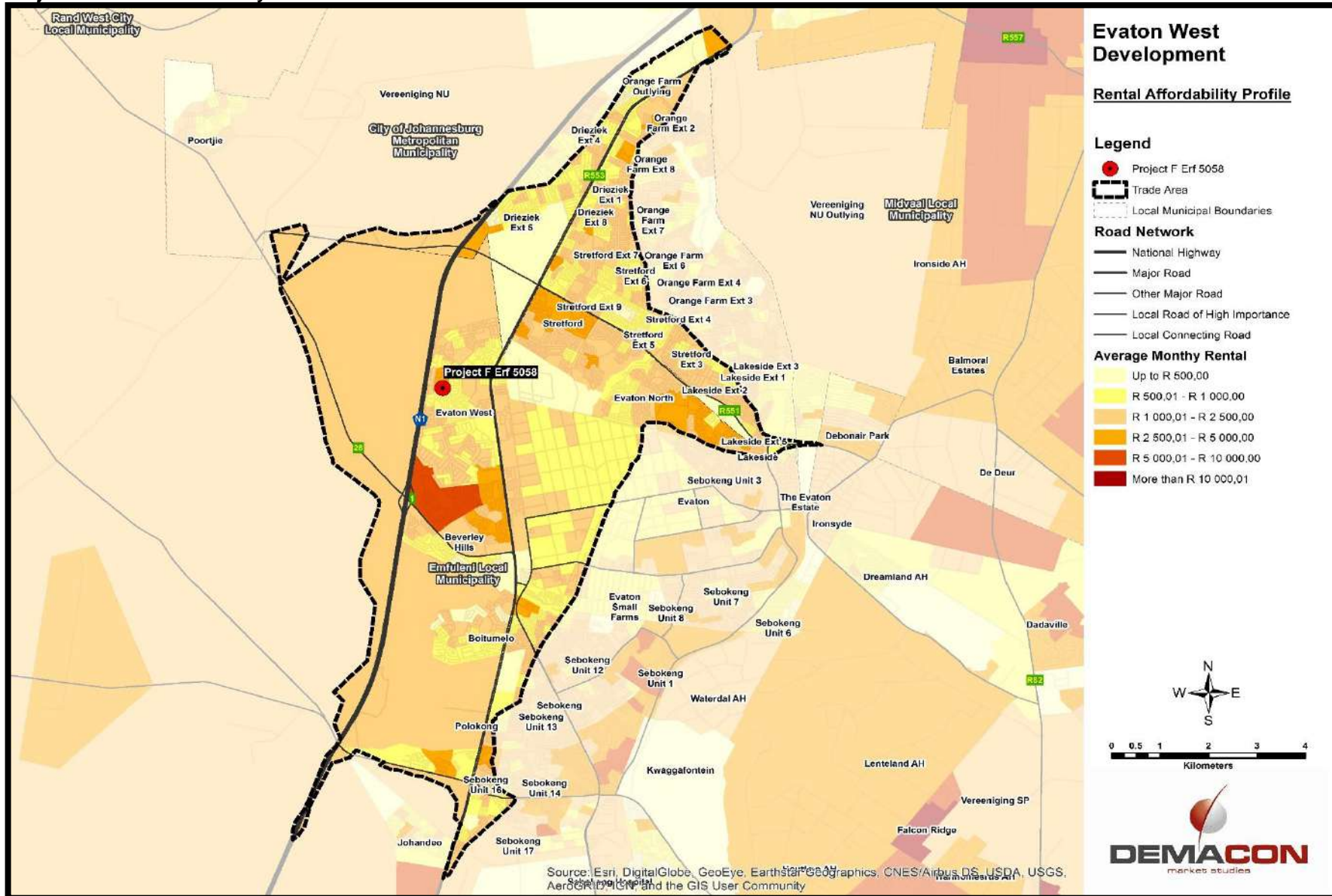
Source: DEMACON, 2020



Map 4.2: Project F - Housing Affordability



Map 4.3: Project F - Rental Affordability



## 4.6 GAP ANALYSIS AND DEVELOPMENT PROSPECTS



There is a market for lower to lower-middle income residential units. Based on the area's residential typology the majority of units include freehold property on separate stands. Therefore, to develop medium to higher density social housing, certain locational realities need to be borne in mind.



**DEVELOPMENT  
OPTION SUMMARY**

**5**

## SECTION 5: DEVELOPMENT OPTION SUMMARY

### 5.1 INTRODUCTION

This section of the report provides a summary of the development potential related to the proposed land use assessed, social housing. The land use will form the platform of the economic impact assessment completed in the next section of the report.

### 5.2 KEY FINDINGS AND RECOMMENDATIONS

Table 5.1: Key Findings and Recommendations

Land Use	Site Rating	Market Gap Development Prospects	Demand Modelling Results	Optimum Point of Market Entry	Recommendations																				
Residential <b>Social Housing Units</b>	<b>64.9%</b>	Market Gap: ✓ <b>Yes</b>  Development Prospects  ✓ <b>Moderate</b>	Social housing units: ✓ <b>450 units</b>	✓ 2020+	<p><b>RESIDENTIAL MODELLING – SOCIAL HOUSING</b></p> <ul style="list-style-type: none"> <li>✓ The proposed project size of 450 units could be accommodated by the primary trade area within an average time period of 4.3 years, given a market share of 10% to 15%.</li> <li>✓ It is evident that there is a market for lower to lower-middle income residential units.</li> <li>✓ Based on the area’s residential typology the majority of units include freehold property on separate stands.</li> <li>✓ To develop medium to higher density social housing, certain locational realities need to be borne in mind.</li> <li>✓ Configuration of units: 3 to 4 storey walk-ups</li> <li>✓ Unit sizes: ±30m<sup>2</sup> - 60m<sup>2</sup></li> <li>✓ The optimum point of market entry based on the market demand analysis would be 2020+.</li> <li>✓ In the context of the target market profile, the optimum unit composition for residential units in the proposed development (to facilitate optimum take-up) would be:</li> </ul> <table border="1"> <thead> <tr> <th>Unit Configuration</th> <th>Unit Size (sqm)</th> <th>Rental Bracket (Rand/month)</th> <th>% of Stock</th> </tr> </thead> <tbody> <tr> <td>Bachelor</td> <td>30 to 35 sqm</td> <td>R400 to R700</td> <td>25% to 30%</td> </tr> <tr> <td>1-Bedroom</td> <td>35 to 40 sqm</td> <td>R700 to R1 300</td> <td>30% to 35%</td> </tr> <tr> <td>2-Bedrooms</td> <td>40 to 45 sqm</td> <td>R1 300 to R2 600</td> <td>20% to 25%</td> </tr> <tr> <td>2 to 3 bedrooms</td> <td>45 to 60 sqm</td> <td>R2 600 to R5 500</td> <td>10% to 15%</td> </tr> </tbody> </table>	Unit Configuration	Unit Size (sqm)	Rental Bracket (Rand/month)	% of Stock	Bachelor	30 to 35 sqm	R400 to R700	25% to 30%	1-Bedroom	35 to 40 sqm	R700 to R1 300	30% to 35%	2-Bedrooms	40 to 45 sqm	R1 300 to R2 600	20% to 25%	2 to 3 bedrooms	45 to 60 sqm	R2 600 to R5 500	10% to 15%
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2 to 3 bedrooms	45 to 60 sqm	R2 600 to R5 500	10% to 15%																						

Source: DEMACON Modelling, 2020

### 5.3 PREFERRED DEVELOPMENT OPTION

In terms of the market data contained in the data analysis presented, social housing represents a reasonably good fit, considering the affordability and rental profile of the market area. The residential environment is, however, dominated by freestanding freehold houses. No medium to higher density residential developments are located within the market area (specifically 3 to 4 storey walk-up units). Site layout and design considerations need to be sensitive to these realities. A site and service development scheme might be preferred by the consumer market. A case could be made for medium density rental stock in proximity to employment opportunities and commercial developments.



**ECONOMIC      IMPACT  
ASSESSMENT**



**6**

## SECTION 6: ECONOMIC IMPACT ASSESSMENT

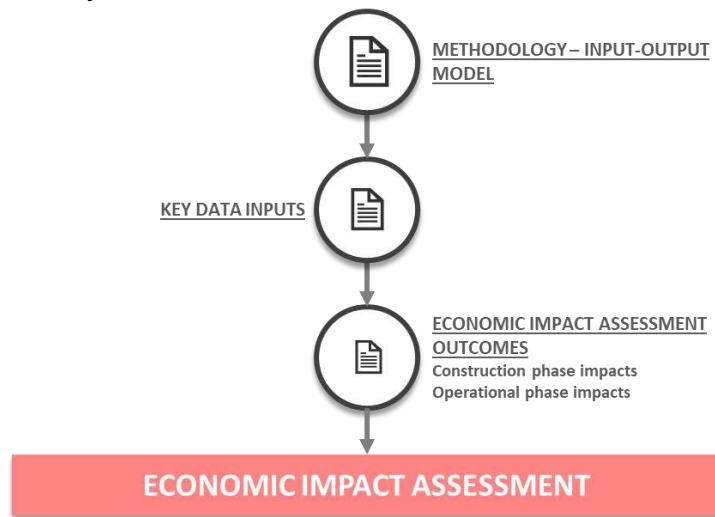
### 6.1 INTRODUCTION

Section 6 of the report is focused on the assessment of potential economic impacts that may arise from the implementation of the proposed development options.

The purpose of the chapter is to assess the anticipated economic impact that will be generated by each of the proposed development uses. Capital investment and operational expenditure that could be associated with the proposed development are used as basis to quantify the potential impact that will result from the proposed development on the local, metropolitan and provincial economies.

The impact refers to the ripple effect throughout the economy caused by investment in a specific economic sector. This impact stretches beyond the jobs and income generated by the original project. In order to estimate the total economic impact, the input-output model is employed.

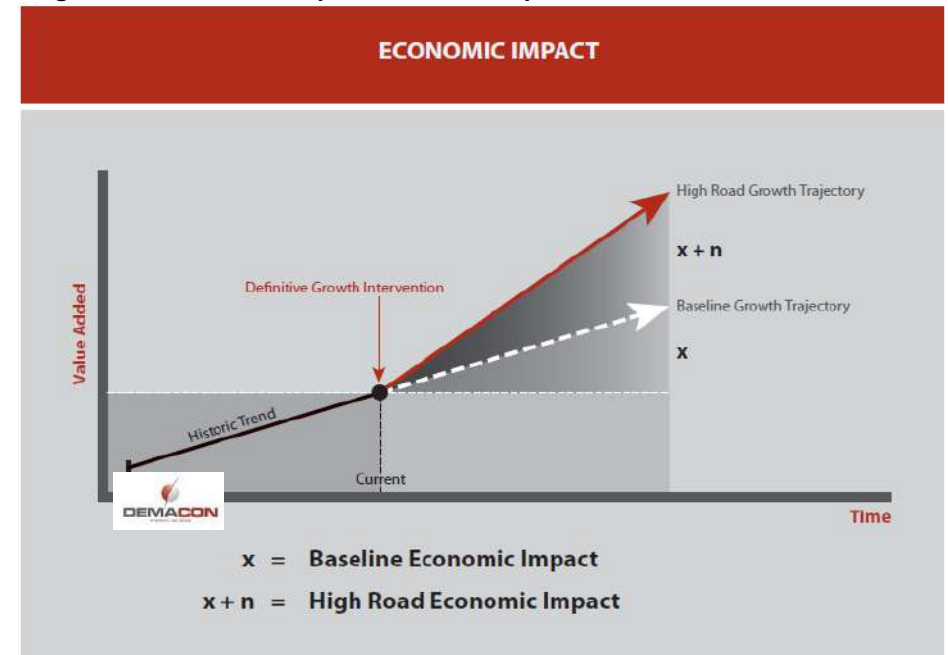
Diagram 6.1: Key Themes



### 6.2 INPUT-OUTPUT MODEL METHODOLOGY

The following figure conceptually illustrates the economic impact that the proposed development options could have on the local economy in terms of additional GGP.

Diagram 6.2: Economic Impact of the Development



Before the input-output model is discussed it is necessary to understand the community economic system and underlying interrelationships (Refer to Diagram 6.3).

It is evident that there is a strong interrelationship and interdependence between the three dominant sectors of the local economy: Basic industry, households and services. These interrelationships refer to sectors purchasing from other sectors, sectors selling to other sectors, sectors selling outside of the local economy and sectors buying outside of the local economy.



This results in the flow of labour, inputs, goods and services as well as money within and beyond the local economy.

The input output analysis creates a picture of a regional economy describing the flows to and from industries and institutions. In other words, it provides a description of the local economy and predicts the estimated impacts resulting from a change in the local economy.

The Input-Output Model depicts economic relationships between different components of an economy by identifying monetary flows (expenditures, receipts) between various units. The relationship between the initial spending and the total effects generated by the spending is known as the multiplier effect of the sector, or more generally as the impact of the sector on the economy.

Diagram 6.3: Community Economic System



The economic impact assessment will focus on the proposed land use, namely:

### (1) Social housing.

## 6.3 SOCIAL HOUSING IMPACT ASSESSMENT

This section is focused on providing the economic impact assessment outcomes during the construction and operational phase if social housing is developed at the proposed location. The section firstly considers the construction phase impacts of the project, followed by an analysis of operational phase impacts.

### 6.3.1 CONSTRUCTION PHASE IMPACTS – SOCIAL HOUSING

This section indicates the anticipated impacts (direct, indirect and induced) that will result from the construction phase if social housing is developed at the proposed development site.

Figure 6.1: Economic Impact of the Construction Phase

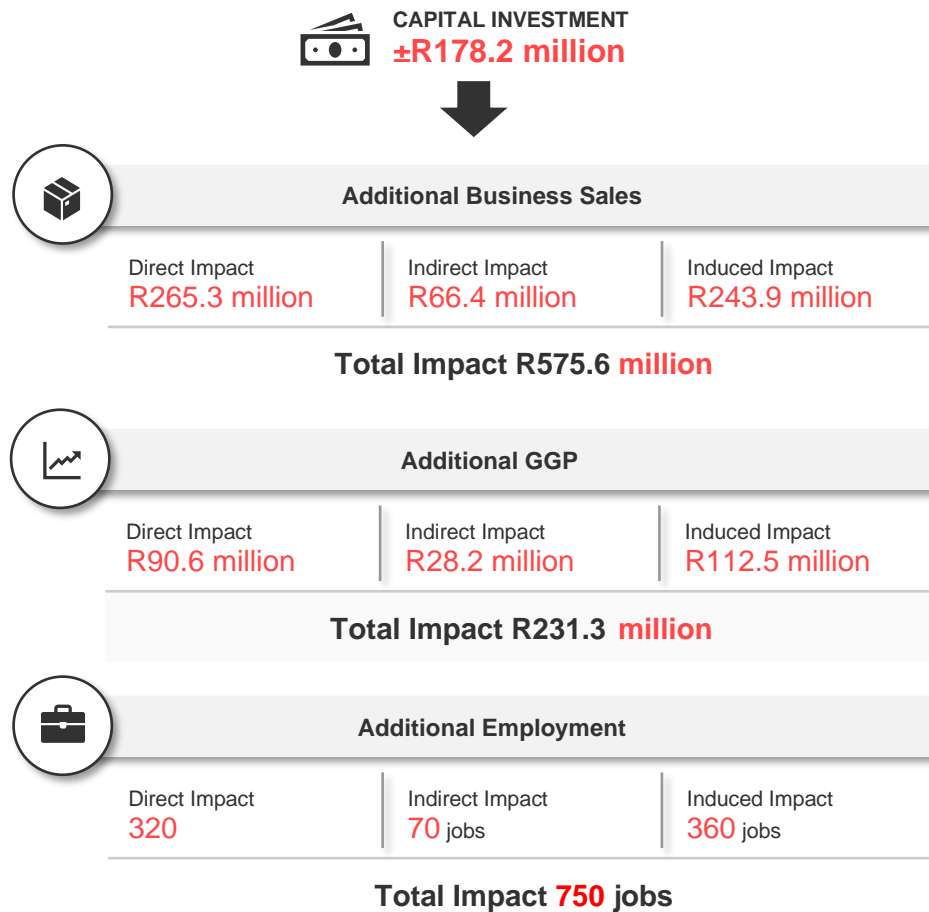
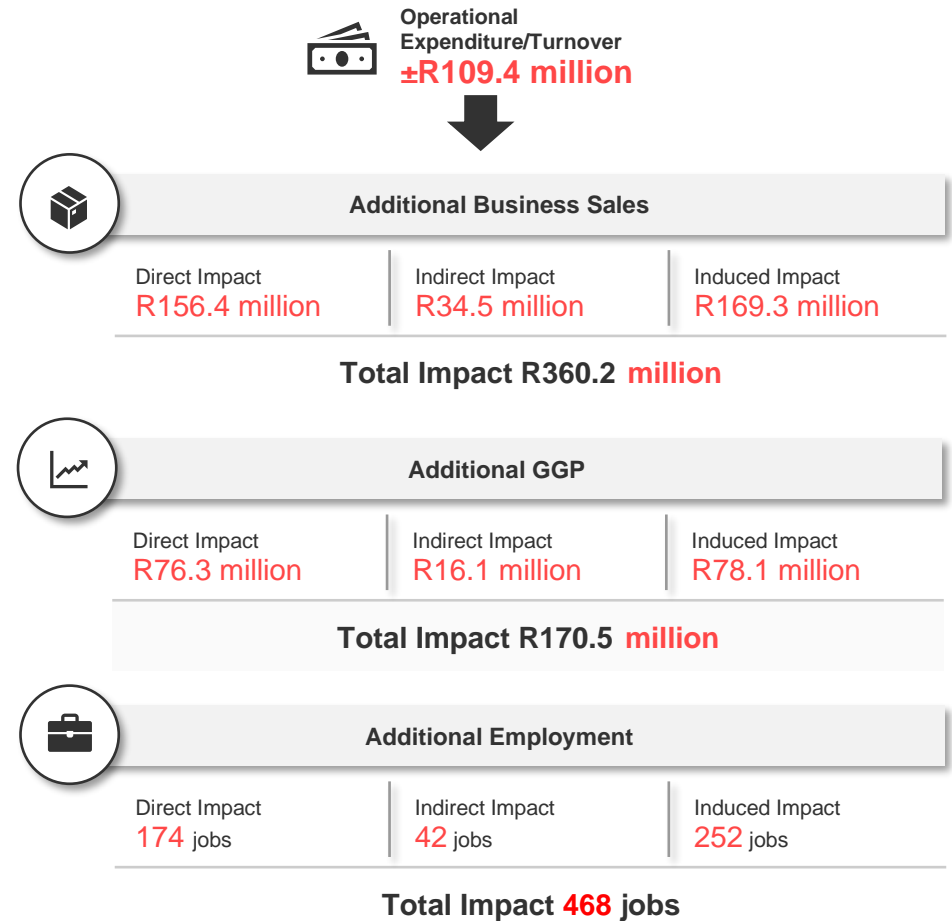


Figure 6.2: Economic Impact of the Operational Phase



### 6.3.2 OPERATIONAL PHASE IMPACTS – SOCIAL HOUSING

This section indicates the anticipated impacts (direct, indirect and induced) that will result from the operational phase of a social housing development at the proposed development site.

### 6.3.3 PROPERTY RATES AND TAXES IMPACT

Having consulted broadly and also having worked on a large number of social housing developments, it became evident that real estate taxation of these developments are not dealt with in a uniform manner. In most instances, these developments are initially not sectionalised, which complicates the calculation of proportional contributions by individual tenants. Individual municipal meters (both water and electricity) is also typically not installed at individual units: it remains the responsibility of the SHA to recoup water and electricity

consumption cost from individual tenants. Most municipalities offer rebates on a proportion of residential property values – typically between R150 000 (City of Tshwane) to R350 000 (City of Johannesburg). Since the development is not sectionalised this rebate cannot be apportioned to individual units. In certain municipalities (e.g. Nelson Mandela Bay Metro) social housing developments are reportedly charged based on business tariffs. On the basis of the majority feedback rates and taxes for social housing developments were calculated as follows:

1. Estimate Capital Investment in Top Structures and Infrastructure
2. Calculate total project value (including residual land value)
3. Calculate rebate and taxable residual value
4. Apply municipal tariff for residential property taxation

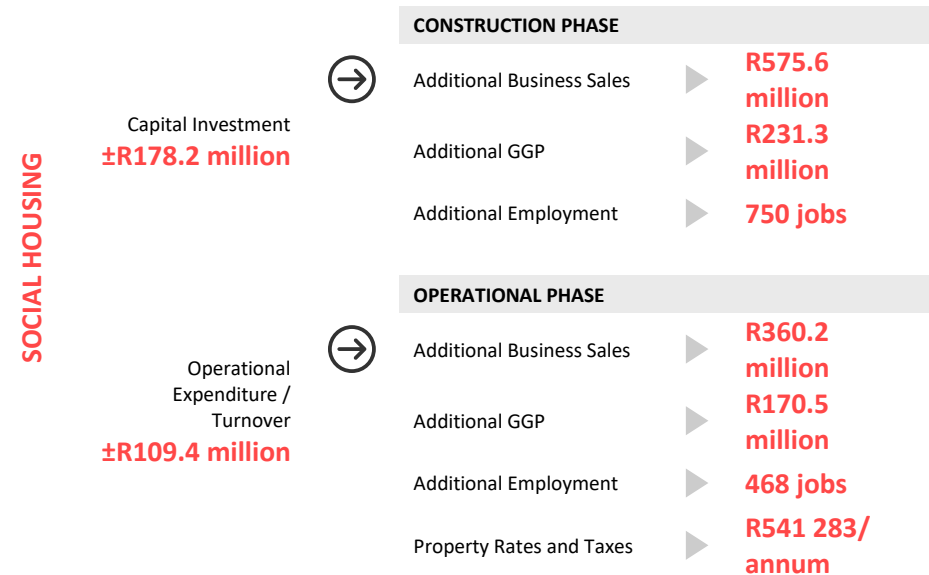
Based on the calculation, the Social Housing Option will have property rates and taxes contributions towards the Emfuleni Local Municipality of approximately R541 283 per annum.

The impact on surrounding property values is not calculated. Should the product offering align with prevailing market prices the property price (and real estate taxation impact) should be neutral or positive. However, if the pricing differential is greater than 100% property pricing impacts might be negative. The converse also holds true. Therefore, if a low cost development with prices averaging say R150 000 - R200 000 were introduced in a market in which house prices average say R800 000 – R1million, a low cost development has been found to decelerate price growth of immediately surrounding properties – and vice versa these trends hold important real estate taxation implications over time.

## 6.4 SYNTHESIS

This chapter describes the potential economic impact that the proposed development option could induce on the local, district and provincial economies and communities during both construction and operational phases.

Figure 6.3: Synthesis of the Economic Impact Modelling for the Proposed Development Option



Source: DEMACON, 2020

The preceding economic impact analysis and the summary figure above shows the impact that the anticipated investment social housing development could induce on the local and regional economies. The proposed use will also generate an additional municipal income through property rates and taxes.

## **APPENDIX E**

### Urban Design Framework including Layout Plans








# GAUTENG RAPID LAND RELEASE PROGRAMME

ERF 5085 EVATON WEST EXT 4

(PROPER PROJECT F)

JULY 2020



<b>Job Title</b>	<b>Gauteng Rapid Land Release Programme</b>		<b>Job Number: 1367</b>
<b>Document Title</b>	<b>GRLRP – UDF for Erf 5085 Evaton West Ext 4</b>		
<b>Document Revision</b>	<b>Revised/Issued By</b>		<b>Date</b>
	<b>Dr Marinda Schoonraad</b>		<b>7 July 2020</b>
<b>Compiled By:</b>	<b>Reuben Mentz</b>		<b>7 July 2020</b>
	<b>Name &amp; Surname</b>	<b>Signature</b>	<b>Date</b>
<b>Reviewed By:</b>	<b>Dr Marinda Schoonraad</b>		<b>7 July 2020</b>
	<b>Name &amp; Surname</b>	<b>Signature</b>	<b>Date</b>
<b>Checked By:</b>	<b>Dr Marinda Schoonraad</b>		<b>7 July 2020</b>
	<b>Name &amp; Surname</b>	<b>Signature</b>	<b>Date</b>
<b>Client Approval</b>			
	<b>Name &amp; Surname</b>	<b>Signature</b>	<b>Date</b>

**Drafted by**  
**Metroplan Town Planners and Urban Designers**

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**CLIENT**

Gauteng Department of Human Settlements



**A multidisciplinary team has provided inputs to the report**

PROJECT LEADER  
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GSC Water & Environmental Consultants



MARKET STUDY  
Demacon Market Studies



TRANSPORT AND SERVICES ENGINEERING  
PHUMAF Holdings



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# 1 INTRODUCTION

The Urban Design Framework (UDF) for Erf 5085 Evaton West Ext 4 (Project F) (the site) forms part of the Gauteng Rapid Land Release Programme (GRLRP) administered by the Gauteng Department of Human Settlements. It falls within the socio-economic development outcome of the GRLRP of 'addressing the housing backlog'.

The Urban Design Framework (UDF) follows on *Stage 1 – Project Readiness Report* in which the site is earmarked for a future high-density residential development to address the need for affordable housing.

This report contains the first draft of the UDF. The UDF consists of five phases:

- *Phase 1: The Situational Analysis* which addresses the site locality, the policy framework, the regional context, the movement network, surrounding development, site characteristics and residential market. The aim of this phase is to develop an in-depth understanding of the site.
- *Phase 2: The Synthesis* which is based on the situational analysis and explores the site development potential and limitations.
- *Phase 3: The Vision* which addresses the development paradigm and objectives.
- *Phase 4: The Design Concept* which contains the design principles, structuring elements, concept alternatives, evaluation of concepts and the final concept.

- *Phase 5: The Detail Design* elaborating on the street network, nodal development, residential densities, the open space network, building typologies and sense of place elements.
- *Phase 6: The Implementation Framework* which gives an indication of the statutory planning process to be followed to implement the project.

This draft report contains the first explorations of Phases 1 – 6 and serves only as a discussion document for inputs and comments. It needs to be supplemented by inputs from various key stakeholders.

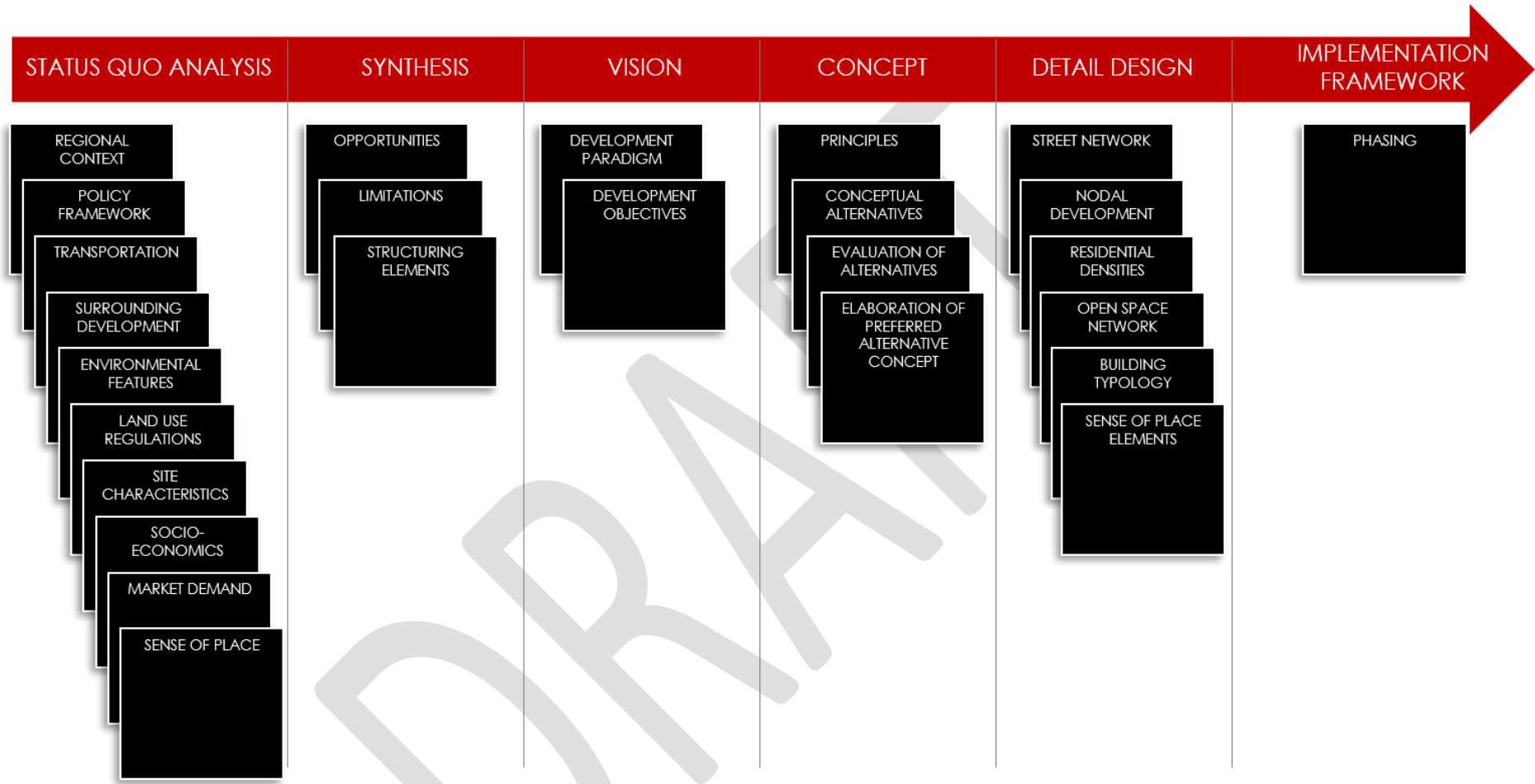
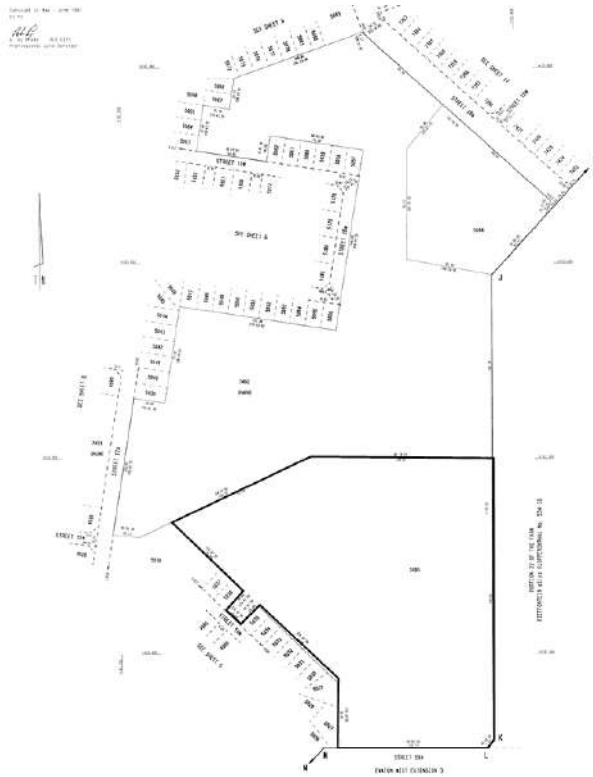


Figure 1: URBAN DESIGN FRAMEWORK DRAFTING PROCESS

## 2 SITE DESCRIPTION AND DELINEATION

Erf 5085 is 3.8353ha in extent and forms part of the proclaimed township of Evaton West Extension 4 (General Plan 6767/1997).

The property is owned by OCWEN INV 85 PTY LTD (Title deed TL111064/2002).



### WinDeed Database Deeds Office Property



EVATON WEST EXT 4, 5085, 0 (PRETORIA)

#### GENERAL INFORMATION

**Date Requested** 2020/03/30 09:43  
**Deeds Office** PRETORIA  
**Information Source** WINDEED DATABASE  
**Reference** GAUTENG RAPID LAND RELEASE



#### PROPERTY INFORMATION

**Property Type** ERF  
**Erf Number** 5085  
**Portion Number** 0  
**Township** EVATON WEST EXT 4  
**Local Authority** EMFULENI LOCAL MUNICIPALITY  
**Registration Division** IQ  
**Province** GAUTENG  
**Diagram Deed** TL111064/2002  
**Extent** 3.8353H  
**Previous Description** -  
**LPI Code** T0KQ06090000508500000

#### OWNER INFORMATION

**Owner 1 of 1**  
**Type** COMPANY  
**Name** OCWEN INV 85 PTY LTD  
**ID / Reg. Number** 200001883607  
**Title Deed** TL111064/2002  
**Registration Date** 2002/09/11  
**Purchase Price (R)** 0  
**Purchase Date** -  
**Share** 0.00  
**Microfilm** 2008 0761 1417  
**Multiple Properties** NO  
**Multiple Owners** NO

Figure 2: SG DIAGRAM AND WINDEED PROPERTY REPORT

### 3 SITUATIONAL ANALYSIS

The situational analysis deals with the contextual and regulatory framework and the spatial and environmental characteristics of the site. It serves to develop an understanding of the contextual role of the site within the larger region; the municipal policy framework that guides the future development of the site; the character of the immediate surroundings of the site and its connections to the wider area; the characteristics of the site itself and the socio-economics that determine the feasibility of development.

The Situational Analysis is based on the analysis of the relevant policy documents and frameworks, as well as specialist studies, such as an environmental assessment and residential market study.

It addresses the following:

- locational context
- regional locality and context
- policy framework
- transportation and road network
- public transport
- surrounding land use
- environmental considerations
- zoning and servitudes
- current use of the site
- site scale and configuration
- access to the site
- sense of place characteristics
- development opportunities

- development limitations
- structuring elements
- residential market study

### 3.1 REGIONAL LOCALITY

Erf 5085 Evaton West Ext 4 is located the southern parts of Gauteng Province in the Sedibeng District Municipality. It is in the Emfuleni Local Municipality. The

site is on the northern border of both the district and the local municipality and directly abuts the City of Johannesburg.

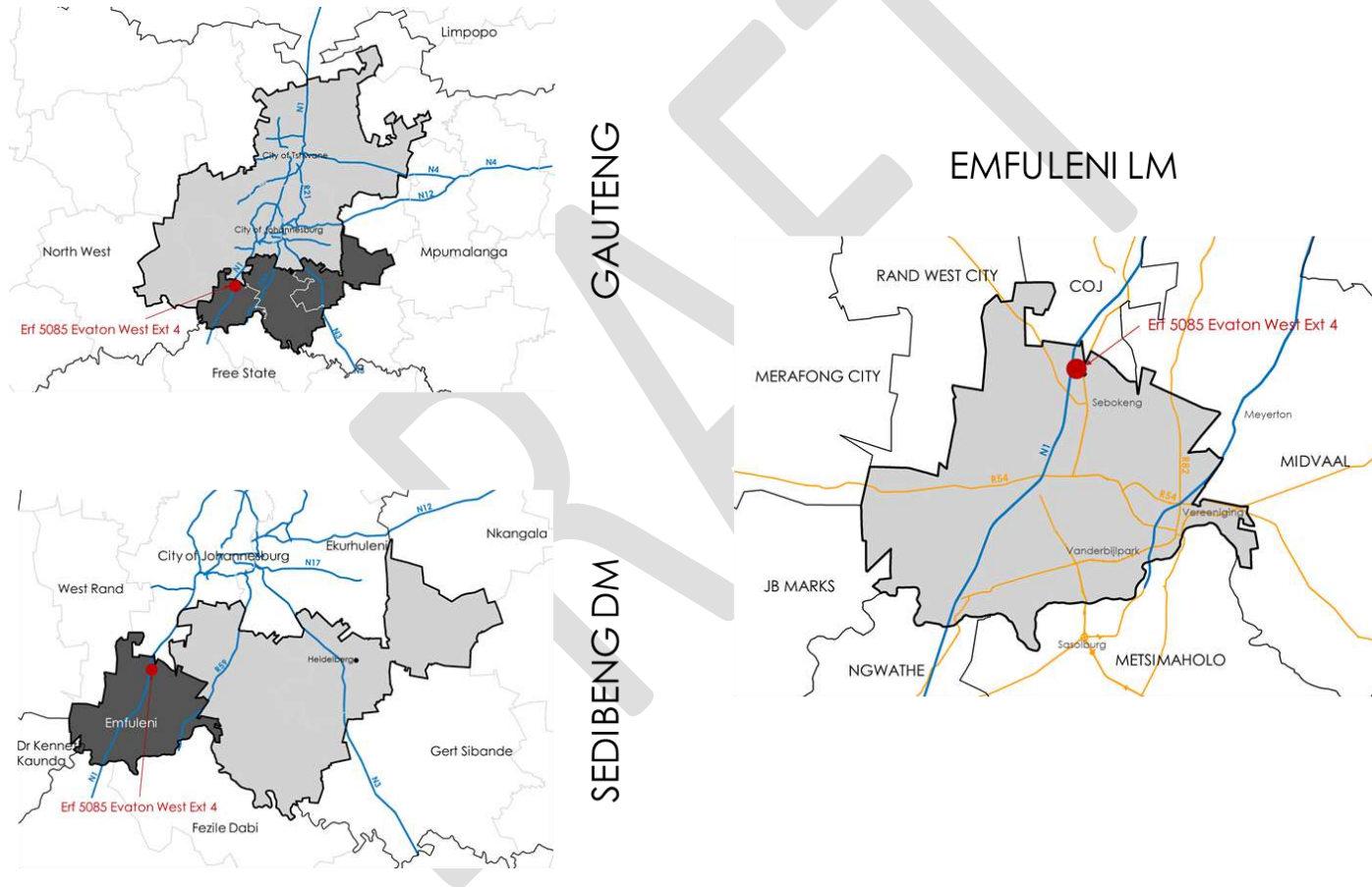


Figure 3: REGIONAL LOCALITY

### 3.2 REGIONAL CONTEXT

The site is located to the east of the N1 which divides the municipal area into the western region which is mostly rural in character and the eastern region which is mostly urban in character.

It is within the Orange Farm - Sebokeng 'urban cluster'. Orange Farm is to the north and Sebokeng to the south. Both abut Evaton and are within 5 – 10km from the site. This cluster is a deprivation area that straddles the Emfuleni and City of Johannesburg municipal areas. 15 – 20km to the north are Lenasia and Ennerdale which are also areas of poverty.

The closest urban node is Vanderbijlpark and Vereeniging which are 15 - 20km to the south.

The site is thus relatively isolated in terms of urban form and economic opportunity.

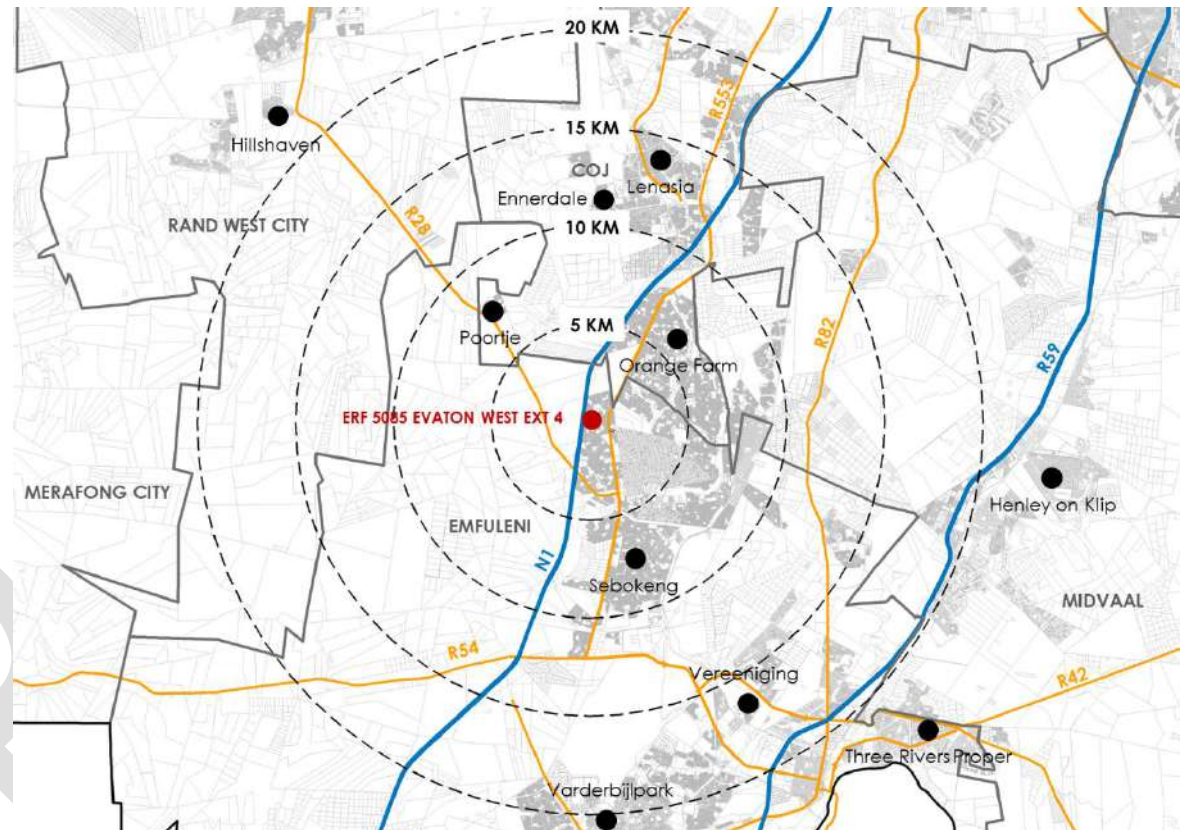


Figure 4: REGIONAL CONTEXT

### 3.3 POLICY FRAMEWORK: SDF

According to the Emfuleni Spatial Development Framework 2017-2025, 2017 Erf 5085 Evaton West Ext 4 is designated as Urban Residential. For the purposes of Land Use Management it falls within a 'Medium Density Residential Zone' (Zone 2). The aim and objective of a medium-density residential zone is defined as: *'to encourage residential densities that allows affordable housing development and supports road-based public transport. A maximum residential density of 60 units per hectare are allowed within Zone 2. Such densities typically allow for the development of a range of affordable housing typologies within this zone. Residential-supporting land uses to be accommodated within Zone 2 include educational facilities and medical facilities. Zone 2 also allows for the establishment of micro enterprises with the aim to support and promote SMMEs within this zone. Consent for the establishment of micro enterprises are strictly managed by the micro enterprises management system'*.

If the site is fully developed at 60du/ha, the approximate yield will be 230 units.

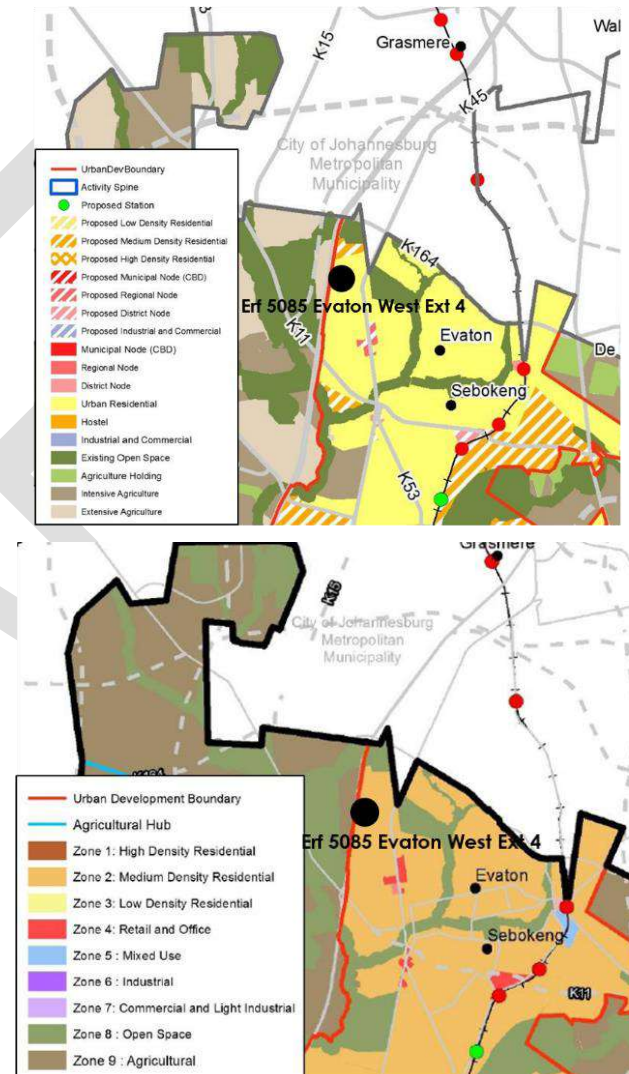


Figure 5: SDF PROPOSALS



The Evaton West SDF also designates the site as Medium Density Residential, similar to the areas to the east and the south. To the north is the CoJ Consolidation Zone and to the south is the Evaton Node. To the west of the N1 is an area designated as Agriculture and Conservation Plan.

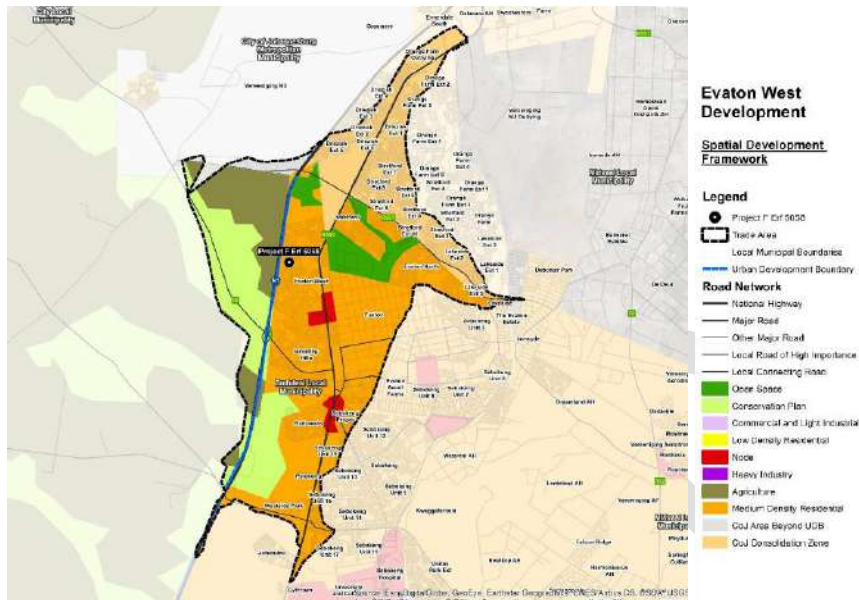


Figure 6: EVATON WEST SDF

### 3.4 TRANSPORTATION

Transportation deals with the street network and public transportation.

#### 3.4.1 ROAD NETWORK

The site is located between the N1 to the west and Golden Highway (R553) and Moshoeshoe Street to the east, which provides it with high levels of regional accessibility. On a sub-regional level accessibility is impaired by the lack of connector roads to the N1: access to the N1 is approximately 16.3km or 20 minutes' drive from the development site.

The most important connection to the Golden Highway is via Moleli/ Pilanesberg Road which links to Evaton Proper. The road directly to the east of the site connects to Moleli/ Pilanesberg Road in the south and an unnamed road to the north, both linking to the Golden Highway. Local accessibility is thus adequate.

The surrounding area has a well-developed street network. It is however a curvilinear layout which limits permeability for pedestrians.

#### 3.4.2 PUBLIC TRANSPORTATION

The Golden Highway and Moshoeshoe Road to the east are a bus and minibus taxi routes. The closest taxi rank is along Adams Road in Evaton Proper approximately 9.5 km from the site. The Golden Highway is also designated as an SPTN Route with a proposed bus station and minibus taxi rank within the Evaton Regional Node.

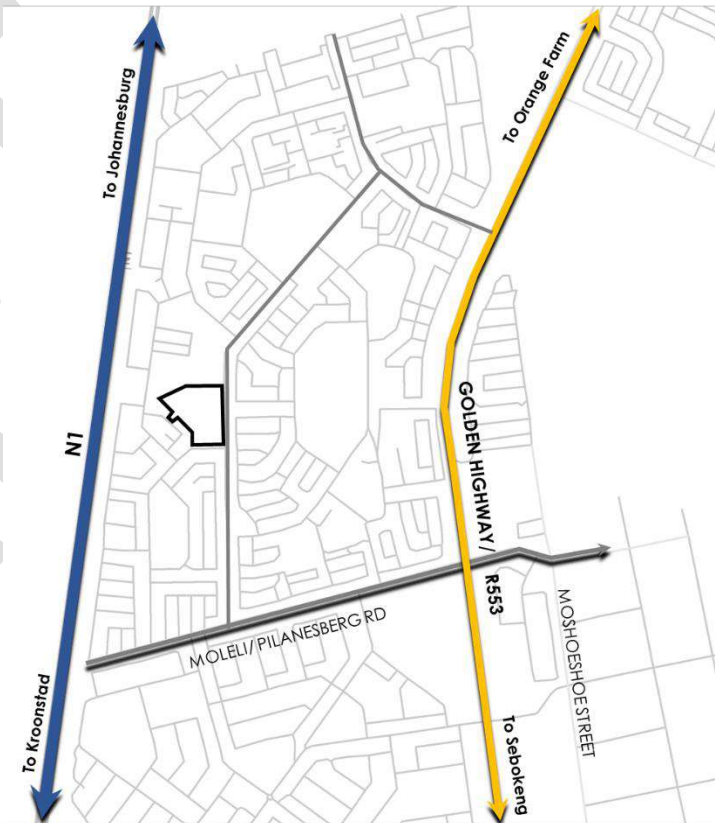


Figure 7: ROAD NETWORK

### 3.5 SURROUNDING LAND USE

The site is within a densely built-up area, which is mostly residential in character.

There are schools, both primary and secondary, to the south, and other social facilities, such as two churches to the north. Some of the sites earmarked for social facilities are currently still vacant.

Ample land in close proximity to the site is designated as public open space. These spaces are however not maintained and detract from the amenity of the neighbourhood rather than acting as an asset. One such open space is directly to the north of the site.

Approximately 400m to the east of the site is a portion of land that is currently invaded.

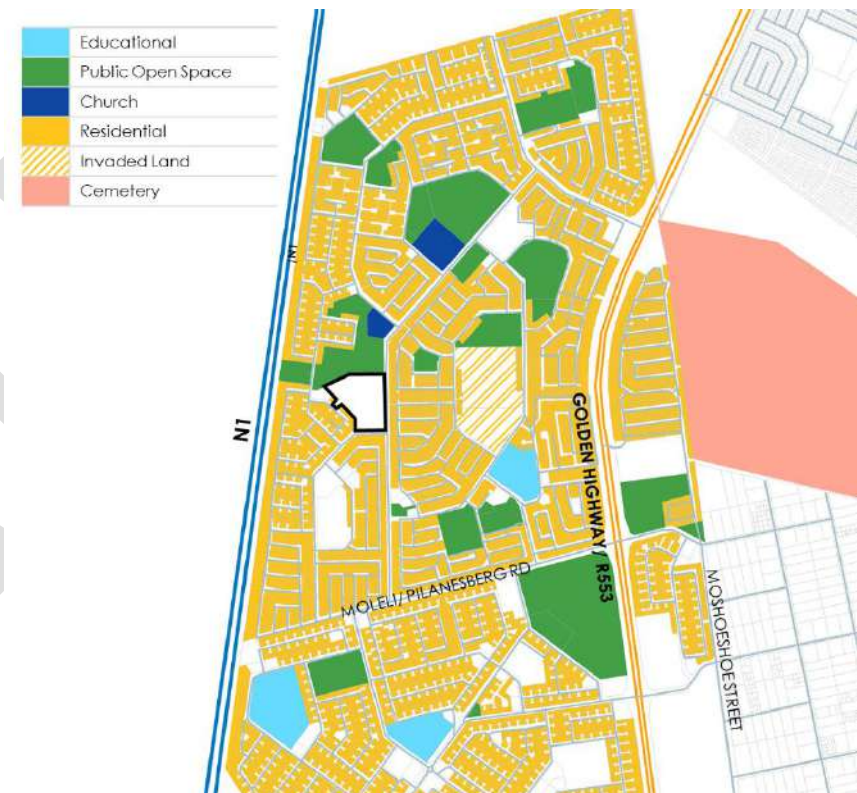


Figure 8: SURROUNDING LAND USE

### 3.6 SURROUNDING RESIDENTIAL DEVELOPMENT

The surrounding area in Evaton West consist mostly of single residential erven of 250m<sup>2</sup> in extent, resulting in a density of 40du/ha. There are a limited number that are up to 500m<sup>2</sup> in extent and some as small as 180m<sup>2</sup>.

Evaton Proper towards the east was established in the early 19<sup>th</sup> century, with original erven exceeding 4 000m<sup>2</sup> translating in a density of 2 du/ha. Since then then small pockets of densification has taken place with the subdivision of erven to approximately 500m<sup>2</sup>.

Most residential erven accommodate additional houses or backyard rental units.

There are no higher density walk-up residential developments within the surrounding area.



Figure 9: SURROUNDING RESIDENTIAL DEVELOPMENT

## 3.7 ENVIRONMENTAL CONSIDERATIONS

### 3.7.1 INTRODUCTION

This section serves to provide a summary of key environmental findings and implications for the proposed development for Erf 5085 Evaton West Ext 4.

### 3.7.2 MAIN ENVIRONMENTAL FINDINGS

- The site is not located within a sensitive area as delineated by the Gauteng Conservation Plan
- To the west is a Critical Biodiversity Area associated with a tributary of the Rietspruit, which is of high conservation value
- There is stormwater channel from the north and west of the site, within 30 meters of the site which drains under the N1 towards the tributary

### 3.7.3 IMPLICATIONS OF FINDINGS ON DESIGN

- Stormwater drainage is an important consideration. The design will impact on the quality and quantity of surface water reaching the Rietspruit tributary.

### 3.7.4 IMPLICATIONS OF FINDINGS

No NEMA listed activities are triggered and therefore no authorisation process is required in terms of the NEMA. However, due to the sensitivity of the critical biodiversity area to the west, and the stormwater channel on site, it is recommended that the following is carried out:

- Environmental Management Plan (EMP) is compiled and implemented during the construction phase.

- An ecological desktop assessment is carried out to confirm the sensitivity of the wetland and watercourse, so as to input recommendations to the EMP.
- An Environmental Control Officer (ECO) is employed by the client during the construction phase to audit the site on a regular basis and ensure compliance of to the EMP.
- A Notice of Intent to Develop (NID) should be sent to the South African Heritage Resources Agency (SAHRA) to indicate the proposed development.

It would appear that any environmental and social impacts will be of low consequence. However, with the implementation of the above recommendations, the client will ensure that best practice is followed, and that effective mitigation and management can be undertaken to minimise any negative impacts.



Figure 10: SENSITIVITY MAP

### 3.8 BULK ENGINEERING SERVICES

The Bulk Engineering Services Report concludes the following:

- There is currently insufficient capacity in the existing reservoirs to accommodate the proposed development and densities. Additional studies will be required to determine a suitable reservoir to supply the proposed development or whether a new reservoir is needed.
- There is currently insufficient capacity in the wastewater treatment works to accommodate the proposed development and densities.

- There are no records of any service installed to accommodate this development and new water and sewer pipes will need to be installed to provide connections.
- Additional capacity analysis of the network pipes will be required with a GLS report to determine if any upgrades are required on the network pipes for both the water and sewer pipes.
- Additional services (roads, stormwater, water and sewer) would need to be installed to accommodate the proposed development.
- A traffic impact assessment is required to determine any additional capacity required on the roads.
- No formal storm water exists, a masterplan and new infrastructure is required to support the development.

### 3.9 SERVITUDES

There are no servitudes that affect the site.

### 3.10 ZONING

According to paragraph 14 of title deed TL111064/2002 erf 5085 Evaton West Extension 4 shall be used as a community facility.

'Community Facilities' generally refer to: '*... a welfare or charitable facility such as home for the aged, indigent or handicapped; a hospital, clinic or nursing home, a sanatorium; or any other institution whether public or private and includes all uses ancillary, directly related to and subservient to the main use, but excludes primary office and administrative functions.*'

Table 1: ZONING

Primary Land Use Rights	Secondary Land Use Rights
Institutions, place of instruction, social halls, religious purposes	Medical consulting rooms, dwelling units, residential buildings, sport and recreation clubs, public or private parking areas

An application has been submitted to rezone and subdivide the site into Residential 1 erven of approximately 180m<sup>2</sup>. The existing application will have to be withdrawn should an alternative development model be proposed.

DRAFT

### 3.11 LAND USE SURROUNDING THE SITE

The site is surrounded by single residential erven to the east, the south and the west. The erven to the east are between approximately 160m<sup>2</sup> and 200m<sup>2</sup> in extent and the erven to the south and the west, are approximately 250m<sup>2</sup>. On the western corner is a social facility and to the north an open space.

### 3.12 LAND USE ON THE SITE

The site is largely vacant, with some small structures on its periphery. There is illegal dumping on the south-eastern corner and the site is used as a 'shortcut' by pedestrians.



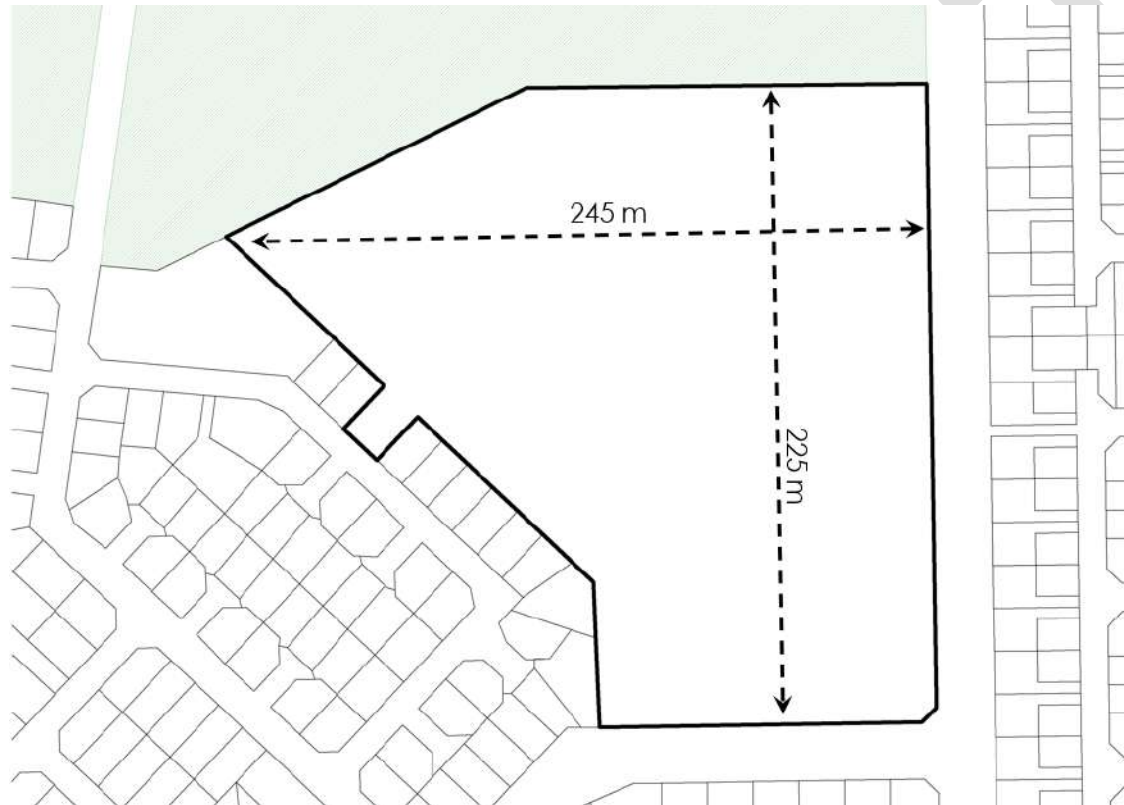
Figure 11: LAND USE ON AND SURROUNDING THE SITE



### 3.13 SCALE AND CONFIGURATION OF THE SITE

The site is approximately 3.8 ha in extent. It is triangular/rectangular in shape with dimensions of 225m north south and 245m west east.

Pennyville and Brickfields are used for size comparison. The site is similar in size to Brickfields in Johannesburg CBD.



**BRICKFIELDS**



**PENNYVILLE**



Figure 12: SITE SCALE AND DIMENSIONS

### 3.14 LOCAL ACCESS TO THE SITE

Access to the site is limited. To the north and the west there is a line of no access, as the site abuts an open space and residential erven. A portion of the site abuts the 'western road' and access can be obtained through this portion. It does however link to low order roads in a residential neighbourhood and it would be undesirable to obtain the main access from this point.

Access can be obtained from the 'eastern road'. Access points will however be limited and no direct access to individual erven will be allowed due to the high order of this road.

Access to the 'southern road' is limited due to the short length of the erf boundary from the intersection.



Figure 13: LOCAL ACCESS TO THE SITE

## 4 RESIDENTIAL MARKET STUDY

Based on the residential market study, social housing represents a reasonably good fit, considering the affordability and rental profile of the market area. The residential environment is, however, dominated by freestanding freehold houses. No medium to higher density residential developments are located within the market area (specifically 3 to 4 storey walk-up units). Site layout and design considerations need to be sensitive to these realities. A site and service development scheme might be preferred by the consumer market. A case could be made for medium density rental stock in proximity to employment opportunities and commercial developments.

The following aspects are taken into consideration:

- The proposed project size of **450 units** could be accommodated by the primary trade area within an average time period of 4.3 years, given a market share of 10% to 15%.
- It is evident that there is a market for lower to lower-middle income residential units.
- Based on the area's residential typology the majority of units include freehold property on separate stands.
- To develop medium to higher density social housing, certain locational realities need to be borne in mind.
- Configuration of units: 3 to 4 storey walk-ups.
- Unit sizes:  $\pm 30\text{m}^2$  -  $60\text{m}^2$ .

- The optimum point of market entry based on the market demand analysis would be 2020+.
- In the context of the target market profile, the optimum unit composition for residential units in the proposed development (to facilitate optimum take-up) would be:

Table 2: RESIDENTIAL DEVELOPMENT RECOMMENDATIONS

Unit configuration	Unit Size (sqm)	Rental Bracket (Rand/month)	% of Stock
Bachelor	30 to 35 m <sup>2</sup>	R400 to R700	25% to 30%
1-Bedroom	35 to 40 m <sup>2</sup>	R700 to R1 300	30% to 35%
2-Bedrooms	40 to 45 m <sup>2</sup>	R1 300 to R2 600	20% to 25%
2 to 3 Bedrooms	45 to 60 m <sup>2</sup>	R2 600 to R5 500	10% to 15%

Table 3: RESIDENTIAL MARKET STUDY SUMMARY

LAND USE	SITE RATING	MARKET GAP DEVELOPMENT PROSPECTS	DEMAND MODELLING RESULTS	OPTIMUM POINT OF MARKET ENTRY
Residential: Social housing units	64.9%	Market Gap: Yes  Development prospects: Moderate	Social housing units: 450	2020+

## 5 DESIGN CONCEPT

The design concept develops the spatial design explorations for the UDF. It is based on the situational analysis and synthesis and serves as the basis for the detail design. It explores different potential options and extracts the highest and best solutions.

The design concept deals with:

- The vision for the development
- The design principles that guide the development of alternative concepts and the evaluation of these alternatives
- The development of the different elements of the concept addressing access, the road network, nodes and public spaces, residential densities and sense of place elements

### 5.1 VISION

The vision for the development is:

*An integrated higher density residential development that provides in the need for housing for a range of household types.*

### 5.2 DESIGN PRINCIPLES

Six design principles guide the urban design concept. These relate to the spatial qualities of the development.

#### 5.2.1 MIXED USE

Mixed use refers to the appropriate level of mix of land uses within one building or close proximity to each other. The aim is firstly to address a range of needs

within walking distance thus reducing the need for vehicular travel and secondly to ensure a 24-hour city.

#### 5.2.2 MIXED RESIDENTIAL TYPOLOGY

Mixed residential typology refers to a mix of different residential typologies, both in terms of structure and in terms of tenure, to address the needs of different income groups and different household types thereby creating socio-economic integration.

#### 5.2.3 PERMEABILITY

Permeability refers to the ease of movement through an area by foot. It is prejudiced towards the pedestrian and non-motorised transport rather than the private vehicle. Permeability necessitates direct routes and short walking distances.

#### 5.2.4 SENSE OF PLACE

Sense of place refers to the unique character of an area and its imageability. It addresses aspects such as gateways, landmarks and vistas.

#### 5.2.5 MULTI-FUNCTIONALITY/ ADAPTABILITY

Multi-functionality/ adaptability refers to the use of space for more than one function and the ability to use space in different ways over time.

#### 5.2.6 HUMAN SCALE

Human scale refers to an environment that fits the scale of its users.

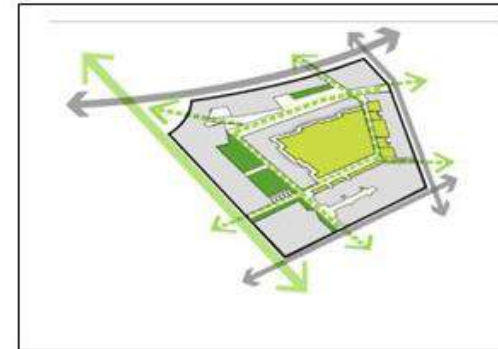
### MIXED USE



### MIXED TYPOLOGY



### PERMEABILITY



### SENSE OF PLACE



### MULTI-FUNCTIONALITY/ ADAPTABILITY



### HUMAN SCALE



<http://oasisdesigns.org/todkarkarduma.asp>

Figure 14: URBAN DESIGN PRINCIPLES

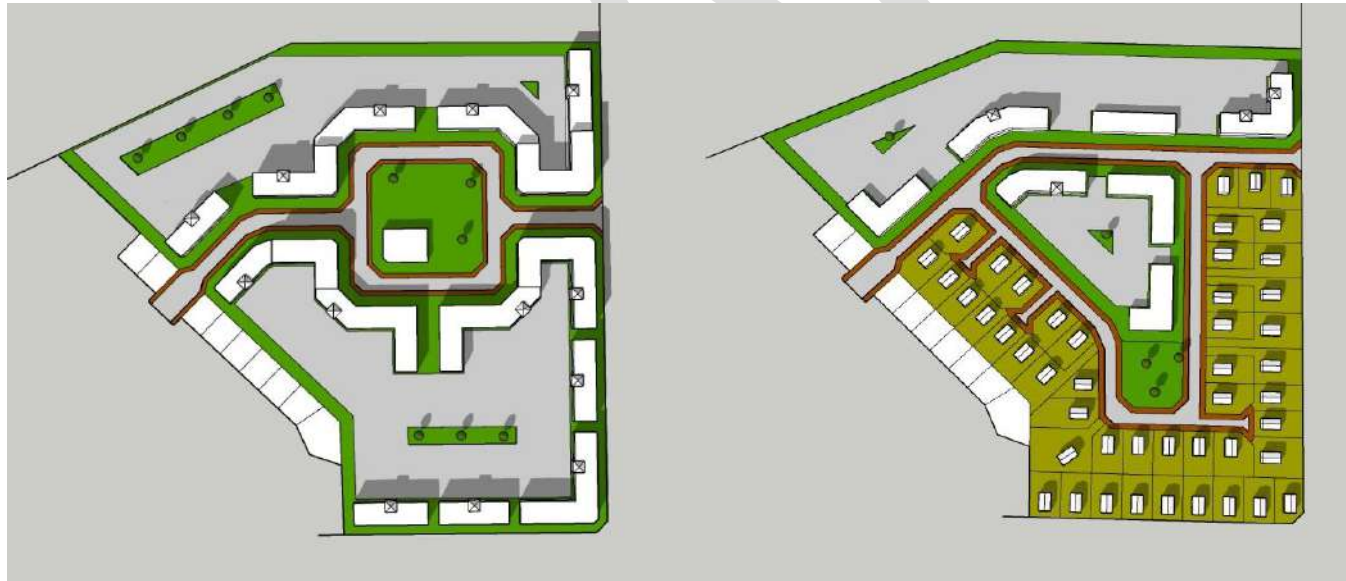
### 5.3 CONCEPT DEVELOPMENT

This section deals with the development of the concept. It addresses:

- Points of access
- Internal circulation
- Social facilities and public spaces
- Residential typologies
- Sense of place elements

Two concepts have been developed:

- OPTION 1: higher density residential development in line with the residential market study that identified the demand for 450 social housing dwelling units.
- OPTION 2: medium density housing consisting of a mix of residential typologies at a density of 60du/ha as prescribed by the SDF. A mix of walk-up flats and single residential erven with a minimum size of 250m<sup>2</sup> was applied.



## 5.4 OPTION 1 – WALK-UP FLATS FOR SOCIAL HOUSING

Option 1 is based on the concept of two to three walk-up flats that provide in the demand for social housing.

### 5.4.1 POINTS OF ACCESS AND INTERNAL CIRCULATION

Access to the site is limited due to the following:

- No access can be obtained from the north as the site is abutted by a public open space.
- Access to the west is limited as the site is abutted by single residential erven. There is only one point of access where the site directly abuts the western road.
- The site is only 120m wide at the southern end and no access can be obtained due to the short distance between the intersection of the eastern and southern roads and the western edge of the site.
- No direct access to individual erven can be obtained from the eastern road due to the high order of this road and its mobility function. Only one access point to the site can be obtained and this should be some distance from the intersection of the southern and the eastern roads.

Two access points are proposed: one from the west where the site abuts the western road and one from the eastern road roughly in the middle of the site. This forms an internal east-west link through the site.



Figure 15: ACCESS POINTS AND INTERNAL CIRCULATION

#### 5.4.2 RESIDENTIAL TYPOLOGY AND PUBLIC SPACES

The bulk of the site (3.2ha of the total 3.8ha) is earmarked for two to three storey residential walk-ups.

The access road is diverted to form a circle in the centre of the site. A communal open space will be provided in this circle. A social facility, such as a community hall or creche is proposed within the public open space.

An estimated **460 dwelling units** can be provided translating into a density of roughly **120du/ha**.



Figure 16: RESIDENTIAL TYPOLOGY AND PUBLIC SPACES



### 5.4.3 BUILT FORM AND SENSE OF PLACE ELEMENTS

Careful attention was given to the creation of a unique and positive sense of place for the development. This was done through the following:

- Perimeter buildings to define both the external and the internal streets as well as the communal open space
- Three storey buildings at the eastern entrance to create a gateway to the development. The remainder of the buildings are two-storeys in height.
- A social facility on the axis of the central internal road to create a landmark on the vistas.



Figure 17: DESIGN CONCEPT SENSE OF PLACE ELEMENTS

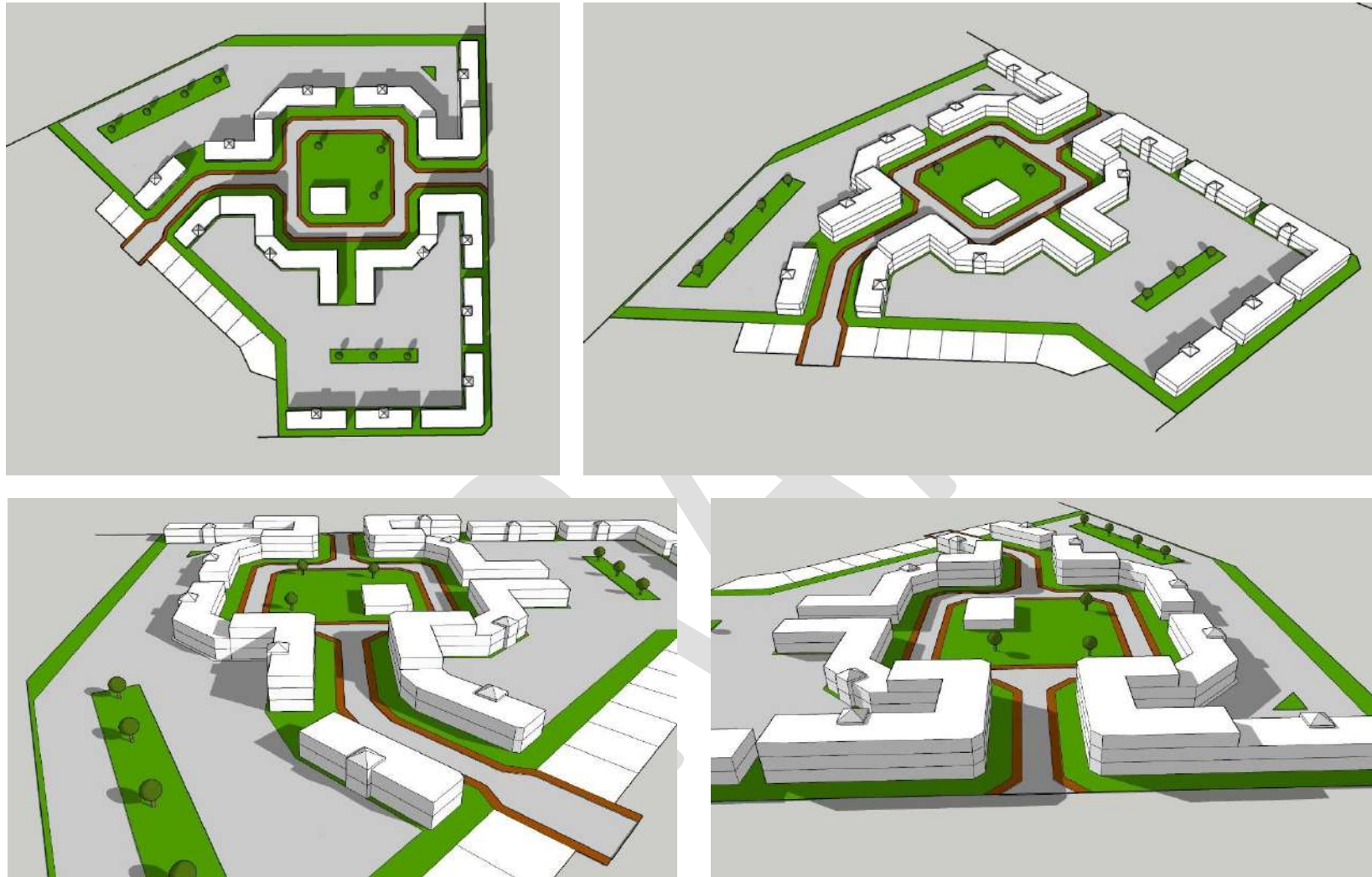


Figure 18: 3D IMAGES

## 5.5 OPTION 2: MIXED RESIDENTIAL TYPOLOGY

Option 2 is based on the concept of a combination of two to three storey walk-up flats and single residential erven with a minimum erf size of 250m<sup>2</sup> to comply with the SDF requirement of a maximum density of 60 dwelling units per hectare.

### 5.5.1 POINTS OF ACCESS AND INTERNAL CIRCULATION

Access to the site is limited due to the following:

- No access can be obtained from the north as the site is abutted by a public open space.
- Access to the west is limited as the site is abutted by single residential erven. There is only one point of access where the site directly abuts the western road.
- The site is only 120m wide at the southern end and no access can be obtained due to the short distance between the intersection of the eastern and southern roads and the western edge of the site.
- No direct access to individual erven can be obtained from the eastern road due to the high order of this road and its mobility function. Only one access point to the site can be obtained and this should be some distance from the intersection of the southern and the eastern roads.

Two access points are proposed: one from the west where the site abuts the western road and one from the eastern road roughly in the middle of the site. This forms an internal east-west link through the site. A ring road provides access to the southern portion of the site.

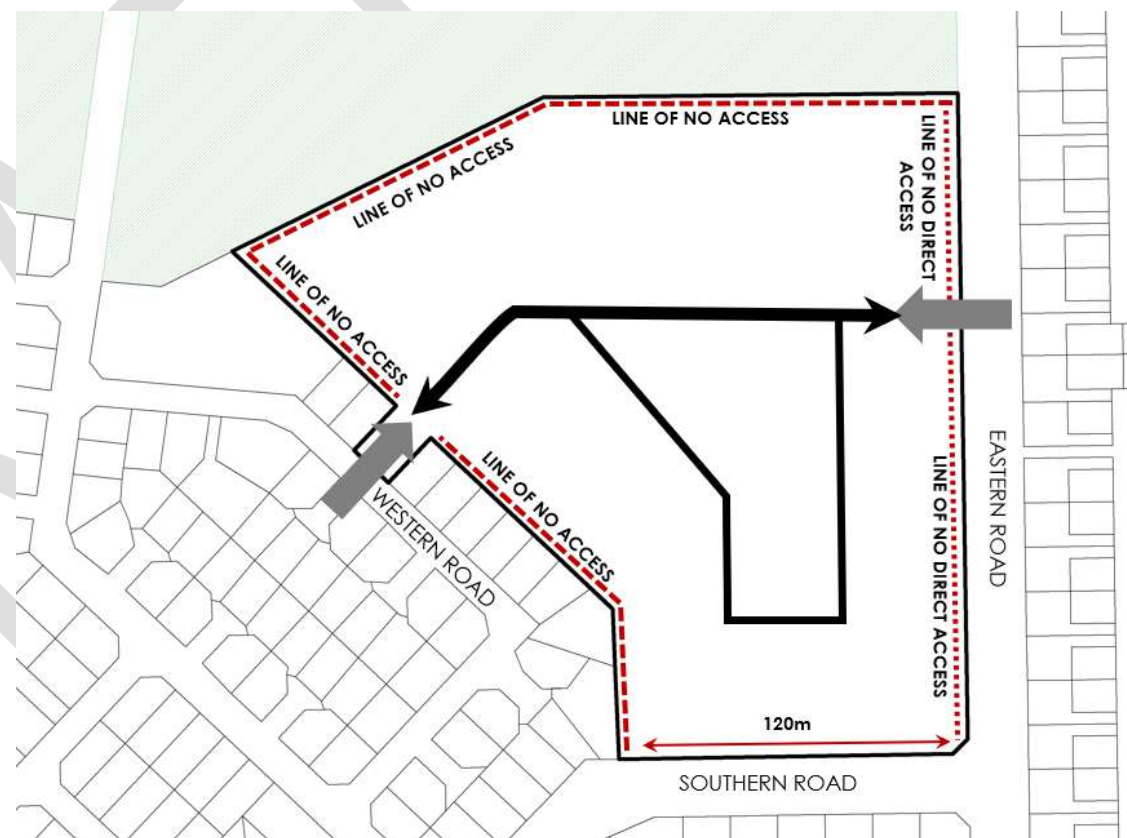


Figure 19: ACCESS POINTS AND INTERNAL CIRCULATION

### 5.5.2 RESIDENTIAL TYPOLOGY AND PUBLIC SPACES

The bulk of the site (3.23ha of the total 3.8ha) is earmarked for residential development.

The northern and central portions of the site is earmarked for two to three storey walk-ups. These are placed at the main entrance road at points of highest accessibility. The walk-ups are located on 1.86ha and approximately **155 units** can be achieved with a resultant net density of **120du/ha**.

The southern periphery of the site is earmarked for single residential erven. These are placed adjacent to the abutting residential properties in order to form a buffer between the walk-up flats and the surrounding low-density development. A total of **45 dwelling units with a minimum size of 250m<sup>2</sup>** can be achieved. This takes up 1.37ha of the site and a resultant density of just over 30du/ha.

Overall a total of **200 dwelling units** can be provided with a resultant density of 53du/ha.

A central open space with a small social facility such as a creche or community hall is placed between the single residential erven and the walk-up flats in a position that is accessible to all future residents.

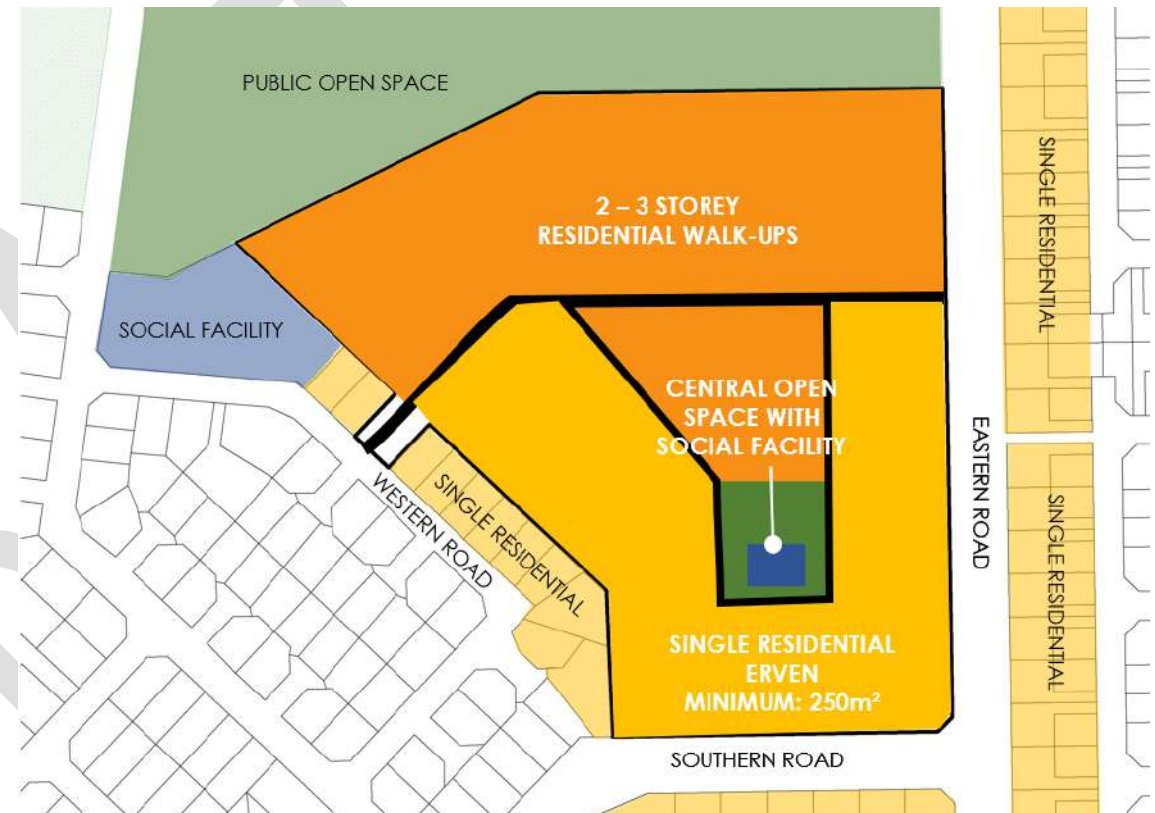


Figure 20: RESIDENTIAL TYPOLOGY AND PUBLIC SPACES

### 5.5.3 BUILT FORM AND SENSE OF PLACE ELEMENTS

Careful attention was given to the creation of a unique and positive sense of place for the development. This was done through the following:

- Perimeter buildings to define the internal streets.
- Walk-up building to define public open space.
- Social facility building to form a focus on the communal open space.
- Three storey building at the eastern entrance to create a gateway to the development. The remainder of the buildings are two-storeys in height.



Figure 21: DESIGN CONCEPT SENSE OF PLACE ELEMENTS



Figure 22: 3D IMAGES

## 6 EVALUATION OF DESIGN CONCEPTS

Two design concepts were developed:

OPTION 1: higher density residential development in line with the residential market study that identified the demand for 450 social housing dwelling units.

OPTION 2: medium density housing consisting of a mix of residential typologies at a density of 60du/ha as prescribed by the SDF. A mix of walk-up flats and single residential erven with a minimum size of 250m<sup>2</sup> was applied.

The development yield for each option is as follows:

OPTION 1:

An estimated **460 dwelling units** can be provided translating into a density of roughly **120du/ha**.

OPTION 2:

A total of **45 dwelling units with a minimum size of 250m<sup>2</sup>** can be achieved. This takes up 1.37ha of the site and a resultant density of just over 30du/ha.

Overall a total of **200 dwelling units** can be provided with a resultant density of 53du/ha.

## 7 PLANNING PROCESSES

In order to develop the erf, the following land use applications need to be submitted in terms of the Emfuleni Municipality Spatial Planning and Land Use Management By-laws, 2018.

- Rezoning in terms of Part 2 Section 38-43; and
- Subdivision in terms of Part 4 Section 51-58.

The following regulations apply:

### PART 2: AMENDMENT OF LAND USE SCHEME (REZONING) AND MATTERS RELATED THERETO:

- Section 38: Amendment of land use scheme application (Rezoning)
- Section 39: Decision and post-decision procedures – Amendment of Land Use Scheme
- Section 40: Correction of errors or omissions
- Section 41: Prohibition of a further application in certain circumstances
- Section 42: Contributions to be paid in respect of external engineering services and Open Spaces and Parks
- Section 43: Lapsing of rezoning and extension of validity periods

### PART 4: SUBDIVISION AND CONSOLIDATION OF AN ERF IN AN APPROVED TOWNSHIP AND THE SUBDIVISION AND/OR CONSOLIDATION OF ANY OTHER LAND:

- Section 51: Subdivision and/or consolidation of an erf/erven in an approved township

- Section 52: Cancellation and amendment of conditions/plan, endorsement of certain documents by Registrar and access



## 8 CONCLUSION

Erf 5085 Evaton West Ext 4 (Project F) is a vacant site zoned for community facility. It is located within the built-up area of Evaton West surrounding by single residential development as well as a number of social facilities and public open spaces. It is earmarked as a medium density zone by the Municipal SDF which means that a maximum residential density of 60 units per hectare should be developed.

Applying a mixture of land uses and residential typologies, whilst retaining a human scale and creating a distinct sense of place, two options were explored:

- Option 1 consists of two to three storey walk-up flats at a density of 120du/ha and yields approximately 460 dwelling units.
- Option 2 consists of a combination of two to three storey flats and single residential erven with a minimum erf size of 250m<sup>2</sup> and yields approximately 200 dwelling units at a density of 53du/ha.

In order to proceed with development, a rezoning and a subdivision application in terms of the municipal SPLUMA by-laws have to be submitted.

# PROPOSED LAYOUT PLAN (DRAFT)

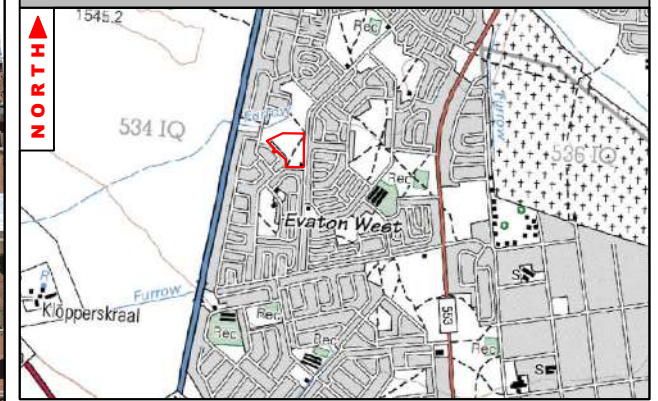
**SITUATED ON:** ERF 5085 EVATON WEST EXTENSION 4

**LOCAL AUTHORITY:** EMFULENI LOCAL MUNICIPALITY

**PROVINCE:** GAUTENG

**SCALE:** 1: 1250

## LOCALITY



## NOTES

1. PROPOSED LAND USES:

LAND USE	AREA (HA)	DENSITY	UNITS
RESIDENTIAL (2 STOREYS)	1.33	110 du/ha	185
SINGLE RESIDENTIAL (250sqm)	1.17	35 du/ha	41
SOCIAL	630sqm	N/A	N/A
PUBLIC OPEN SPACE	0.46	N/A	N/A
<b>RESIDENTIAL TOTAL</b>			<b>226</b>

2. COORDINATE SYSTEM: WG 27

3. ALL AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO FINAL SURVEY.

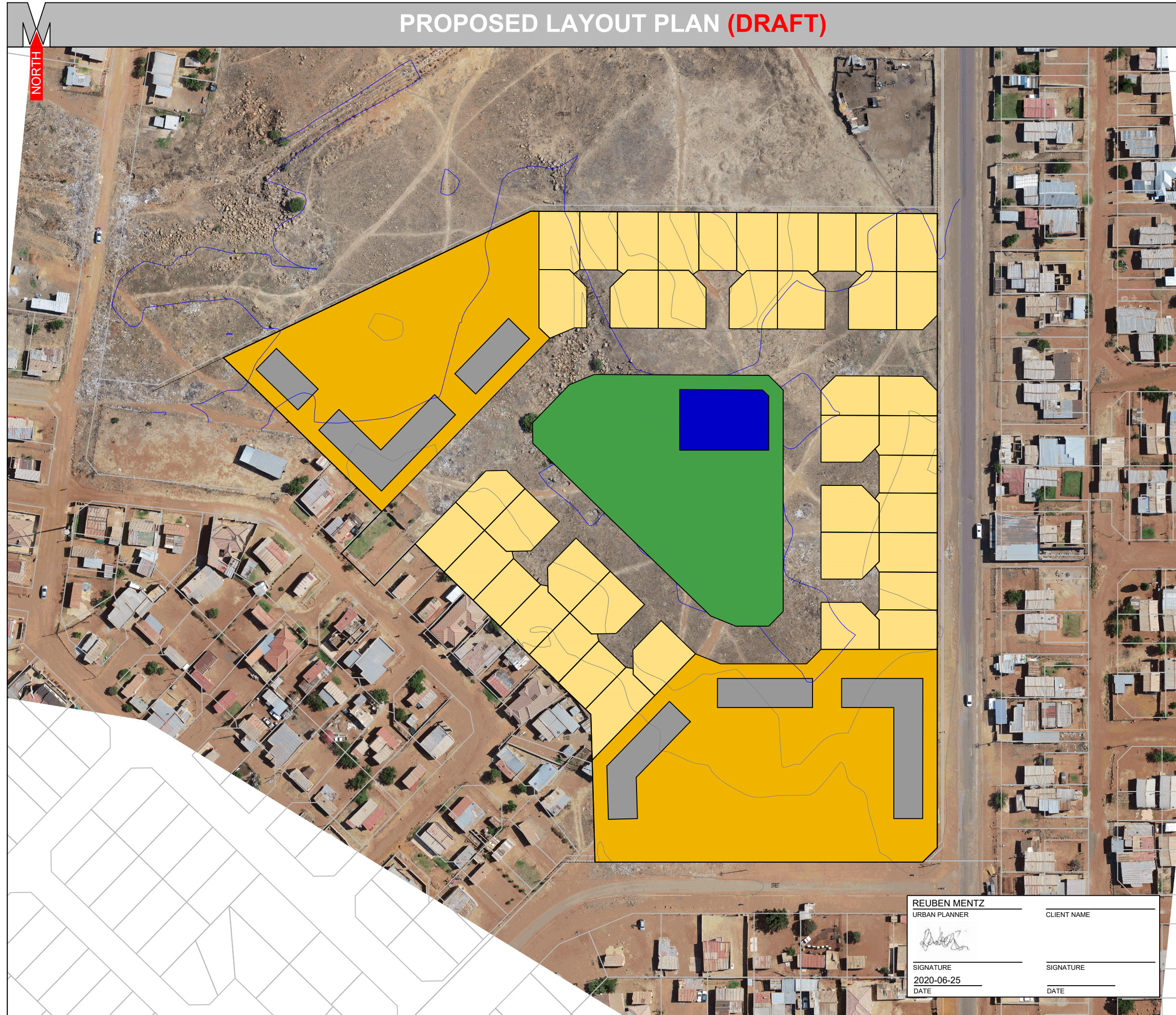
## DETAILS

DATE: 2020-06-25  
 DRAWN: RF MENTZ  
 SCALE: 1: 1250 (A3)  
 DRAWING NO: N/A



PLAN NO  
**1**

PROJECT NUMBER: MP- 1367



REUBEN MENTZ URBAN PLANNER	CLIENT NAME
SIGNATURE	SIGNATURE
2020-06-25	
DATE	DATE

1: 1250

100m

100m

100m

# PROPOSED LAYOUT PLAN (DRAFT)

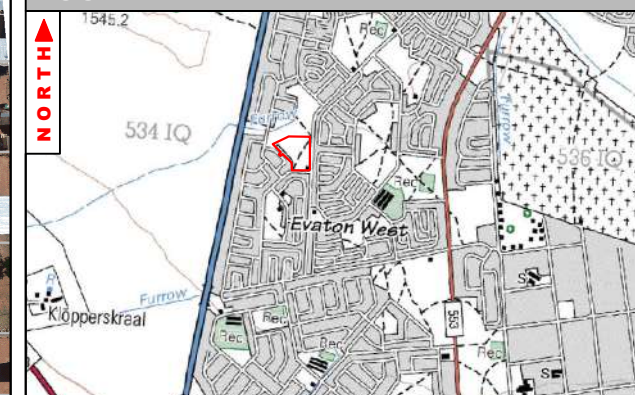
**SITUATED ON:** ERF 5085 EVATON WEST EXTENSION 4

**LOCAL AUTHORITY:** EMFULENI LOCAL MUNICIPALITY

**PROVINCE:** GAUTENG

**SCALE:** 1: 1250

## LOCALITY



## NOTES

### 1. PROPOSED LAND USES:

LAND USE	AREA (HA)	DENSITY	UNITS
RESIDENTIAL (2-3 STOREYS)	3.2	145 du/ha	462
SOCIAL	300sqm	N/A	N/A
PUBLIC OPEN SPACE	0.2	N/A	N/A
RESIDENTIAL TOTAL			462

### 2. COORDINATE SYSTEM: WG 27

### 3. ALL AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO FINAL SURVEY.

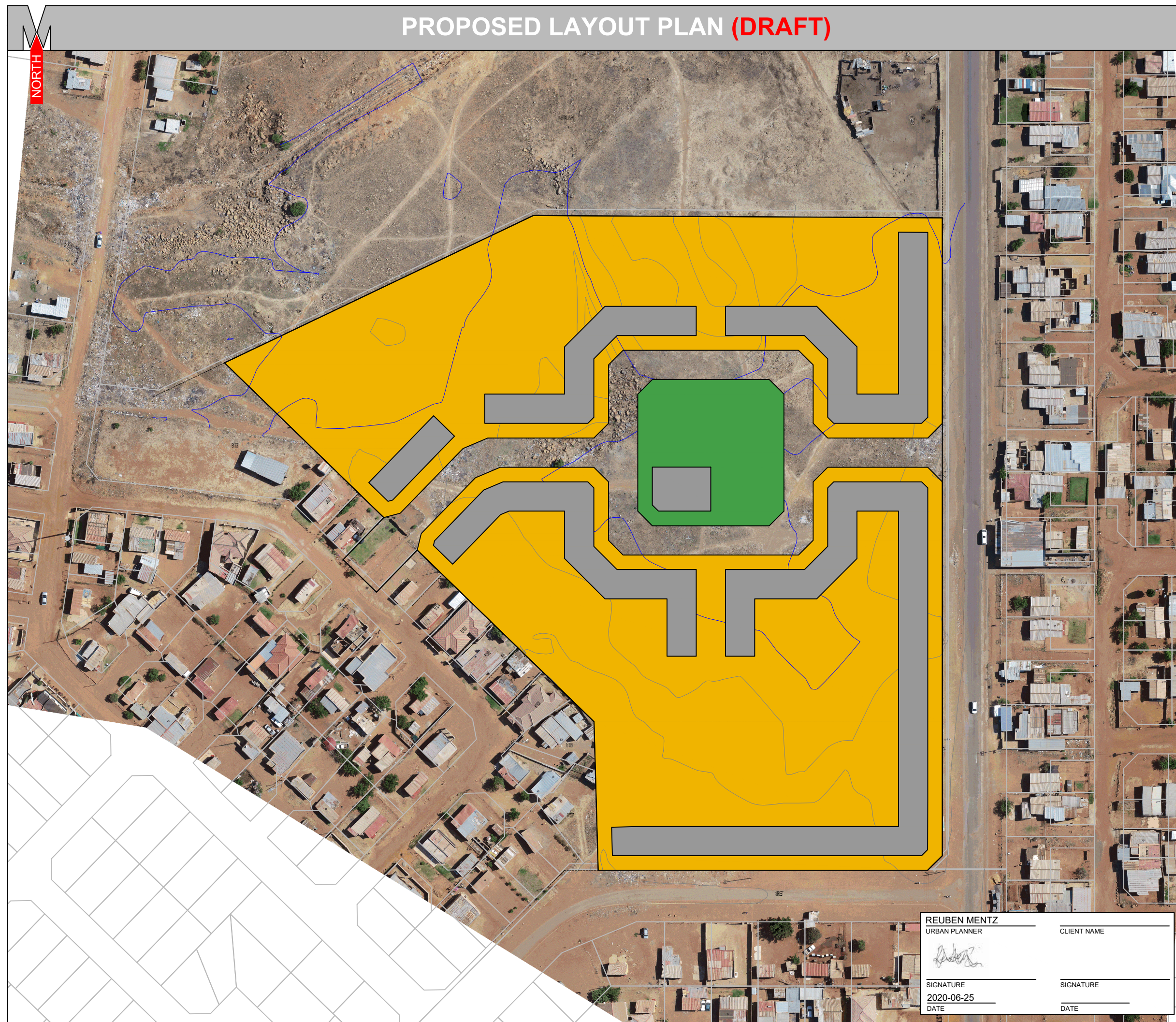
## DETAILS

DATE: 2020-06-25  
 DRAWN: RF MENTZ  
 SCALE: 1: 1250 (A3)  
 DRAWING NO: N/A



PLAN NO  
**1**

PROJECT NUMBER: MP- 1367



REUBEN MENTZ	
URBAN PLANNER	CLIENT NAME
SIGNATURE	SIGNATURE
2020-06-25	
DATE	DATE

1: 1250

100m

100m

100m

**APPENDIX F**  
Minutes of GDARD Pre-Application Meeting





63 Wessel Road, Rivonia, 2128 PO Box 2597, Rivonia, 2128 South Africa  
 Tel: +27 (0) 11 803 5726 Fax: +27 (0) 11 803 5745 Web: www.gcs-sa.biz

## Meeting Minutes

<b>Subject</b>	Pre-application Meeting for Gauteng Rapid Land Release Programme (GRLRP) - Unitas Park - Extension 16 and Evaton West - Project F, G, H and I, Gauteng Province
<b>Date</b>	19 August 2020
<b>Time</b>	10h00
<b>Attendance</b>	Dan Motaung (DM) (Gauteng Department of Agriculture and Rural Development) Boitshoko Buthelezi (BB) (Phumaf Holdings) Ngoni Gandiwa (NG) (Phumaf Holdings) Sikelela Mnguni (SM) (Phumaf Holdings) Gerda Bothma (GB) - GCS Water & Environmental Consultants Lehlogonolo Mashego (LM) - GCS Water & Environmental Consultants
<b>Apologies</b>	None

### 1. Introduction and Welcome

- GB welcomed all present and introduced the meeting as the Pre-application Meeting.
- A disclaimer was expressed of the session being recorded and that the meeting outcomes will further be shared (see Appendix 1).
- All attendees were requested to introduce themselves for the purpose of all parties being acquainted with the stakeholders involved and present.

### 2. Attendance Register and Apologies

- No apologies were received.

### 3. Discussion

- *Unitas Park - Extension 16*
  - Dan Motaung (DM) indicated that it is critical to include a Traffic Impact Assessment (TIA) and Geotechnical Assessment (GA) in addition to the proposed assessments. These assessments are also to be submitted to the department. It was since confirmed in the meeting that the assessments have been covered for the respective sites under the Engineering Assessments conducted and this will further be incorporated into the environmental application accordingly.
  - A great issue faced within Gauteng Province are the issues associated with waste (solid and liquid) and this is to be accounted for in the proposed developments. Maintenance and the available capacity needs to evidently allow for connections and

efficient connections into the municipal grid and to be able to handle the increase capacity.

- Ngoni Gandiwa (NG) indicated that the current proposal especially regarding this site is to make provision for a package plant to deal with the sewage issue and the expected flow will be large. Any associated impacts relevant to the Environmental Impact Assessment (EIA) are still to be verified at this stage.
- *Evaton West - Project F*
  - Include the applicable TIA and GA - DM
  - DM indicated that considering that there is an alleged drainage line traversing the site (natural drainage line) this will require a Storm Water Management Plan (SWMP). This needs to be submitted and drafted by a qualified Engineer or professional. The impacts associated with lack of storm water are vast in lower income communities, this is to be curbed and accounted for accordingly.
- *Evaton West - Project G*
  - Include the applicable TIA and GA - DM
  - DM noted that the Critical Biodiversity Areas (CBA) data is not to be omitted without further verifying with a qualifying Specialist. The site itself is evidently degraded and transformed and would not necessarily warrant any environmental protection. To this nature a Land-use application/enquiry detailing the site observations and sensitivities must be submitted to have the department confirm and accept the approach.
- *Evaton West - Project H*
  - Include the applicable TIA and GA - DM
  - DM noted again that the CBA data is not to be omitted without further verifying with a qualifying Specialist. The site itself is evidently degraded and transformed and would not necessarily warrant any environmental protection. To this nature a Land-use application/enquiry detailing the site observations and sensitivities must be submitted to have the department confirm and accept the approach.
- *Evaton West - Project I*
  - Include the applicable TIA and GA - DM
  - DM indicated that considering that there is an alleged drainage line traversing the site (natural drainage line) this will require a SWMP. DM indicated that the SWMP submitted to the municipality and to the department serve different purposes and this needs to be taken into consideration when submitting the respective reports.
- *Public Participation*
  - The intent of carrying out the public participation process (PPP) is in line with Chapter 6 of the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) as amended and the Covid-19 response guidelines as issues on 05 June 2020. We have

since moved to Level 2 and as such, await on the updated guidelines to inform any changes to the way the PPP will be conducted.

- The proposed PPP will include virtual activities as far as possible.
- The proximity of the Evaton West sites will potentially work in the collectives' favour if a combined PPP is conducted and a separate process initiated for the Unitas Park site.
- Should a combined approach be followed then all interested and affected parties (I&APs) are to be included and ensure that the message gets through to all I&APs. This needs to be managed carefully whilst ensuring that it is efficiently carried out in accordance with the NEMA regulations. - DM
- Suggestion with regards to project announcement is not to start too early as the community's response, cannot be pre-empted should this be done. - DM

#### **4. General**

- Where there are wetlands and areas of sensitivity on site, the necessary buffer zones are to be applied. These need to be included in the Specialist Assessments - DM.
- Low-cost housing generally does not account for spacing and greening or functional open areas. This is a recommendation was provided by DM and it was since confirmed in the meeting that this is an added component proposed to be included in support of the developments. - DM

#### **5. Way Forward and Closure**

Action	Role	Date
Internal project team to regroup and pave the response from the meeting way	GCS + Phumaf	20 August 2020
Meeting minutes to be distributed accordingly	GCS	24 August 2020
Submit PPP plan for approval	GCS	28 August 2020
Combination approach of PPP must be submitted to department for approval	GCS	28 August 2020
Submit a Land-use Application/Enquiry	GCS	28 August 2020

Meeting was closed off at 11:10, the meeting outcomes will be shared accordingly, so comments and input may be shared for **three (3) days** from the date of receipt.

## Appendix 1 - Meeting Recording

Link - <https://web.microsoftstream.com/video/854ec04d-80a8-4e17-94a8-4dc21707298d>



From: **Lehlo Mashego** <Lehlo@gcs-sa.biz>  
To: **MOTAUNG, DAN (GDARD)** <Dan.Motaung@gauteng.gov.za>  
CC: **Gerda Bothma** <gerdab@gcs-sa.biz>  
Subject: RE: Pre-Application Meeting Minutes  
Date: 01.09.2020 12:01:26 (+0200)

Good day Dan

Noted with thanks.

Kind regards  
Lehlogonolo Mashego

---

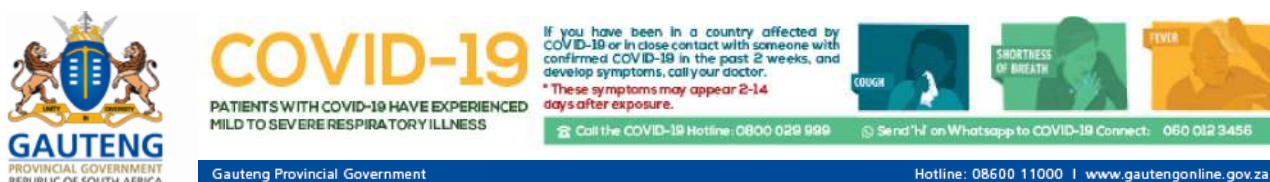
**From:** MOTAUNG, DAN (GDARD) <Dan.Motaung@gauteng.gov.za>  
**Sent:** Monday, 31 August 2020 11:14 AM  
**To:** Lehlo Mashego <lehlo@gcs-sa.biz>  
**Cc:** Gerda Bothma <gerdab@gcs-sa.biz>  
**Subject:** RE: Pre-Application Meeting Minutes

Good morning,

I hereby confirm that the contents of the minutes are a true reflection of the meeting held on 19 August 2020.

Regards

Dan



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**From:** Lehlo Mashego <[lehlo@gcs-sa.biz](mailto:lehlo@gcs-sa.biz)>  
**Sent:** Monday, 31 August 2020 09:56  
**To:** MOTAUNG, DAN (GDARD) <[Dan.Motaung@gauteng.gov.za](mailto:Dan.Motaung@gauteng.gov.za)>  
**Cc:** Gerda Bothma <[gerdab@gcs-sa.biz](mailto:gerdab@gcs-sa.biz)>  
**Subject:** Pre-Application Meeting Minutes

Good morning Dan

Following the pre-application meeting held on Wednesday, 19 August 2020, please see attached are the meeting outcomes for your comment and input.

Kindly have the comments sent in by Thursday midday and feel free to contact us should you need any additional information.

Kind regards  
Lehlogonolo Mashego

**Lehlo Mashego**  
Environmental Liaison Officer



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**Address** 63 Wessel  
Road, Rivonia,

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in 1987**

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**APPENDIX G**  
DEFF Online Screening Report



**SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION OR  
FOR A PART TWO AMENDMENT OF AN ENVIRONMENTAL AUTHORISATION  
AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE  
ENVIRONMENTAL SENSITIVITY**

**EIA Reference number:** Gauteng Rapid Land Release Programme

**Project name:** Evaton West - Project F

**Project title:** Environmental Screening Report

**Date screening report generated:** 03/06/2020 14:17:07

**Applicant:** Phumaf Holdings (Pty) Ltd

**Compiler:** GCS Water and Environmental Consultants (Pty) Ltd

**Compiler signature:**

.....

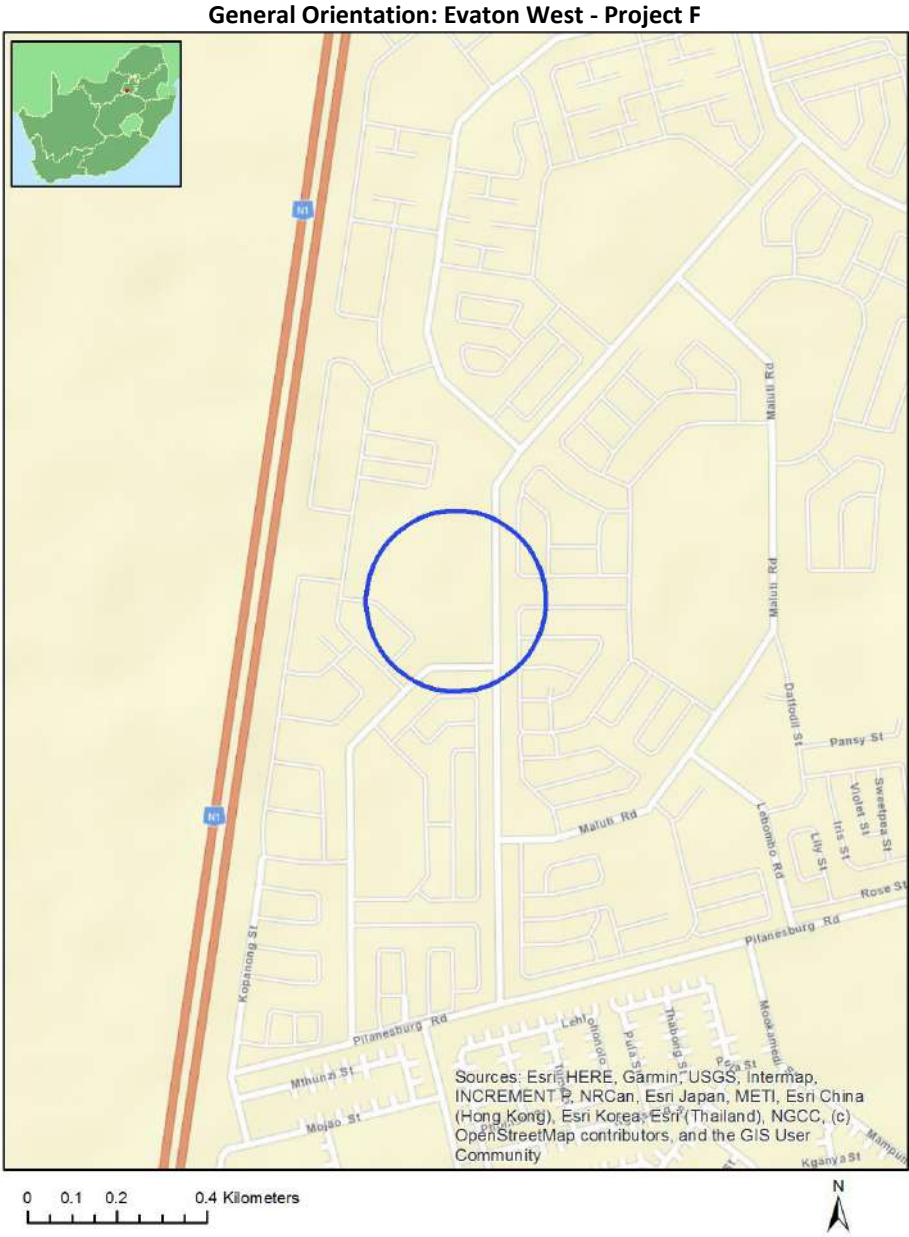


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# Proposed Project Location

Orientation map 1: General location



## Map of proposed site and relevant area(s)



## Cadastral details of the proposed site

Property details:

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	EVATON WEST	4059	0	26°30'44.8S	27°48'54.72E	Erven
2	EVATON WEST	4072	0	26°30'44.8S	27°48'55.84E	Erven
3	EVATON WEST	4073	0	26°30'44.76S	27°48'56.61E	Erven
4	EVATON WEST	4985	0	26°30'39.96S	27°48'51.74E	Erven
5	EVATON WEST	4989	0	26°30'40.58S	27°48'52.27E	Erven
6	EVATON WEST	4990	0	26°30'40.86S	27°48'52.61E	Erven
7	EVATON WEST	4998	0	26°30'43.05S	27°48'52.09E	Erven
8	EVATON WEST	5022	0	26°30'43.38S	27°48'54.31E	Erven
9	EVATON WEST	5023	0	26°30'42.93S	27°48'53.65E	Erven
10	EVATON WEST	5024	0	26°30'42.58S	27°48'54E	Erven
11	EVATON WEST	5038	0	26°30'38.34S	27°48'50.7E	Erven
12	EVATON WEST	5085	0	26°30'38.33S	27°48'55.86E	Erven
13	EVATON WEST	13350	0	26°30'34.63S	27°49'0.53E	Erven
14	EVATON WEST	13369	0	26°30'38.5S	27°49'2.15E	Erven
15	EVATON WEST	13371	0	26°30'38.11S	27°49'2.66E	Erven
16	EVATON WEST	13424	0	26°30'38.85S	27°49'2.19E	Erven
17	EVATON WEST	13436	0	26°30'41.45S	27°49'1.16E	Erven
18	EVATON WEST	13438	0	26°30'42.04S	27°49'0.64E	Erven
19	EVATON WEST	13445	0	26°30'43.5S	27°49'0.66E	Erven
20	EVATON WEST	13590	0	26°30'42.79S	27°49'2.15E	Erven
21	EVATON WEST	4051	0	26°30'44.09S	27°48'59.5E	Erven
22	EVATON WEST	4056	0	26°30'44.05S	27°48'56.6E	Erven
23	EVATON WEST	4075	0	26°30'44.74S	27°48'57.76E	Erven
24	EVATON WEST	4076	0	26°30'44.76S	27°48'58.33E	Erven
25	EVATON WEST	4983	0	26°30'39.56S	27°48'50.9E	Erven
26	EVATON WEST	4988	0	26°30'41.08S	27°48'51.84E	Erven
27	EVATON WEST	4991	0	26°30'41.37S	27°48'52.12E	Erven
28	EVATON WEST	4992	0	26°30'41.62S	27°48'52.44E	Erven
29	EVATON WEST	4994	0	26°30'41.45S	27°48'53.26E	Erven

30	EVATON WEST	5002	0	26°30'41.8S	27°48'51.61E	Erven
31	EVATON WEST	5021	0	26°30'43.62S	27°48'54.02E	Erven
32	EVATON WEST	5029	0	26°30'41.73S	27°48'55.07E	Erven
33	EVATON WEST	5030	0	26°30'41.25S	27°48'54.67E	Erven
34	EVATON WEST	13359	0	26°30'36.56S	27°49'1.13E	Erven
35	EVATON WEST	13361	0	26°30'37.02S	27°49'0.6E	Erven
36	EVATON WEST	13363	0	26°30'37.58S	27°49'1.16E	Erven
37	EVATON WEST	13365	0	26°30'37.99S	27°49'0.6E	Erven
38	EVATON WEST	13367	0	26°30'38.53S	27°49'1.14E	Erven
39	EVATON WEST	13419	0	26°30'39.22S	27°49'3.36E	Erven
40	EVATON WEST	13441	0	26°30'42.52S	27°49'0.65E	Erven
41	EVATON WEST	4986	0	26°30'40.53S	27°48'51.19E	Erven
42	EVATON WEST	4999	0	26°30'42.77S	27°48'51.74E	Erven
43	EVATON WEST	5005	0	26°30'41.53S	27°48'51.36E	Erven
44	EVATON WEST	5019	0	26°30'43.42S	27°48'53.11E	Erven
45	EVATON WEST	13353	0	26°30'35.08S	27°49'0.61E	Erven
46	EVATON WEST	13362	0	26°30'37.55S	27°49'0.61E	Erven
47	EVATON WEST	13364	0	26°30'37.93S	27°49'1.13E	Erven
48	EVATON WEST	13368	0	26°30'38.6S	27°49'1.97E	Erven
49	EVATON WEST	13373	0	26°30'38.49S	27°49'3.22E	Erven
50	EVATON WEST	13421	0	26°30'38.82S	27°49'2.67E	Erven
51	EVATON WEST	13422	0	26°30'39.26S	27°49'2.65E	Erven
52	EVATON WEST	13429	0	26°30'39.43S	27°49'0.6E	Erven
53	EVATON WEST	13446	0	26°30'43.96S	27°49'0.67E	Erven
54	EVATON WEST	13593	0	26°30'42.07S	27°49'2.56E	Erven
55	EVATON WEST	13627	0	26°30'40.8S	27°49'2.66E	Erven
56	EVATON WEST	4055	0	26°30'44.06S	27°48'57.16E	Erven
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59	EVATON WEST	5006	0	26°30'41.27S	27°48'50.99E	Erven
60	EVATON WEST	5007	0	26°30'40.93S	27°48'50.73E	Erven
61	EVATON WEST	5027	0	26°30'42.42S	27°48'55.22E	Erven
62	EVATON WEST	5031	0	26°30'40.96S	27°48'54.37E	Erven
63	EVATON WEST	13357	0	26°30'36.05S	27°49'0.61E	Erven
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66	EVATON WEST	13433	0	26°30'40.54S	27°49'0.58E	Erven
67	EVATON WEST	13439	0	26°30'42.07S	27°49'1.14E	Erven
68	EVATON WEST	13631	0	26°30'40.49S	27°49'2.1E	Erven
69	EVATON WEST	13635	0	26°30'40.48S	27°49'3.13E	Erven
70	EVATON WEST	13786	0	26°30'36.44S	27°49'2.84E	Erven
71	EVATON WEST	4053	0	26°30'44.1S	27°48'58.31E	Erven
72	EVATON WEST	4058	0	26°30'44.37S	27°48'55.18E	Erven
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74	EVATON WEST	4987	0	26°30'40.73S	27°48'51.61E	Erven
75	EVATON WEST	5020	0	26°30'43.92S	27°48'53.62E	Erven
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77	EVATON WEST	13354	0	26°30'35.57S	27°49'0.61E	Erven
78	EVATON WEST	13356	0	26°30'35.97S	27°49'1.13E	Erven
79	EVATON WEST	13372	0	26°30'38.5S	27°49'2.66E	Erven
80	EVATON WEST	13427	0	26°30'38.91S	27°49'0.68E	Erven
81	EVATON WEST	13434	0	26°30'41.04S	27°49'0.59E	Erven
82	EVATON WEST	13437	0	26°30'41.49S	27°49'0.61E	Erven
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98	EVATON WEST	13797	0	26°30'36.04S	27°49'2.5E	Erven
99	EVATON WEST	13790	0	26°30'37.37S	27°49'2.66E	Erven
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119	EVATON WEST	13443	0	26°30'43.05S	27°49'1.13E	Erven
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126	EVATON WEST	13792	0	26°30'37.02S	27°49'2.07E	Erven
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129	EVATON WEST	13633	0	26°30'40.11S	27°49'2.6E	Erven
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134	EVATON WEST	5000	0	26°30'42.37S	27°48'52.26E	Erven
135	EVATON WEST	5028	0	26°30'42.06S	27°48'54.67E	Erven
136	EVATON WEST	5032	0	26°30'40.7S	27°48'54.02E	Erven
137	EVATON WEST	5034	0	26°30'40.22S	27°48'53.45E	Erven
138	EVATON WEST	5035	0	26°30'39.93S	27°48'53.18E	Erven
139	EVATON WEST	13349	0	26°30'34.08S	27°49'0.57E	Erven
140	EVATON WEST	13374	0	26°30'38.12S	27°49'3.34E	Erven
141	EVATON WEST	13440	0	26°30'42.43S	27°49'1.15E	Erven
142	EVATON WEST	13629	0	26°30'41.2S	27°49'2.16E	Erven
143	EVATON WEST	13798	0	26°30'35.51S	27°49'2.47E	Erven
144	EVATON WEST	13800	0	26°30'35.08S	27°49'2.02E	Erven
145	RIETFONTEIN ALIAS KLOPPERSKRAAL	534	0	26°31'9.69S	27°47'48.62E	Farm
146	RIETFONTEIN ALIAS KLOPPERSKRAAL	534	35	26°30'28.82S	27°49'11.81E	Farm Portion
147	RIETFONTEIN ALIAS	534	33	26°30'15.41S	27°48'56.25E	Farm Portion

	KLOPPERSKRAAL					
148	RIETFONTEIN ALIAS KLOPPERSKRAAL	534	20	26°30'58.67S	27°48'48.53E	Farm Portion

Development footprint<sup>1</sup> vertices:  
No development footprint(s) specified.

### Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No nearby wind or solar developments found.

### Environmental Management Frameworks relevant to the application



<b>Environm ental Managem ent Framewor k</b>	<b>LINK</b>
Gauteng EMF	<a href="https://screening.environment.gov.za/ScreeningDownloads/EMF/Zone_1,_Zone_2,_Zone_3,_Zone_4,_Zone_5.pdf">https://screening.environment.gov.za/ScreeningDownloads/EMF/Zone_1, Zone 2, Zone 3, Zone 4, Zone 5.pdf</a>

<sup>1</sup> “development footprint”, means the area within the site on which the development will take place and includes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

## Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development site as well as the most environmental sensitive features on the site based on the site sensitivity screening results for the application classification that was selected. The application classification selected for this report is: Transformation of land | From open space or Conservation | Transformation of land - From open space or Conservation.

### Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this site are indicated below.

Incentive, restriction or prohibition	Implication
Strategic Transmission Corridor-Central corridor	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/GNR_350_of_13_April_2017.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/GNR_350_of_13_April_2017.pdf</a>
Gauteng EMF-Urban development zone 1	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Zone_1.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Zone_1.pdf</a>
Air Quality-Vaal Triangle Airshed Priority Area	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Final_VTAPA_AQMP_20090408_-15_April_2009.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Final_VTAPA_AQMP_20090408_-15_April_2009.pdf</a>

Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones

**Project Location: Evaton West - Project F**



**Proposed Development Area Environmental Sensitivity**

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	

Aquatic Biodiversity Theme				X
Civil Aviation Theme				X
Plant Species Theme			X	
Defence Theme				X
Terrestrial Biodiversity Theme	X			

### Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

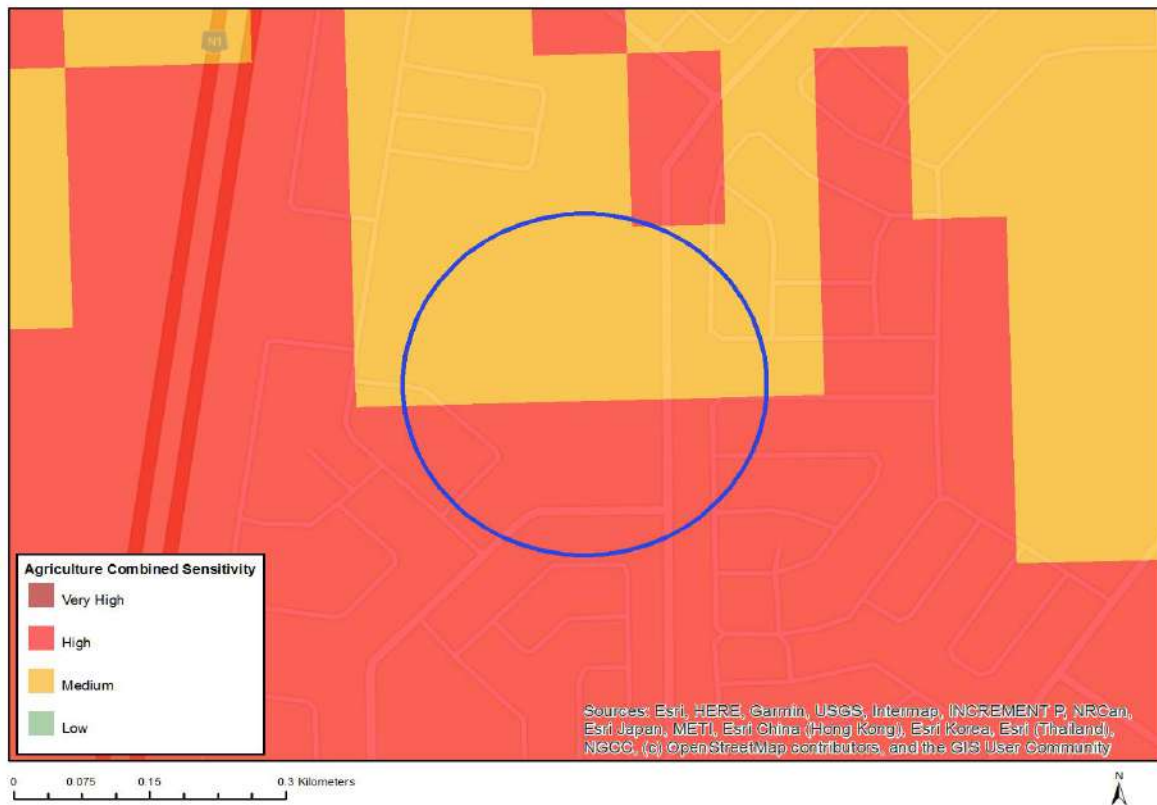
<b>N o</b>	<b>Specialist assessment</b>	<b>Assessment Protocol</b>
1	Landscape/Visual Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>
2	Archaeological and Cultural Heritage Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>
3	Palaeontology Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>
4	Terrestrial Biodiversity Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf</a>
5	Aquatic Biodiversity Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Aquatic_Biodiversity_Assessment.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Aquatic_Biodiversity_Assessment.pdf</a>
6	Hydrology Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>
7	Socio-Economic	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>

	Assessment	
8	Plant Species Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>
9	Animal Species Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf</a>

## Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

### MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

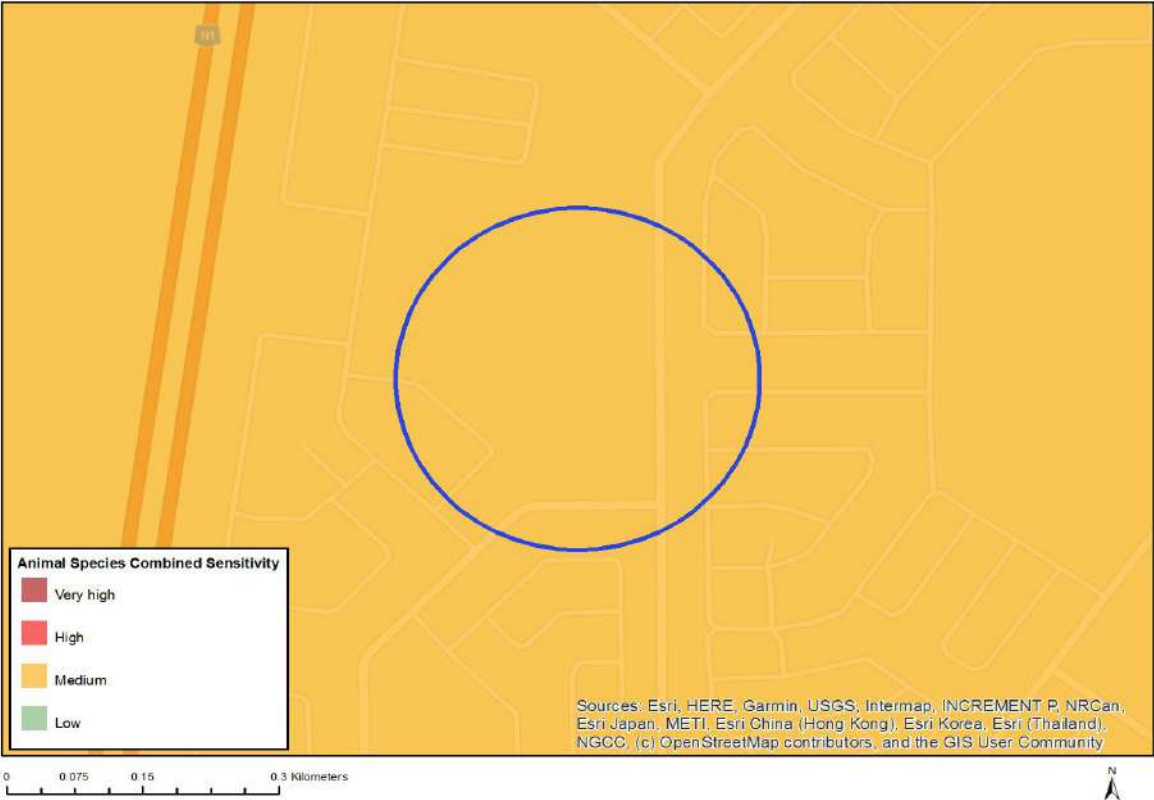


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

#### Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Insecta-Lepidochrysops praeterita
Medium	Insecta-Aloeides dentatis dentatis
Medium	Insecta-Orachrysops mijburghi



## MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

## MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY

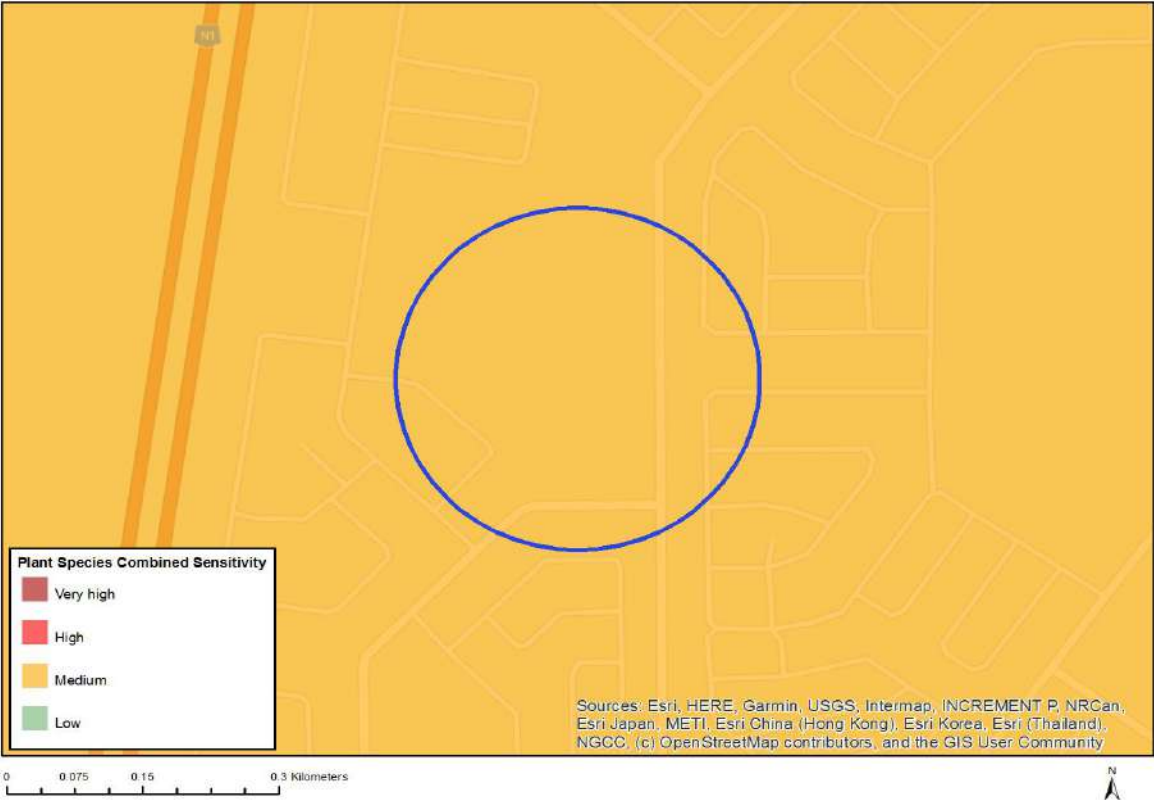


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Sensitive species 647
Medium	Khadia beswickii

## MAP OF RELATIVE DEFENCE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

## MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

### Sensitivity Features:

Sensitivity	Feature(s)
Very High	Vulnerable ecosystem

# APPENDIX H

## Public Participation



**APPENDIX H-1**  
Database of Interested and Affected Parties



<b>Gauteng Rapid Land Release Programme: I&amp;AP/Stakeholder Database</b>				
<b>Title</b>	<b>Last name</b>	<b>First name</b>	<b>Organisation</b>	<b>Position</b>
<b>Landowners and lawful occupiers (Directly Affected)</b>				
Mr	Molokomme	Daniel	Department of Human Settlements (DHS) - Gauteng Provincial Government	Departmental Representative
<b>Authorities</b>				
			<b>Department of Environment, Forestry and Fisheries (DEFF)</b>	
Mr	Mahlangu	Lucas	Department of Environment, Forestry and Fisheries (DEFF)	
Ms	Masina	Litsoane	Department of Environment, Forestry and Fisheries (DEFF)	
	Administration		Department of Environment, Forestry and Fisheries (DEFF)	Administration and Support
			<b>Department of Human Settlements, Water and Sanitation</b>	
Mr	Khathutshelo	Mudau	Department of Human Settlements, Water and Sanitation	Environmental Officer - Sedibeng Region
			<b>Gauteng Department of Agriculture and Rural Development</b>	
Mr	Dan	Motaung	Gauteng Department of Agriculture and Rural Development	Case Officer
Ms	Malesela	Sehona	Gauteng Department of Agriculture and Rural Development	Administration and Support
Ms	Thabisile	Nkosi	Gauteng Department of Agriculture and Rural Development	Environmental Officer
	Tebogo	Leku	Gauteng Department of Agriculture and Rural Development	Environmental Officer
	Aristotelis	Kapsosiders	Gauteng Department of Agriculture and Rural Development	Environmental Officer
			<b>Department of Roads and Transport</b>	
			Department of Roads and Transport	
			<b>Sedibeng District Municipality</b>	
Mr	Stanley	Khanyile	Sedibeng District Municipality	Municipal Manager
	Maisaka	Mtshali	Sedibeng District Municipality	MM - Personal Assistant
	Administration		Sedibeng District Municipality	
Ms	Mapuleng	Mateane	Sedibeng District Municipality - Office of the Executive Mayor	Personal Assistant
Mr	Sipho	Nhlengethwa	Sedibeng District Municipality - Office of the Executive Mayor	Assistant Manager: Ntirhisano Service Delivery Programmes
	Archie	Mokonane	Sedibeng District Municipality - Office of the Executive Mayor	Director
	Motshedisi	Motsoari	Sedibeng District Municipality - Transport Infrastructure, Development and Environment	Office Manager
			Sedibeng District Municipality	Environmental Officer
Ms	Betty	Peterson	Sedibeng District Municipality - Municipal Manager	Personal Assistant
	Refilwe	Mhlwatika	Sedibeng District Municipality - Municipal Manager	Director - Legal
	Marriam	Mosiane	Sedibeng District Municipality - Spatial Development and Economic Development	Office Manager
	Khulu	Mbongo	Sedibeng District Municipality - Spatial Development and Economic Development	Director: Local Economic Development
	Bassey	Ramagaga	Sedibeng District Municipality - Spatial Development and Economic Development	Manager: IDP (Intergrated Development Planning)
	Sello	Pitso	Sedibeng District Municipality - Spatial Development and Economic Development	Manager: Housing
	Kate	Plank	Sedibeng District Municipality - Office of the Chief Whip of Council	Community Liaison
			<b>Emfuleni Local Municipality</b>	
Ms	Nomsa	Mooi	Emfuleni Local Municipality	Ward Councillor
Ms	Mmatshapo	Mathumbo	Emfuleni Local Municipality	Executive Secretary to the Speaker
Mr	Oupa	Nkoane	Emfuleni Local Municipality	Municipal Manager
	Amanda	van Onselen	Emfuleni Local Municipality	MM - Personal Assistant
	Lekgotla	Motapane	Emfuleni Local Municipality	Town Planning Manager
	Moratuwa	Mthimkhulu	Emfuleni Local Municipality	



	Hennie	Pelser	Emfuleni Local Municipality	
	Anton	Mojapelo	Emfuleni Local Municipality	
	Administration		Emfuleni Local Municipality	
			Emfuleni Local Municipality - Social Development	
Cllr	Nomvula	Thulo	Emfuleni Local Municipality - Mayorial Committee	MMC: Environmental Management and Planning
Cllr	Dimakatso Maria	Malisa	Emfuleni Local Municipality - Mayorial Committee	MMC: Health and Social Development
Cllr	Khethiwe	Ntombela	Emfuleni Local Municipality - Mayorial Committee	MMC: Infrastructure Planning, Development and Asset Management (IPAM)
Cllr	Mokete Edwin	Kele	Emfuleni Local Municipality - Mayorial Committee	MMC: Human Settlement
Cllr	Pius	Maseko	Emfuleni Local Municipality - Mayorial Committee	MMC: Agriculture, Local Economic Development, Development Planning and Tourism
Cllr	Thembile Samson	Nquba	Emfuleni Local Municipality - Mayorial Committee	MMC: Basic Services
			<b>South African Heritage Resources Agency (SAHRA)</b>	
Ms	Khumalo	Nokukhanya	South African Heritage Resources Agency (SAHRA)	
Ms	Natasha	Higgitt	South African Heritage Resources Agency (SAHRA)	
	Leomile	Mofutsanyana	South African Heritage Resources Agency (SAHRA)	
<b>Business Forum</b>				
Mr	Paul	Mosedi	Sedibeng Business Forum	
<b>Libraries (Public Places for review of documents)</b>				
			Evaton Community Library	
			Zone 7 Library	
			Vereeniging Public Library	
			Vereeniging Public Library	Senior Librarian
			Vereeniging Public Library	Principal Librarian
			Vanderbijlpark Public Library	
			Unit 13 Community Library	
			Sebokeng Public Library	
<b>Media</b>				
	Maretha	Lombard	Sedibeng Ster	Advertising Manager
			Caxton	
			Evaton Community Radio Station	
<b>Business</b>				
			Pro-Pneumatic Retail Operations	
			Gauteng Coaches (Pty) Ltd	
			Alliance Conveying Systems	
			Microdot Fitment Centre	
			Global Village	
			Motordeal Truck and Commercial	
			Laerskool Vryheidsmonument	
			OK Minimark Duncanville	
			Premier FMCG - Vereeniging Wheat Mill	
			The Waste Group Vaal	
			Sonland Eskom Substation	
			Fibre and Plastic Technology	
<b>Schools</b>				
			Evaton West Primary School	
			Evaton Primary School	

**APPENDIX H-2**  
Newspaper Advertisement





**NOTIFICATION OF A BASIC ASSESSMENT AUTHORISATION APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998) FOR, EVATON WEST PROJECT F AND I, GAUTENG PROVINCE.**

**GCS Project Reference: 19.0921**

**Background and Project Description**

The Provincial Department of Human Settlements (DHS) aims at fast tracking the release of serviced stands from State owned land to qualifying beneficiaries through the Gauteng Rapid Land Release Programme (GRLRP). The proposed projects are planned to have a township layout. There are two project sites and applications under investigation:

**1. Evaton West – Project F**

**GDARD Ref No: 002/20-21/E0032**

Evaton West – Project F is located within Evaton West on Erf 5085, close to Adidas Road and the National (N1) Road, which is to the west. The site is approximately 3.84 hectares in extent. Evaton West – Project F is inside of the 2010 urban edge and is zoned as “community facilities”.

**Activities for which Environmental Authorisation is being sought:**

Evaton West – Project F triggers the following potential Listed Activities in terms of the NEMA EIA Regulations (2014, as amended) and the National Heritage Resources Act (Act No. 25 of 1999):

- GN R327, 07 April 2017, Listing Notice 1 – Activity 27
- GN R324, 07 April 2020, Listing Notice 3 – Activity 4
- Section 38 of the NHRA (Heritage Permitting)

**2. Evaton West – Project I**

**GDARD Ref No: 002/20-21/E0031**

Evaton West – Project I is located within Evaton West on Erf 14540 IQ, directly to the east of the Golden Highway (R553). The site is approximately 4.32 hectares in extent. Evaton West – Project I is inside of the 2010 urban edge and is zoned as “public open space/parks”.

**Activities for which Environmental Authorisation is being sought:**

Evaton West – Project I triggers the following potential Listed Activities in terms of the NEMA EIA Regulations (2014, as amended), the National Water Act (NWA) (Act 36 of 1998) and the National Heritage Resources Act (Act No. 25 of 1999):

- GN R327, 07 April 2017, Listing Notice 1 – Activity 12, 14, 19, 27; 30
- GN R324, 07 April 2020, Listing Notice 3 – Activity 4, 10, 12, 14 and 15
- Section 21 of the NWA (Water Use License Application)
- Section 38 of the NHRA (Heritage Permitting)

**Project Progress and Participation:**

GCS Water and Environmental Consultants (Pty) Ltd (GCS), has been appointed to undertake the necessary environmental processes for the above-mentioned Projects and this notification forms part of the public consultation process as required by the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) EIA Regulations (2014, as amended) and the National Water Act, 1998 (Act 36 of 1998) (NWA).

**Opportunity to Participate:** Interested and affected parties (“I&APs”) are hereby invited to register as a stakeholder for these Projects. I&APs should please use the 19-0921 reference number when commenting and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and a disclosure of any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application, to the contact person indicated below, within **30 days** (i.e. the deadline for comments is **15 March 2021**) from the date of commencement (**12 February 2021**) in accordance with the statutory requirements.

The Draft Basic Assessment Reports and Supporting Documentation can be accessed at the following link from 12 February 2021:

- [www.gcs-sa.biz/Documents](http://www.gcs-sa.biz/Documents)

**PLEASE NOTE:** Due to COVID19 restrictions, no hard copies of the report will be available for review at public venues. However, the report is available electronically via the GCS Website (link provided above) or a CD can be made available upon request.

**Please submit all comments directly to GCS on or before 15 March 2021, as follows:**

Lehlogonolo Mashego

Tel: 011 803 5726

Fax: 011 803 5232

E-mail: [lehlo@gcs-sa.biz](mailto:lehlo@gcs-sa.biz)

Mail: P O Box 2597, Rivonia, 2128

# APPENDIX H-3

## Site Notices





# NOTIFICATION OF AN ENVIRONMENTAL AUTHORISATION APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998) FOR EVATON WEST – PROJECT F, GAUTENG PROVINCE.

GCS Ref. No: 19.0921  
GDARD Ref No: 002/20-21/E0032

## Background and Project Description

The Department of Human Settlements (DHS) aims at fast tracking the release of serviced stands from State owned land to qualifying beneficiaries through the Gauteng Rapid Land Release Programme (GRLRP). As part of this programme, the Evaton West – Project F Development has been identified for implementation.

The proposed project site is located on Erf 5085 within Evaton West falling within the Emfuleni Local Municipality and Sedibeng District Municipality. The site is close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is approximately 3.84 hectares in extent. Evaton West – Project F is inside of the 2010 urban edge and is zoned as “community facilities”.



## Project Progress and Participation:

GCS Water and Environmental Consultants (Pty) Ltd (GCS), has been appointed to undertake the necessary environmental processes for the above-mentioned Project and this notification forms part of the public consultation process as required by the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) EIA Regulations (2014, as amended) and the National Water Act, 1998 (Act 36 of 1998) (NWA).

**Opportunity to Participate:** Interested and affected parties (“I&APs”) are hereby invited to register as a stakeholder for this Project. I&APs should please use the 19-0921 reference number when commenting and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and a disclosure of any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application, to the contact persons indicated below, within 30 days (i.e. the deadline for comments is **15 March 2021**) from the date of commencement (**12 February 2021**) in accordance with the statutory requirements.

### Activities for which Environmental Authorisation is being sought:

The Project triggers the following potential Listed Activities in terms of the NEMA EIA Regulations (2014, as amended) and the National Heritage Resources Act (Act No. 25 of 1999) (NHRA):

- GN R327, 07 April 2017, Listing Notice 1 – Activity 27
- GN R324, 07 April 2020, Listing Notice 3 – Activity 4
- Section 38 of the NHRA (Heritage Permitting)

The Draft Basic Assessment Report and Supporting Documentation can be accessed at the following link from 12 February 2021:

- [www.gcs-sa.biz/Documents](http://www.gcs-sa.biz/Documents)

**PLEASE NOTE:** Due to COVID19 restrictions, no hard copies of the report will be available for review at public venues. However, the report is available electronically via the GCS Website (link provided above) or a CD can be made available upon request.

Please submit all comments directly to GCS on or before **15 March 2021**, as follows:

Lehlogonolo Mashego  
Tel: 011 803 5726  
Fax: 011 803 5232  
E-mail: [lehlo@gcs-sa.biz](mailto:lehlo@gcs-sa.biz)  
Mail: P O Box 2597, Rivonia, 2128

## **APPENDIX H-4**

### **Email Notifications**

It is to be noted that the email notifications will further be appended as part of the planned submission of the Final BAR.



**APPENDIX H-5**  
Flyer and Signed Registers





**FLYER OF AN ENVIRONMENTAL AUTHORISATION APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998) FOR EVATON WEST – PROJECT F, GAUTENG PROVINCE.**

**GCS Ref. No: 19.0921**  
**GDARD Ref No: 002/20-21/E0032**

**Background and Project Description**

The Department of Human Settlements (DHS) aims at fast tracking the release of serviced stands from State owned land to qualifying beneficiaries through the Gauteng Rapid Land Release Programme (GRLRP). As part of this programme, the Evaton West – Project F Development has been identified for implementation.

The proposed project site is located on Erf 5085 within Evaton West falling within the Emfuleni Local Municipality and Sedibeng District Municipality. The site is close to Adidas Road and the National Road N1, which is to the west. Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south. The site is approximately 3.84 hectares in extent. Evaton West – Project F is inside of the 2010 urban edge and is zoned as “community facilities”.



**Project Progress and Participation:**

GCS Water and Environmental Consultants (Pty) Ltd (GCS), has been appointed to undertake the necessary environmental processes for the above-mentioned Project and this notification forms part of the public consultation process as required by the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) EIA Regulations (2014, as amended) and the National Water Act, 1998 (Act 36 of 1998) (NWA).

Opportunity to Participate: Interested and affected parties (“I&APs”) are hereby invited to register as a stakeholder for this Project. I&APs should please use the 19-0921 reference number when commenting and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and a disclosure of any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application, to the contact persons indicated below, within 30 days (i.e. the deadline for comments is **15 March 2021**) from the date of commencement (**12 February 2021**) in accordance with the statutory requirements.

Activities for which Environmental Authorisation is being sought:

The Project triggers the following potential Listed Activities in terms of the NEMA EIA Regulations (2014, as amended) and the National Heritage Resources Act (Act No. 25 of 1999) (NHRA):

- GN R327, 07 April 2017, Listing Notice 1 – Activity 27
- GN R324, 07 April 2020, Listing Notice 3 – Activity 4
- Section 38 of the NHRA (Heritage Permitting)

The Draft Basic Assessment Report and Supporting Documentation can be accessed at the following link from 12 February 2021:

- [www.gcs-sa.biz/Documents](http://www.gcs-sa.biz/Documents)

**PLEASE NOTE:** Due to COVID19 restrictions, no hard copies of the report will be available for review at public venues. However, the report is available electronically via the GCS Website (link provided above) or a CD can be made available upon request.

Please submit all comments directly to GCS on or before **15 March 2021**, as follows:

Lehlogonolo Mashego  
Tel: 011 803 5726  
Fax: 011 803 5232  
E-mail: [lehlo@gcs-sa.biz](mailto:lehlo@gcs-sa.biz)  
Mail: P O Box 2597, Rivonia, 2128



## **APPENDIX H-6**

### **Original Comments**

It is to be noted that the received original comments will further be appended as part of the planned submission of the Final BAR.



**APPENDIX I**  
Draft Environmental Management Programme





63 Wessel Road, Rivonia, 2128 PO Box 2597, Rivonia, 2128 South Africa  
Tel: +27 (0) 11 803 5726 Fax: +27 (0) 11 803 5745 Web: www.gcs-sa.biz

# Draft Environmental Management Plan (EMP) for Evaton West - Project F (ERF 5085, EXT. 4)

11 February 2021



Phumaf Holdings (Pty) Ltd

GCS Project Number: 19.0921

Client Reference: Evaton West - Project F

GDARD Reference: 002/20-21/E0032





# Draft Environmental Management Plan (EMP) Evaton West - Project F (ERF 5085, EXT. 4)



February 2021

## DOCUMENT ISSUE STATUS

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## 1 OVERVIEW

### 1.1 Project Background

The Gauteng Rapid Land Release Programme aims to fast track the release of serviced stands from state-owned land to qualifying beneficiaries, in order to address housing, economic, social and agricultural needs in the province. Several stands in Gauteng were identified as potential development sites. Phumaf Holdings (Pty) Ltd (Phumaf, the Applicant) was appointed to assist the Department of Human Settlements (DHS) with all pre-planning, planning work, design and construction management to enable the release of the identified stands.

The Evaton West Project F stand (Erf 5085), located in Emfuleni Local Municipality, was identified for development of a housing project. As the site is 3.83 hectare (ha) in extent and is located within the urban edge, triggering Activity 27 of Listing Notice 1 under the National Environmental Management Act (NEMA, Act 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (GNR 327, GG 40772, 07 April 2017) and Activity 4 of Listing Notice 3 under NEMA EIA Regulations (GNR 324, GG 40772, 07 April 2017). This requires that the Applicant undertake a Basic Assessment process in order to gain Environmental Authorisation (EA) for the development.

GCS Water and Environmental Consultants (Pty) Ltd (GCS) has been appointed as the Environmental Assessment Practitioner (EAP) to undertake the required Basic Assessment process.

### 1.2 Purpose of the EMPr

Section 19 of the NEMA EIA Regulations of 2017 (GNR326 in GG 40772, 07 April 2017), requires that the Applicant submit an Environmental Management Programme (EMPr) to the Competent Authority. This EMPr will form part of the Environmental Authorisation for Evaton West Project F, once approved.

Furthermore, the EMPr is an important environmental management tool, developed in line with best practices under NEMA and other environmental legislation, and informed by the EAP's professional experience as well as any relevant specialist information. The EMPr provides management guidance for activities undertaken at the development site. If correctly followed, the EMPr ensures that any adverse environmental impacts which could result from the development are adequately managed and mitigated for.

The EMPr outlines all environmental management and monitoring actions required throughout the project lifecycle. The EMPr is legally binding and any person who contravenes the provisions herein is liable for imprisonment or a fine. This document should be viewed as "live" and thus, should be updated as and when necessary. The purpose of this document is therefore to guide environmental management throughout the various lifecycle phases of the proposed development.

The objectives of the EMPr are as follows:

- Ensure compliance with the relevant environmental legislation and conditions of the EA;
- Ensure that development activities are appropriately managed;
- Verify environmental performance through information on impacts as they occur;
- Respond to changes or unforeseen events; and
- Provide feedback on the continual improvement in environmental performance.

It is understood the all contract documentation related to the construction, operation and decommissioning (if required) of the proposed development will include the conditions of this EMPr. It is important to note that the contract obligations must include the recording of any complaints on the project in the environmental register. Further, it is incumbent on the ECO to keep an accurate audit trail showing compliance with the EMPr during construction phase.

### 1.3 Content of the EMPr

According to Appendix 4 of the NEMA EIA Regulations of 2017 (GNR 326 in GG 40772, April 2017), the EMPr for a project must include certain information. **Table 1.1** below describes how this report meets those requirements.

**Table 1.1: Contents of this Environmental Management Plan (EMP)**

REQUIREMENT	SECTION IN THIS REPORT
Details of– (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.4
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section Error! Reference source not found.
A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section Error! Reference source not found.
A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including– (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities;	Section Error! Reference source not found.



<p>(iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities;</p>	
<p>A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated above will be achieved, and must, where applicable, include actions to— (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;</p>	<p>Section Error! Reference source not found.</p>
<p>The method of monitoring the implementation of the impact management actions;</p>	<p>Section Error! Reference source not found.</p>
<p>The frequency of monitoring the implementation of the impact management actions;</p>	<p>Section Error! Reference source not found.</p>
<p>An indication of the persons who will be responsible for the implementation of the impact management actions;</p>	<p>Section Error! Reference source not found.</p>
<p>The time periods within which the impact management actions must be implemented;</p>	<p>Section Error! Reference source not found.</p>
<p>The mechanism for monitoring compliance with the impact management actions;</p>	<p>Section Error! Reference source not found.</p>
<p>A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</p>	<p>Section Error! Reference source not found.</p>
<p>An environmental awareness plan describing the manner in which— (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and</p>	<p>Section Error! Reference source not found.</p>
<p>Any specific information that may be required by the competent authority.</p>	<p>NA</p>

## 1.4 Details of Applicant and EAP

The details of the applicant are provided in **Table 1.2**.

**Table 1.2:** Name and address of applicant.

ITEM	DETAILS
Company Name	Department of Human Settlement (DHS) - Provincial
Company Representative	Daniel Molokomme
Contact Persons	Daniel Molokomme
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Facsimile No.	016 950 5050
E-mail Address	<a href="mailto:Daniel.Molokomme@gauteng.gov.za">Daniel.Molokomme@gauteng.gov.za</a>
Postal Address	Private Bag X79, Marshalltown, 2001

GCS Water and Environment (Pty) Ltd (GCS) have been appointed as the independent Environmental Assessment Practitioners (EAP) to undertake the environmental processes required to obtain approval for the proposed listed activities, as requested by the relevant competent authorities. The contact details of the EAP are provided in **Table 1.3** and the EAP's CV is attached as **Appendix A**.

**Table 1.3:** Name and address of Environmental Assessment Practitioner (EAP).

ITEM	DETAILS
Company Name	GCS Water and Environment (Pty) Ltd
Company Representative	Gerda Bothma
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Facsimile No.	+27 (0)11 803 5745
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Postal Address	PO Box 2597, Rivonia, 2128

Gerda Bothma has over 20 years' experience within the environmental and waste management field and strives to deliver custom environmental services to clients. Ms Bothma began her career in the environmental field within the government sector, managing environmental aspects and impacts as well as reviewing environmental assessments with the view of authorizing or declining authorization of the developments.

After six years within the government sector she joined a consulting engineering firm where she was ultimately responsible for the Management of the Environmental Sub-Division. Ms Bothma has experience in project and client management, financial management and the compilation and costing of project proposals and tenders. She has been involved in several engineering projects as the Environmental Assessment Practitioner as well as the Environmental Control Officer during construction, working closely with the Occupational Health and Safety Officer. Ms Bothma has also been involved in projects where waste licensing as well as water use licensing processes formed an integral part of the services offered. Environmental auditing and compliance monitoring of waste disposal sites also forms part of her experience gained. She also has experience in dealing with projects which involve NEC3 Contracts.

## 1.5 Assumptions and Limitations

This EMPr has been drafted with the acknowledgment of the following assumptions and limitations:

- Information used to guide the development of this EMPr was gained during the site visit, through the Department of Environment, Forestry and Fisheries' (DEFF) Online Screening Tool, through specialist input and using the EAP's experience in such developments. The following information/documentation formed part of the review process to inform the assessment of impacts and development of mitigating measures:
  - Civil Engineering Services Report;
  - Residential Market Study;
  - Urban Design Framework Including Layout Plans; and
  - The Heritage Assessment, which was the only contributing specialist assessment.
- The mitigation measures recommended in this EMPr document are based on the risks/impacts identified in the Basic Assessment Report (BAR). These impacts were identified according to the activities described and the known receiving environment. Should the development expand to include additional activities not covered in the BAR, the risks will have to be reassessed and mitigation measures updated accordingly.

## 1.6 Legal Requirements

The EMPr has been developed using knowledge of relevant South African legislation as well as best practice guidelines. The Applicant is legally required to adhere to the laws laid out below, throughout the life cycle of the project. Error! Reference source not found. below lists the relevant legislation and guidelines applicable to the development.

**Table 1.4:** Applicable legislation and best practice guidelines used to develop this EMPr and to be considered by the Applicant.

LEGISLATION/ GUIDELINES	DESCRIPTION	APPLICABILITY
The Constitution of the Republic of South Africa (Act 108 of 1996)	The Constitution is the supreme act to which all other acts must speak to and sets out the rights for every citizen of South Africa and aims to address past social injustices. With respect to the environment, Section 24 of the constitution states that: "Everyone has the right: a) To an environment that is not harmful to their health or well-being; b) To have the environment protected, for the benefit of present and future generations,	The Applicant must ensure that environmental impacts are avoided, mitigated or managed as far as possible throughout the life cycle of the project.

LEGISLATION/ GUIDELINES	DESCRIPTION	APPLICABILITY
	<p>through reasonable legislative and other measures that:</p> <ul style="list-style-type: none"> <li>i. Prevent pollution and ecological degradation;</li> <li>ii. Promote conservation; and</li> <li>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.</li> </ul>	
<p>National Environmental Management Act (Act 107 of 1998) (NEMA)</p>	<p>Framework law giving effect to the constitutional environmental right. Provides the framework for regulatory tools in respect of environmental impacts. Section 24 of NEMA regulates environmental authorisations.</p> <p>Section 28(1) states that “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”.</p>	<p>Residential developments outside an urban area where the total land to be developed is larger than 1 ha requires Environmental Authorisation through a Basic Assessment process.</p> <p>The Applicant must ensure that environmental impacts are avoided, mitigated or managed as far as possible throughout the life cycle of the project.</p>
<p>National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA)</p>	<p>Regulates inter alia the duty of care, management, transport and disposal of waste. Section 16(1) of the NEM:WA provides that:</p> <p>“A holder of waste must, within the holder’s power, take all reasonable measures to -</p> <ul style="list-style-type: none"> <li>a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;</li> <li>b) reduce, re-use, recycle and recover waste;</li> <li>c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;</li> <li>d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;</li> <li>e) prevent any employee or any person under his or her supervision from contravening this Act; and</li> <li>f) prevent the waste from being used for an unauthorised purpose.” <p>The NEM:WA also provides for a licensing regime specific to waste management activities.</p> </li></ul>	<p>While no Waste Management Licence will be required for this development, the Applicant must ensure that waste is appropriately managed throughout the life cycle of the project.</p>

LEGISLATION/ GUIDELINES	DESCRIPTION	APPLICABILITY
National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM:AQA)	Regulates activities which may have a detrimental effect on ambient air quality including certain processes and dust generating activities.	An Air Emissions Licence will not be required, however, duty of care should be employed during construction to minimise air pollution as far as possible.
National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA)	Regulates the protection of biodiversity and the management of invasive species. Section 73 speaks to duty of care with respect to listed invasive species and states that “A person who is the owner of land on which a listed invasive species occurs must notify any relevant competent authority, in writing, of the listed invasive species occurring on that land, take steps to control and eradicate the listed invasive species and to prevent it from spreading and take all the required steps to prevent or minimise harm to biodiversity.”	Should a threatened or protected species be discovered on the site, a permit will be required to remove or relocate the specimen.  It is also the duty of the Applicant to remove invasive species found on site.
Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA)	Regulates the eradication of weeds and invader plants, including those occurring on development sites.	It is the duty of the Applicant to remove invasive species found on site.
National Water Act (Act 36 of 1998) (NWA)	Regulates the protection of the water resources and the use of water. Section 19(1) states that “An owner of land, a person in control of land or a person who occupies or uses the land on which - a) any activity or process is or was performed or undertaken; or b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.”  Section 21 outlines various water uses for which authorization is required.	No scheduled water uses are anticipated through the proposed housing development and as such no Water Use Licence will be required for this development.
The National Heritage Resources Act (Act 25 of 1999) (NHRA)	Section 34(1) of NHRA states that “No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.”	A heritage study undertaken on the site confirmed that no heritage features or sites of significance were identified. However, should a heritage artefact be found during development, the chance find procedure should be adhered to.
Spatial Planning and Land Use	The aim of SPLUMA is to provide a uniform system of spatial planning and land use management	The land on which the settlement will be

LEGISLATION/ GUIDELINES	DESCRIPTION	APPLICABILITY
Management Act (Act 16 of 2013) (SPLUMA)	throughout the country. SPLUMA places emphases on the fundamental role municipal planning and municipalities have on effective spatial planning and development. Based on the above use is primarily governed by the applicable land use or zoning scheme and land may not be used in contravention of such a scheme. Despite any issued environmental authorisation, activities can only be executed on land with the appropriate zoning permitting such activities.	developed must be appropriately rezoned by the Applicant with the assistance of a town planner.
Carbon Tax Act (Act 15 of 2019)	Regulates and guides the imposition of taxes on businesses or organisations in relation to their carbon emissions.	The Applicant must adhere to the reporting stipulations within the Act.
Occupational Health and Safety Act (Act 85 of 1993) (OHSA) and Regulations for Hazardous Chemical Substances (GN R1179, 1995)	Makes provision to protect the health and safety of employees at work or others affected by activities undertaken by businesses or industries.	The Applicant must adhere to the stipulations within the Act throughout the lifecycle of the activity.
Hazardous Substance Act (Act 15 of 1973)	Regulates substances which may cause injury, ill-health or death of human beings through their toxic, corrosive, irritant, strongly sensitizing or flammable nature.	The Applicant must adhere to the stipulations within the Act throughout the lifecycle of the activity.
Emfuleni Local Municipality Notice: Water and Sanitation By-Laws, 2004	Regulates/manages waste water in the Emfuleni Local Municipality.	The Applicant must adhere to the stipulations within the by-laws throughout the lifecycle of the activity.
Emfuleni Local Municipality Solid Waste Management By-Laws, 2017	Regulates collection and removal of refuse for residents and businesses within the municipal area.	The business must adhere to the stipulations within the by-laws throughout the lifecycle of the activity.  Waste removal services will be provided by the municipality.
Emfuleni Local Municipality Air Quality Management By-Laws, 2017	Regulates air pollution and provides a management framework to ensure that air pollution is avoided or managed within the municipality's jurisdiction.	The Applicant must adhere to the stipulations within the by-laws throughout the lifecycle of the activity.

## 2 PROJECT DESCRIPTION

### 2.1 Site Description

Evaton West - Project F Erf 5085 IQ is a 3.83 ha parcel of land located within Emfuleni Local Municipality, in the suburb of Evaton West, east of the Golden Highway (R553). Orange Farm and Ennerdale are located to the north of the site, and Sebokeng is situated to the south (see **Figure 2-1** and **Figure 2-2**). The site is currently vacant, with residential land use to the south west, east and south of the stand. Land to the north and north west is vacant.

### 2.2 Site Sensitivity

#### 2.2.1 Climate

In the Evaton area, the highest average monthly maximum temperature occurs in January (30.2 °C) and the lowest average monthly maximum temperature occurs in July (21.1 °C). The highest average monthly minimum temperature occurs in June/ July (-1.9 °C) and the highest average monthly minimum temperature occurs in January (11 °C). Evaton West falls within a summer rainfall area where precipitation is highest on average in January (125 mm) and lowest in July (4 mm) (Meteovista, 2020).

The climate is characterised by warm, wet summers and cool, dry winters; this, combined with the effects of altitude, results in a long growing season (centred over summer) lasting about six to seven months, alternating with unproductive winter and early spring seasons. There is also high primary productivity leading to a rapid build-up of biomass, resulting in a high fuel load and potentially intense fires (SANBI, 2013).

#### 2.2.2 Topography

The proposed site can be considered to be flat to having slightly undulating plains and low hills. The lowest point on the site is recorded as being approximately 1539 meters above mean sea level (mamsl), while the highest point is outside the site to the west and is recorded at 1541 masl. Although available topographic contours show a gentle dip slope south-westward with a gradient of merely 1:75 (0.8° or 1.3%), the Civil Engineering Services Report prepared by Phumaf (7 July 2019) (Appendix C to the DBAR), the site is described as “hummocky” as a consequence of widespread dumping throughout the site.

Much of the proposed housing development would be visible to road users of the N1 and adjacent roads based on the relatively flat topography of the site. The site would also be visible from the formal settlements immediately adjacent to the site. The site is predominately flat (around 1540 mamsl across the site). The existing stormwater canal is located to the north at an elevation of approx. 1542 mamsl, which means that the surface water flow would not naturally drain in this direction. Additional stormwater management infrastructure would be required to facilitate drainage towards the canal.

### 2.2.3 *Geology and Soils*

The diverse geology underlying Mesic Highveld Grassland correlates closely with high levels of plant species richness and endemism. The soils derived from the diverse types of parent rock vary in texture from sandy to clayey and the sandier soils tend to support lower basal cover but higher plant species diversity than less sandy ones (SANBI, 2013).

Geoid Geotechnical Engineers (Pty) Ltd was appointed to conduct a GFSH2 - Phase 1 Geotechnical Site Investigation for Erf 5085, Evaton West Ext.4. The information below is extracted from the recommendations from the Geotechnical Investigation Report (Appendix C). Several foundation strategies are presented in the report. The selection of a foundation solution will require appropriate consideration of the relative stiffness and deformation potential with that of the top-structure in each instance, as well as environmental issues inclusive of potential disturbance to neighbouring developments from compaction vibrations, noise, space for stockpiling excavated materials, etc. Test pits profiling indicates that there is limited colluvial material which may satisfy nominally G6-G7 standards, with the remainder of the natural soils rated as poor to very poor quality in terms of their engineering applications. As such, none of these soils, other than the pebble marker, should be relied upon for high-quality soil mattress construction.

Moreover, the highly bouldery nature of both the fill and the underlying residual lava are poorly suited to an earthwork's solution - unless this were to be fragmented and crushed on-site to generate a suitable engineered fill material. If the fill is not to be removed, the site should be approximately leveled, whereafter the fill should be impact rolled, and buried beneath imported fill of at least 2B thickness to facilitate adequate load distribution to overcome the irregular support offered by the underlying fill. This is, however, not a recommended option for consideration.

Depending on the foundation solution to be adopted, the pebble marker horizon may be of sufficient bulk for reuse beneath all surface beds but is likely to be of insufficient volume. As such, concrete should be constructed on a consistent bed of at least two 150mm layers of imported / colluvial gravel, compacted to 95% Mod AASHTO density to prevent cracking induced by differential support. Where the pebble marker cannot be harvested, nor the bouldery fill crushed to provide this material, provision should be made for suitable G5/G6 materials to be imported from commercial quarries.

In view of the site classification, the general drainage precautions presented in Appendix C should be strictly applied to obviate any unnecessary/avoidable saturation of the profile immediately adjacent to the structures. The drainage patterns of the site under the present surface must, however, be formally investigated to assess if the perimeter canal deals with all the surface water challenges, as the site observations suggest that there may be some internal drainage problems induced by the fill deposits.



The flat slope of the site means that only minor terracing for the proposed housing development would be required. Notwithstanding this, the sidewalls of any deep services trenches or box cuts should be appropriately battered or propped during construction. The surcharging of cut sidewalls by way of spoil heaps, construction materials, and equipment (including those with outrigger jacks) should be strictly avoided as being highly-detrimental to cut stability, particularly when workers are present in trenches/box excavations in excess of 1.5 m deep.

#### *2.2.4 Terrestrial Biodiversity*

According to Mucina and Rutherford (2006) the proposed development area falls within the Soweto Highveld Grassland vegetation unit. This vegetation unit has been classified as 'endangered' with almost half already having been impacted or transformed due to cultivation, urban sprawl, mining and building of road infrastructure (Mucina and Rutherford, 2006). Despite the ongoing impacts to this vegetation unit, only 0.2% is protected which is far below the conservation target of 24%.

The Civil Engineering Report (Appendix C to the BAR) states that vegetation is very sparse and limited to veld grass with scattered trees and shrubs dotted around the site.

According to the Gauteng CPlan Version 3.3 (GDARD, 2011), there are no CBAs or ESAs on or adjacent to the site.

The site is located within an area classified as part of the Threatened Ecosystem (Soweto Highveld Grassland- Vulnerable). Soweto Highveld Grassland is a form of Mesic Highveld Grassland (SANBI, 2013). In this landscape, there is a high natural incidence of fire, owing to frequent storms, and lightning strikes. The natural occurrence of fire, combined with the effects of frost and hail storms, maintains the open, largely treeless character of these grasslands (SANBI, 2013).

The site has been subjected to high levels of disturbance, with clearing, excavations, illegal dumping and pedestrian activity taking place on the site. An analysis of aerial imagery dating back to 2004 indicates that the site has been subjected to disturbance over more than 16 years.

### **2.2.5 Hydrology**

The area of study is located within DWS Quaternary Catchment C22H, in the Vaal Water Management Area (WMA).

No watercourses or wetlands are located within the proposed site. A man-made stormwater canal is located approx. 60 m north of the northern boundary of the site, which drains under the N1 towards the Rietspruit tributary. No scheduled water uses are anticipated through the proposed housing development. The Rietspruit River runs south of the site, and its associated tributaries and wetland systems are located north and west of the site. The site does not fall within 500 m regulated of the NFEPA wetlands.

The site is located in a high rainfall region. The characteristically dense vegetation in mesic grassland landscapes cover traps surface water, slowing runoff and allowing more time for water to drain vertically through the porous soil profile; this water is then stored as sub-surface water by the impermeable rock layers that lie beneath the subsoil. This sub-surface water drains slowly as clean water into the many wetland systems that occur throughout this ecosystem (as a result of its flattish topography), replenishing streams and rivers almost year-round. The supply of good quality water from these ecosystems is important for domestic, agricultural, industrial and commercial water users both in South Africa and neighbouring countries (SANBI, 2013).

In the Civil Engineering Services report (Appendix C to the BAR), the need for further assessment of the capacity of the existing stormwater canal to the north of the site is highlighted. The site is predominately flat (around 1540 mamsl across the site). The existing stormwater canal is located to the north at an elevation of approx. 1542 mamsl, which means that the surface water flow would not naturally drain in this direction. Additional stormwater management infrastructure would be required to facilitate drainage towards the canal.

### **2.2.6 Socio-Economic Context**

According to the Sedibeng Growth and Development Strategy 2 (Sedibeng District Municipality, 2012), the Evaton population is of low-income and low literacy levels with a low access to services, placing the community as vulnerable to impact. The community also has a high unemployment rate. These factors must be considered when proposing development within Evaton West. The community is not positioned to address impacts to their human health, living conditions or environment. Therefore, it is important that the developer communicate with neighbouring community members in order to minimize negative impacts of the development. This will be focused within the construction phase of the project. It must be noted that neighbouring households are located within 15m of the proposed development area.

Stats SA provides the following information: According to Census 2011, ELM has a total population of 721 663, of which 85,4% are black African, 12% are white, 1,2% are coloured, and 1,0% are Indian/Asian. Of those 20 years and older, 3,6 % completed primary school, 36,7% have some secondary education, 32,4% completed matric, and 12,9% have some form of higher education. The percentage with no form of schooling is 4,0%. Of the population, 202 543 people are economically active (employed or unemployed but looking for work) and, of these, 34,7% are unemployed. Of the 85 594 economically active youth (15-35 years) in the area, 45% are unemployed.

### **2.2.7 Traffic**

A Traffic Impact and Access Study was undertaken. The proposed site is within the Orange Farm - Sebokeng 'urban cluster'. This cluster is a deprivation area that straddles the Emfuleni and City of Johannesburg municipal areas. 15 - 20km to the north are Lenasia and Ennerdale. The closest urban node is Vanderbijlpark and Vereeniging which are 15 - 20km to the south. The site is located between the N1 to the west and Golden Highway (R553) to the east, which provides it with high levels of regional accessibility. On the sub-regional level accessibility is impaired by the lack of connector roads to the N1: access to the N1 is approximately 16.3km or 20 minutes' drive from the development site. It is to be noted that the surrounding area has a well-developed street network. It is however a curvilinear layout that limits permeability for pedestrians.

### **2.2.8 Cultural Heritage Resources**

A Phase 1 HIA was undertaken in March 2020 by HCAC - Heritage Consultants (Appendix B-1) in terms of the NHRA.

The study area is currently vacant, bordered by township development apart from areas to the north and north-west that consists of vacant land. The study area is approximately 3.8 ha in size and shows signs of clearing and excavation activities that would have impacted on surface indicators of heritage sites if any occurred in the study area. The lack of significant heritage resources in the study area was confirmed by a survey of the impact areas of the proposed project, and no heritage sites were identified.

An independent paleontological study (Bamford 2020) concluded that the proposed site lies on the volcanic rocks (lava, basalt, andesite, tuff) of the Hekpoort Formation, Pretoria Group, Transvaal Supergroup, of early Proterozoic age that do not preserve fossils. Based on the geological record and literature it is recommended that no palaeontological site visit is required and the project can proceed and the study included a Fossil Chance Find Protocol.

Due to the apparent lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the Environmental Management Programme (EMPr) (Appendix I) and based on approval from SAHRA:

- Implementation of a chance find procedure (archaeological and paleontological).

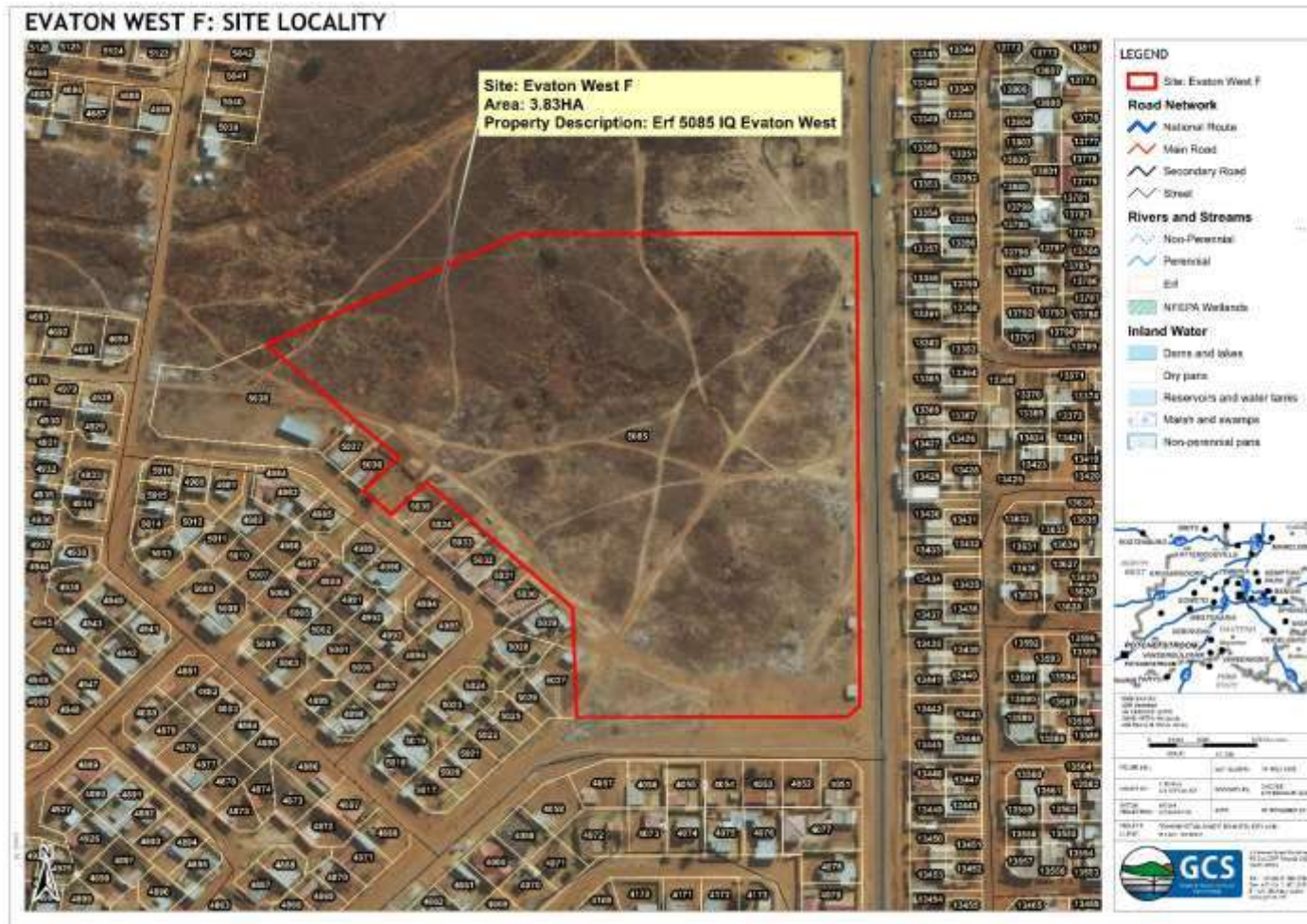


Figure 2-1: Evaton West Project F Locality Map.

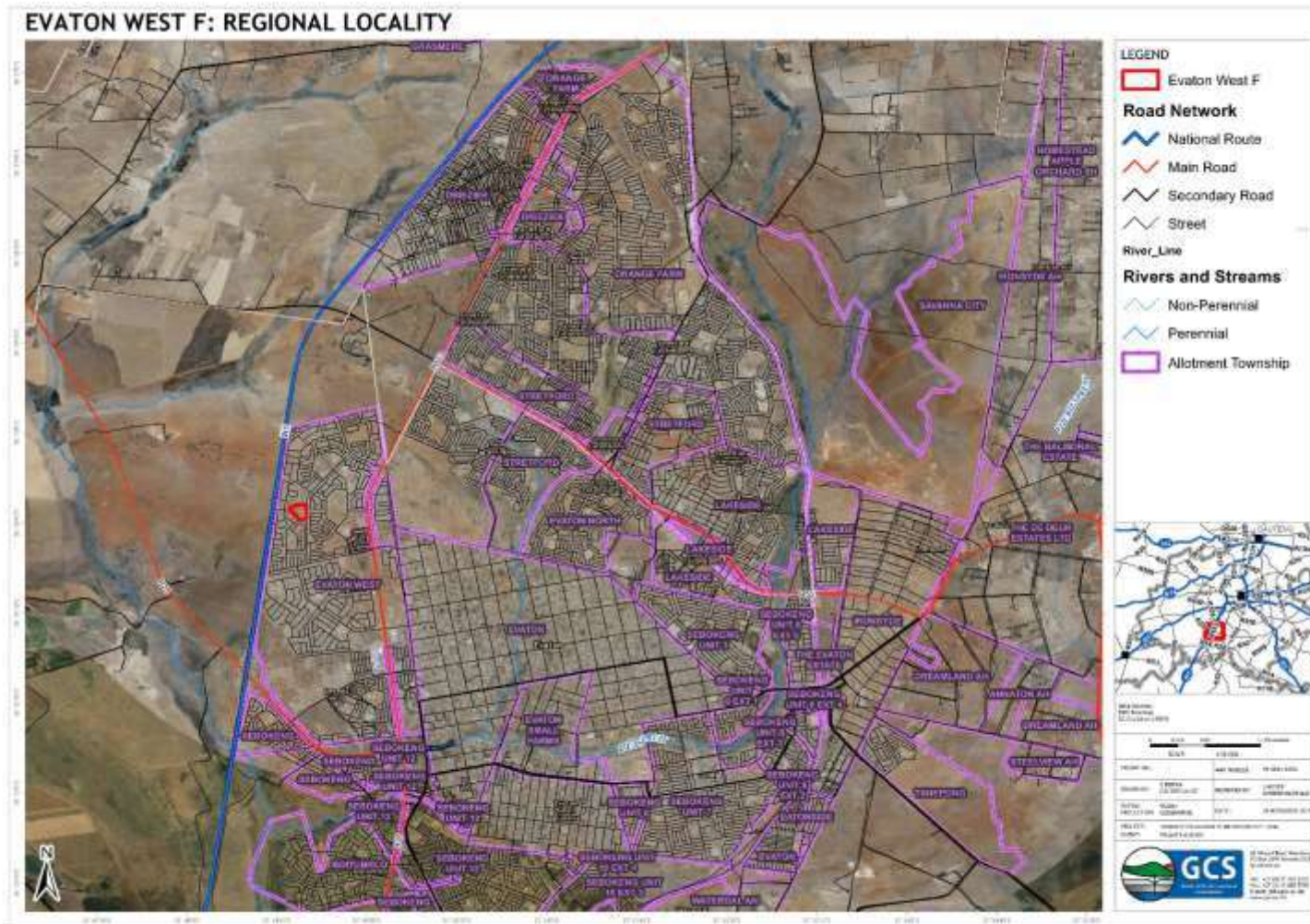


Figure 2-2: Evaton West Project F Regional Locality Map.

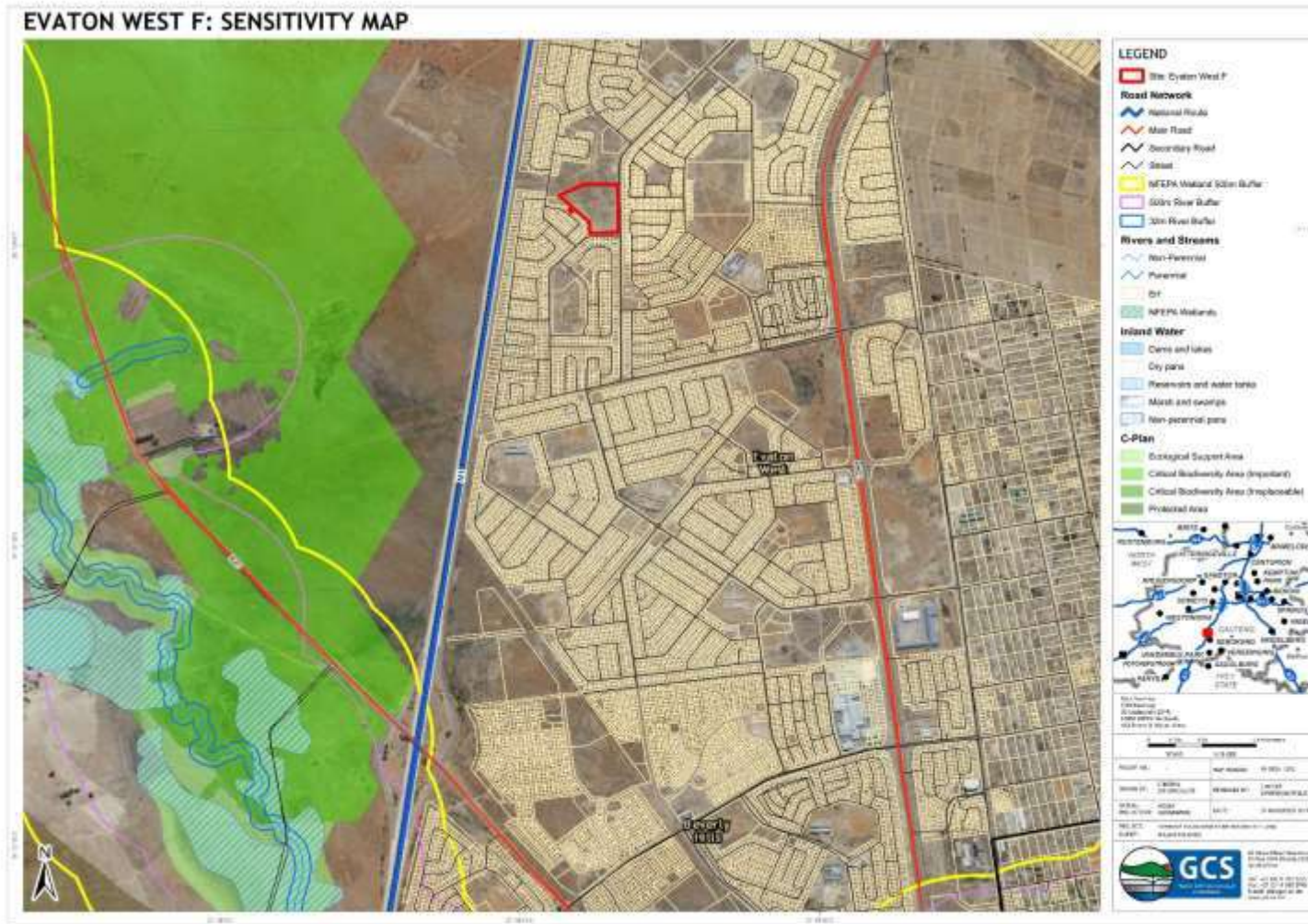


Figure 2-3: Map indicating Environmental Sensitivity of the Evaton West Project F

### 2.3 Activity Description

The development of the site from open space to a residential development will include the following aspects during the pre-planning phase:

- Site design and layout;
- Identification of service infrastructure already present in the area;
- Construction planning; and
- Relevant permitting.

Construction phase activities will include:

- Vegetation clearance;
- Excavation;
- Service infrastructure installation;
- Paving and concreting;
- Building; and
- Rehabilitation.

During the operational phase, activities will include:

- Occupation of residential structures;
- Use of service infrastructure;
- Stormwater Management; and
- Use of roads.

Decommissioning of this project is highly unlikely due to its permanent nature, however, should decommissioning be deemed necessary, activities would include:

- Demolition of residential;
- Decommissioning of service infrastructure;
- Removal of building rubble; and
- Rehabilitation.

Throughout the project lifecycle, the construction, operating and decommissioning teams must be prepared for unplanned emergencies or incidents threatening human health or the environment.



### 3 ROLES AND RESPONSIBILITIES

#### 3.1 Engineer's Representative

Phumaf has been appointed by the Department of Human Settlements to undertake the design and implementation of the project. Phumaf is therefore responsible for the implementation of this EMPr on site.

During the construction phase, a representative of Phumaf (the Engineer) must be on site every day in order to oversee and manage the environmental (and other) aspects of development. Throughout other phases of the project lifecycle, the representative must visit the site frequently to manage environmental aspects.

This individual will be responsible for overseeing all environmental aspects on site, including sub-contractors or service providers. The representative should undertake weekly site inspections to ensure that the EMPr is being effectively implemented on site. The representative's responsibilities include the following:

- Managing and facilitating communication and training to all staff on the content of this EMPr;
- Ensuring that a copy of this EMPr is always available on site;
- Conducting and reporting on weekly site inspections (by way of a checklist) to document the implementation of this EMPr;
- Identifying and assessing previously unforeseen, actual or potential impacts on the environment;
- Facilitating any monitoring required;
- Advising the Site Manager regarding the removal of person(s) and/or equipment not complying with the provisions of this EMPr;
- Making recommendations to the Site Manager with respect to the issuing of fines for contraventions of the EMPr; and
- Continually reviewing the EMPr and recommending additions and/or changes to this document as necessary.

##### 3.1.1 Method Statements

It is recommended that the Engineer's Representative develop site specific method statements, in consultation with the appointed Contractor, which will assist in managing aspects of the development, in line with the requirements of the EMPr. A generic method statement has been included as

**Appendix B.** Method Statements should include at least a description of the activity to be undertaken, a detailed description of the process to be followed (including methods and materials), an indication of which areas the work will be undertaken in and an indication of the timeframes and end dates of the activity.

All Method Statements must be in place at least five (5) working days prior to the relevant activity beginning. At minimum, the following method statements must be in place:

- Site plan, including “no-go areas”, sensitive sites and TOPS;
- Waste Management Plan;
- Erosion Management Plan;
- Biodiversity Management Plan;
- Hazardous Substance/ Hydrocarbon Management Plan; and
- Traffic Management Plan.

### **3.1.2 Environmental Register**

An Environmental Register must be kept on site throughout all phases of the project in order to record environmental incidents, deviations from the EMPr by employees and complaints. The register must include the date of the incident and the measures taken to rectify it. The Register must be available for any party who wishes to investigate its contents. The Register may be kept by the Engineer’s/ Applicant’s representative or a suitable individual within the Contractor’s team.

### **3.2 Environmental Control Officer**

An Environmental Control Officer (ECO) must be appointed by the Engineer/Applicant to assess (on a monthly basis during construction and every five (5) years in operational phase) the implementation of the EMPr on site. The Engineer/ Applicant may decide to assign this role to one person for all phases or may assign a different ECO for each phase. The ECO will have the following responsibilities:

- Managing and facilitating communication between the Applicant, Applicant/Engineer’s representative, contractors and Interested and Affected Parties (I&APs) with regard to this EMPr;
- Conducting monthly site inspections and audits during construction phase to assess the implementation of this EMPr on site;
- Conducting inspections and audits every 5 (five) years during operational phase to assess the implementation of this EMPr on site;
- Submitting audit reports to the Applicant and Competent Authority for review;

- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMPr;
- Advising the Applicant/Engineer's representative regarding the removal of person(s) and/or equipment not complying with the provisions of this EMPr;
- Making recommendations to the Applicant/Engineer's representative with respect to work stoppages or the issuing of fines for contraventions of the EMPr; and
- Continually reviewing the applicability of the EMPr and recommending additions and/or changes to this document.

## 4 ENVIRONMENTAL MANAGEMENT PLAN ACTIONS

### 4.1 Key Environmental Impacts

The following key impacts have been identified, based on a site visit, the DEA Online Screening Tool, a desktop review of the site, the Consultants previous experience with similar projects and the input of a heritage specialist:

#### 4.1.1 *Planning and Design Phase*

- Avoidable environmental harm resulting from unsuitable site designs or layout;
- Avoidable social impacts resulting from unsuitable site designs or layout;
- Illegal activities resulting from a lack of appropriate permitting;
- Social disturbance resulting from improper construction planning.

#### 4.1.2 *Construction Phase*

- Loss of or disturbance to vegetation and habitat;
- Loss of topsoil;
- Erosion of surrounding soil;
- Introduction of alien invasive species (AIS);
- Soil and groundwater contamination from hydrocarbon/ hazardous substance spills;
- Increase in sedimentation and potential contamination from hydrocarbon / hazardous substance spills in the surrounding surface water;
- Impact on vehicular traffic;
- Increase in emissions of greenhouse gases by construction machinery/vehicles;
- Dust generation- disturbance to surrounding land owners/users;
- Noise generation- disturbance to surrounding land owners/users;
- Visual intrusion of the construction activities on the neighbourhood;
- Waste generation;
- Archaeological impacts if heritage sites are found on the project site; and
- Health and safety impacts of construction workers and surrounding land owners/users.

#### 4.1.3 *Operational Phase*

- Increased surface runoff resulting in erosion and sedimentation affecting downstream surface water systems;
- Soil and groundwater contamination from vehicle oil spills;

- Soil and groundwater contamination from sewage leaks;
- Encroachment of alien invasive species (AIS);
- Impact of vehicular traffic;
- Waste generation;
- Edge effects of development on surrounding open spaces; and
- Invasion of alien invasive species.

#### **4.1.4 Decommissioning Phase**

- Loss of residential space;
- Soil and groundwater contamination from hydrocarbon/ hazardous substance spills;
- Impact on vehicular traffic;
- Increase in emissions of greenhouse gases by decommissioning machinery/vehicles;
- Dust generation- disturbance to surrounding land owners/users;
- Noise generation- disturbance to surrounding land owners/users;
- Waste generation; and
- Health and safety impacts of decommission team workers and surrounding land owners/users.

#### **4.1.5 Cumulative and Latent Impacts**

- Loss of Soweto Highveld Grassland vegetation and habitat;
- Reduced landscape connectivity;
- Loss of open spaces in Gauteng; and
- Reduction in housing demand (positive).

These impacts are unavoidable; however, they will be mitigated as far as possible through implementation of mitigation/ management measures recommended for the above phases.

## **4.2 Environmental Opportunities**

The environmental opportunities provided by this project can be maximized through implantation of the NEMA Sustainable Development Principles. Sustainable development can be achieved by addressing the current housing needs while still minimizing environmental harm, so that future generations may also benefit from environmental resources. The NEMA Principles require the following:

- Avoid, minimise or remedy ecosystem disturbance and biodiversity loss as far as possible;
- Avoid, minimise or remedy pollution and environmental degradation as far as possible;
- Avoid, minimise or remedy landscape disturbance and loss of cultural heritage as far as possible;
- Avoid, minimise, re-use or recycle waste where possible, otherwise dispose of waste in a responsible manner;
- Responsibly and equitably use/ exploit non-renewable natural resources in a manner which takes into account the consequences of the depletion of the resource;
- Apply a risk-averse and cautious approach which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Anticipate and prevent, or minimise and remedy, negative impacts on the environment and environmental rights be anticipated and prevented.

In order to achieve sustainable development goals, use of alternatives that are technologically and environmentally superior to “standard” technologies should be investigated and promoted throughout the project lifecycle.

### **4.3 Management Actions**

The following management actions of this EMPr (Table 4-1Error! Reference source not found.) have been developed in order to avoid the potential impacts listed above as far as possible. Where impacts cannot be avoided, measures are provided to mitigate for and reduce the significance of these impacts.

The Applicant’s signature on this document indicates that the Applicant acknowledges their responsibility to uphold the specific management actions detailed below.

**Table 4.1: EMPr management actions throughout the project lifecycle.**

ASPECT	IMPACT	MANAGEMENT ACTIONS
<b>PLANNING AND DESIGN PHASE</b>		
Site design and layout	Avoidable environmental harm resulting from unsuitable site designs or layout	<ul style="list-style-type: none"> <li>• Site design/layout should minimise transformed spaces and ensure that the footprint is as small as possible</li> <li>• Site design must include indigenous garden patches in order to maintain some connectivity for insects, birds and reptiles</li> <li>• Gardens must contain insect-, bird- and reptile-friendly indigenous grass, bush and tree species</li> <li>• Floral TOPS must be identified prior to construction and accommodated by the site design or removed (to be placed in a nursery or other suitable habitat)</li> <li>• Large plant species (trees, bushes) must be left on site if and where possible</li> <li>• Stormwater designs must be appropriately designed so as to minimise erosion</li> </ul>
	Avoidable social impacts resulting from unsuitable site designs or layout	<ul style="list-style-type: none"> <li>• Site design/layout should include open spaces to avoid over-crowding</li> <li>• The site should be designed so as to minimise disturbance to residents in the area, as far as possible</li> </ul>
Construction planning	Social disturbance resulting from improper construction planning	<ul style="list-style-type: none"> <li>• Construction must be planned so as to minimise disturbance to the current residents of the area</li> <li>• At least two weeks prior to construction, residents should be warned of possible disturbances</li> <li>• The Engineer/Contractor must maintain open communication with the surrounding residents regarding the progress and timeframes of the project</li> <li>• The Contractor must record and repair any damage to neighbouring properties caused by construction activities</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
Relevant permitting	Illegal activities resulting from a lack of appropriate permitting	<ul style="list-style-type: none"> <li>• The EA and WUL must be in place prior to construction beginning</li> <li>• A permit in terms of NEM:BA must be in place should any TOPS need to be relocated or damaged (including trimmed)</li> <li>• A permit in terms of NHRA must be in place should any heritage artefacts need to be relocated</li> </ul>
<b>CONSTRUCTION PHASE</b>		
Environmental awareness	Lack of awareness may result in environmental harm and/or non-compliance to the EMPr/EA	<ul style="list-style-type: none"> <li>• Comprehensive induction of all employees on site, including an environmental section which outlines as a minimum the following:                             <ul style="list-style-type: none"> <li>○ Explanation of the importance of complying with the EMPr</li> <li>○ Discussion of the potential environmental impacts of development activities</li> <li>○ Employees' roles and responsibilities, including emergency preparedness</li> <li>○ Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities</li> <li>○ Importance of biodiversity</li> </ul> </li> <li>• Daily safety talks should include environmental topics (at least one environmental topic per week) to increase general and site-specific environmental awareness</li> </ul>
Monitoring of compliance	Lack of monitoring may result in environmental harm and/or non-compliance to the EMPr/EA	<ul style="list-style-type: none"> <li>• The construction site should be informally monitored on a continual basis by the Engineer/Applicant's representative to ensure compliance to the EMPr and thus reduce environmental harm</li> <li>• The Engineer/Applicant's representative should conduct weekly inspections of the site and implementation of the EMPr</li> <li>• Implementation of the EMPr and conditions of the EA must be formally monitored (audited) on a monthly basis by an appropriately qualified and experienced ECO</li> </ul>



ASPECT	IMPACT	MANAGEMENT ACTIONS
Vegetation clearance	Loss of or disturbance to vegetation and habitat	<ul style="list-style-type: none"> <li>• The clearance footprint should be kept as small as possible</li> <li>• The site must be clearly demarcated, and employees made aware to stay within its boundaries</li> <li>• Areas that are not intended for clearance must be appropriately marked and cordoned off as “no-go areas”</li> <li>• Construction machinery and vehicles to stay within site and on demarcated roads as far as practically possible</li> <li>• Floral TOPS and large plant species (trees or bushes) are to be left in situ where possible</li> <li>• Floral species to be left on site must be appropriately marked and cordoned off to prevent damage</li> <li>• No fires are permitted on site</li> </ul>
	Loss of topsoil	<ul style="list-style-type: none"> <li>• Topsoil must be cleared and stored separately from subsoil and other excavated materials (e.g. rock)</li> <li>• Topsoil stockpiles should be no higher than 2 m tall</li> <li>• Topsoil should be stockpiled for the least amount of time before being reused on site for rehabilitation or moved to other sites for use</li> <li>• Topsoil stockpiles should be barricaded so as to prevent loss of topsoil through erosion</li> </ul>
	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• The clearance footprint should be kept as small as possible</li> <li>• Any areas on site or on the edge of the site susceptible to erosion must be monitored and protected where necessary, through the use of silt fences or rock packing</li> </ul>
	Introduction/ proliferation of AIS	<ul style="list-style-type: none"> <li>• Any plant AIS noted on site must be removed</li> <li>• Disturbed soils must be monitored for colonisation of plant AIS</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Plant AIS must be removed from disturbed soils before seeding and disposed of with general waste</li> <li>• Animal AIS may not be dealt with using poison, but should be controlled through prevention measures (such as keeping waste areas clean) or biocontrol measures</li> </ul>
	<p>Soil and groundwater contamination resulting from hydrocarbon leaks from clearing machinery/equipment</p>	<ul style="list-style-type: none"> <li>• Construction machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>• Servicing of machinery/equipment may only take place within a designated area which must be appropriately bunded and have an oil separation system in place</li> <li>• In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> <li>• A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>• Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>• All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>• Fully stocked spill kits must be available in all working areas on site and inspected weekly to ensure they have all the required elements</li> <li>• Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>• Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> <li>• Significant spills must be reported to GDARD</li> <li>• A record of all spills must be kept on site</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Soil and groundwater contamination from hazardous substance spills	<ul style="list-style-type: none"> <li>• All hazardous substances (including hydrocarbons) must be stored in labelled and sealed containers, within a labelled, protected and bunded area</li> <li>• Employees must be trained on appropriate hazardous substance management techniques</li> <li>• All hazardous substances utilised or stored on site must be accompanied by a Material Safety Data Sheet (MSDS) and employees must be trained in using these documents appropriately</li> <li>• Hazardous substance spills are to be dealt with in the same manner as hydrocarbon spills</li> <li>• A record of all spills must be kept on site</li> </ul>
	Impact on vehicular traffic from movement of clearing machinery	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's licenses</li> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>
	Increase in emissions of greenhouse gases by construction machinery/vehicles	<ul style="list-style-type: none"> <li>• Construction machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>
	Dust generation	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised daily to reduce airborne dust</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Dust screens should be erected around working areas if and where practically possible</li> <li>• Employees must be provided with appropriate dust masks</li> </ul>
	Noise generation	<ul style="list-style-type: none"> <li>• Notices must be erected prior to construction, forewarning surrounding land owners/users of construction activities</li> <li>• Construction must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> <li>• Tips should be periodically serviced to ensure they do not overflow</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Tips must be serviced by a licensed service provider</li> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	<p>Destruction or partial destruction of non-renewable heritage resources</p>	<ul style="list-style-type: none"> <li>• While unlikely, should any chance-finds of graves or other archaeological artefacts occur, all work in the area is to be ceased immediately and the Chance Find Procedure as laid out in the Archaeological Impact Assessment report must be implemented:                         <ul style="list-style-type: none"> <li>○ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager</li> </ul> </li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>○ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area</li> <li>○ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.</li> <li>• If fossils are seen on the surface or during clearance/excavations:             <ul style="list-style-type: none"> <li>○ When excavations begin the site must be given a cursory inspection by the Applicant/Engineer’s representative or designated person. Any fossiliferous material (stromatolites, microbially induced sedimentary structures) should be put aside in a suitably protected place (see Archaeological Impact Assessment report for examples)</li> <li>○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment</li> <li>○ If there is any possible fossil material found then the qualified palaeontologist sub-contracted for this project should visit the site to inspect the selected material and check the dumps where feasible</li> </ul> </li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits</li> <li>○ If no good fossil material is recovered, then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils</li> </ul>
	<p>Health and safety of construction workers</p>	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Unsafe work areas should be identified and marked as such</li> <li>• MSDSs for any hazardous substances are to be readily available on site</li> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>
Excavation and service structure installation	Loss of topsoil	<ul style="list-style-type: none"> <li>• Topsoil must be cleared and stored separately from subsoil and other excavated materials (e.g. rock)</li> <li>• Topsoil stockpiles should be no higher than 2 m tall</li> <li>• Topsoil should be stockpiled for the least amount of time before being reused on site for rehabilitation or moved to other sites for use</li> <li>• Topsoil stockpiles should be barricaded so as to prevent loss of topsoil through erosion</li> </ul>
	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• The site footprint should be kept as small as possible</li> <li>• Any areas on site or on the edge of the site susceptible to erosion must be monitored and protected where necessary, through the use of silt fences or rock packing</li> </ul>
	Loss of TOPS, both floral and faunal	<ul style="list-style-type: none"> <li>• Floral TOPS and large plant species (trees or bushes) are to be left in situ where possible</li> <li>• Floral species to be left on site must be appropriately marked and cordoned off to prevent damage</li> <li>• Plant species left on site may not be used as fence posts or to hang bags, store waste or as latrines by employees</li> <li>• Permits must be in place if any plant TOPS will be removed, trimmed or relocated</li> <li>• Any TOPS which will be temporarily removed from site and planted back during rehabilitation must be protected in a suitable nursery</li> <li>• No hunting, poaching, fishing, or any other harm to animals by employees is permitted on or around site</li> </ul>



ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Any snakes (or other animals) found on site may not be killed or harmed in any way, but may be removed safely by a professional snake handler or rehabilitation expert</li> <li>• No poisons are to be utilised on site</li> </ul>
	<p>Soil and groundwater contamination resulting from hydrocarbon leaks from excavators</p>	<ul style="list-style-type: none"> <li>• Construction machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>• Servicing of machinery/equipment may only take place within a designated area which must be appropriately bunded and have an oil separation system in place</li> <li>• In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> <li>• A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>• Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>• All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>• Fully stocked spill kits must be available in all working areas on site and inspected weekly to ensure they have all the required elements</li> <li>• Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>• Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> <li>• Significant spills must be reported to GDARD</li> <li>• A record of all spills must be kept on site</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Soil and groundwater contamination from hazardous substance spills	<ul style="list-style-type: none"> <li>• All hazardous substances (including hydrocarbons) must be stored in labelled and sealed containers, within a labelled, protected and bunded area</li> <li>• Employees must be trained on appropriate hazardous substance management techniques</li> <li>• All hazardous substances utilised or stored on site must be accompanied by an MSDS and employees must be trained in using these documents appropriately</li> <li>• Hazardous substance spills are to be dealt with in the same manner as hydrocarbon spills</li> <li>• A record of all spills must be kept on site</li> </ul>
	Impact on vehicular traffic from movement of excavators	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's license</li> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>
	Increase in emissions of greenhouse gases by construction machinery/vehicles	<ul style="list-style-type: none"> <li>• Construction machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>
	Dust generation	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised daily to reduce airborne dust</li> <li>• Dust screens should be erected around working areas if and where practically possible</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Employees must be provided with appropriate dust masks</li> </ul>
	Noise generation	<ul style="list-style-type: none"> <li>• Notices must be erected prior to construction, forewarning surrounding land owners/users of construction activities</li> <li>• Construction must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> <li>• Tips should be periodically serviced to ensure they do not overflow</li> <li>• Tips must be serviced by a licensed service provider</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	<p>Destruction or partial destruction of non-renewable heritage resources</p>	<ul style="list-style-type: none"> <li>• While unlikely, should any chance-finds of graves or other archaeological artefacts occur, all work in the area is to be ceased immediately and the Chance Find Procedure as laid out in the Archaeological Impact Assessment report must be implemented:                             <ul style="list-style-type: none"> <li>○ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager</li> </ul> </li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>○ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area</li> <li>○ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.</li> <li>• If fossils are seen on the surface or during clearance/excavations:             <ul style="list-style-type: none"> <li>○ When excavations begin the site must be given a cursory inspection by the Applicant/Engineer’s representative or designated person. Any fossiliferous material (stromatolites, microbially induced sedimentary structures) should be put aside in a suitably protected place (see Archaeological Impact Assessment report for examples)</li> <li>○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment</li> <li>○ If there is any possible fossil material found then the qualified palaeontologist sub-contracted for this project should visit the site to inspect the selected material and check the dumps where feasible</li> </ul> </li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits</li> <li>• If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils</li> </ul>
	<p>Health and safety</p>	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Unsafe work areas should be identified and marked as such</li> <li>• Deep excavations must be cordoned off and marked as such</li> <li>• Material Safety Data Sheets (MSDS) for any hazardous substances are to be readily available on site</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area if required</li> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>
Paving, concreting and infrastructure development/building	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• The site footprint should be kept as small as possible</li> <li>• Any areas on site or on the edge of the site susceptible to erosion must be monitored and protected where necessary, through the use of silt fences or rock packing</li> <li>• Concreted/paved areas must include suitable drainage and stormwater management systems to avoid erosion of the surrounding land, as per the stormwater management design</li> </ul>
	Loss of TOPS, both floral and faunal	<ul style="list-style-type: none"> <li>• Floral TOPS and large plant species (trees or bushes) are to be left in situ where possible</li> <li>• Floral species to be left on site must be appropriately marked and cordoned off to prevent damage</li> <li>• Plant species left on site may not be used as fence posts or to hang bags, store waste or as latrines by employees</li> <li>• Permits must be in place if any plant TOPS will be removed, trimmed or relocated</li> <li>• Any TOPS which will be temporarily removed from site and planted back during rehabilitation must be protected in a suitable nursery</li> <li>• No hunting, poaching, fishing, or any other harm to animals by employees is permitted on or around site</li> <li>• Any snakes (or other animals) found on site may not be killed or harmed in any way, but may be removed safely by a professional snake handler or rehabilitation expert</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>No poisons are to be utilised on site</li> </ul>
	Introduction/ proliferation of AIS	<ul style="list-style-type: none"> <li>Any plant AIS noted on site must be removed</li> <li>Disturbed soils must be monitored for colonisation of plant AIS</li> <li>Plant AIS must be removed from disturbed soils before seeding and disposed of with general waste</li> <li>Animal AIS may not be dealt with using poison, but should be controlled through prevention measures (such as keeping waste areas clean) or biocontrol measures</li> </ul>
	Soil and groundwater contamination resulting from hydrocarbon leaks from concrete trucks and other construction machinery/ vehicles	<ul style="list-style-type: none"> <li>Construction machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>Servicing of machinery/equipment may only take place within a designated area which must be appropriately bunded and have an oil separation system in place</li> <li>In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> <li>Concrete trucks must be sourced from a reputable contractor who ensures that trucks are well-maintained to ensure that no preventable leakages occur</li> <li>A drip tray is to be placed under any potentially leaking elements of concrete trucks while they unload concrete</li> <li>A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>Fully stocked spill kits must be available in strategic positions on site and inspected weekly to ensure they have all the required elements</li> </ul>



ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>• Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> <li>• Significant spills must be reported to GDARD</li> <li>• A record of all spills must be kept on site</li> </ul>
	Soil and groundwater contamination from concrete/cement spills	<ul style="list-style-type: none"> <li>• If concrete is being delivered, it must be deposited on an area that is going to be laid with concrete (i.e. not on other areas where bare soil will remain)</li> <li>• If concrete is mixed on site, this must take place on an area that is going to be laid with concrete (i.e. not on other areas where bare soil will remain)</li> <li>• Concrete and cement must be adequately contained and prevented from spilling onto bare soil areas or into the road</li> </ul>
	Soil and groundwater contamination from other hazardous substance spills	<ul style="list-style-type: none"> <li>• All hazardous substances (including hydrocarbons) must be stored in labelled and sealed containers, within a labelled, protected and bunded area</li> <li>• Employees must be trained on appropriate hazardous substance management techniques</li> <li>• All hazardous substances utilised or stored on site must be accompanied by an MSDS and employees must be trained in using these documents appropriately</li> <li>• Hazardous substance spills are to be dealt with in the same manner as hydrocarbon spills</li> <li>• A record of all spills must be kept on site</li> </ul>
	Impact on vehicular traffic from concrete truck movement	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's license</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>
	<p>Increase in emissions of greenhouse gases by construction machinery/vehicles</p>	<ul style="list-style-type: none"> <li>• Construction machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>
	<p>Cement dust generation</p>	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised daily to reduce airborne cement dust</li> <li>• Dust screens should be erected around areas where raw cement (i.e. not wet concrete) is being utilised, where possible</li> <li>• Employees must be provided with appropriate dust masks to reduce inhalation of cement particles</li> </ul>
	<p>Noise generation</p>	<ul style="list-style-type: none"> <li>• Notices must be erected prior to construction, forewarning surrounding land owners/users of construction activities</li> <li>• Construction must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Waste cement must be removed as building rubble, by a licensed contractor/service provider and disposed of at the nearest appropriately licensed facility</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> <li>• Tips should be periodically serviced to ensure they do not overflow</li> <li>• Tips must be serviced by a licensed service provider</li> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	Health and safety	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• Unsafe work areas should be identified and marked as such</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Material Safety Data Sheets (MSDS) for any hazardous substances are to be readily available on site</li> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area if required</li> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
Rehabilitation	Loss of topsoil	<ul style="list-style-type: none"> <li>• Topsoil which was stockpiled during vegetation stripping should be placed in areas where vegetation will be grown</li> <li>• Newly topsoiled areas should be revegetated as soon as possible, using indigenous (and endemic, if possible) plant species</li> <li>• Topsoil should be placed last, after subsoil layers have been replaced</li> <li>• In areas with a high risk of erosion, topsoil should be protected with additional measures such as biodegradable soil blankets until vegetation has re-established</li> </ul>
	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• The rehabilitated areas should blend into the surrounding vegetation so as to discourage erosion</li> <li>• The stormwater management plan must be properly implemented on site</li> <li>• There should be no harsh transition zones between the developed areas and the rehabilitated or surrounding areas, to prevent increased surface water runoff speed and resultant erosion</li> </ul>
	Loss of TOPS, both floral and faunal	<ul style="list-style-type: none"> <li>• Floral species left on site must be appropriately marked and cordoned off to prevent damage during topsoiling and revegetation activities</li> <li>• Plant species left on site may not be used as fence posts or to hang bags, store waste or as latrines by employees</li> <li>• Any TOPS which were temporarily removed from site protected in a suitable nursery must be placed back on site in suitable areas and must be monitored for at least three months or until successfully re-established on site</li> <li>• No hunting, poaching, fishing, or any other harm to animals by employees is permitted on or around site</li> <li>• Any snakes (or other animals) found on site may not be killed or harmed in any way, but may be removed safely by a professional snake handler or rehabilitation expert</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>No poisons are to be utilised on site</li> </ul>
	Introduction/ proliferation of AIS	<ul style="list-style-type: none"> <li>Any plant AIS noted on site must be removed</li> <li>Rehabilitated areas must be monitored for colonisation of plant AIS</li> <li>Plant AIS must be removed before seeding and disposed of with general waste</li> <li>Animal AIS may not be dealt with using poison, but should be controlled through prevention measures (such as keeping waste areas clean) or biocontrol measures</li> </ul>
	Soil and groundwater contamination from hydrocarbon spills from rehabilitation machinery/ vehicles	<ul style="list-style-type: none"> <li>Rehabilitation machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>Servicing of machinery/equipment may only take place within a designated area which must be appropriately bunded and have an oil separation system in place</li> <li>In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> <li>A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>Fully stocked spill kits must be available in all working areas on site and inspected weekly to ensure they have all the required elements</li> <li>Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Significant spills must be reported to GDARD</li> <li>• A record of all spills must be kept on site</li> </ul>
	<p>Soil and groundwater contamination from hazardous substance spills</p>	<ul style="list-style-type: none"> <li>• All hazardous substances (including hydrocarbons) must be stored in labelled and sealed containers, within a labelled, protected and bunded area</li> <li>• Employees must be trained on appropriate hazardous substance management techniques</li> <li>• All hazardous substances utilised or stored on site must be accompanied by an MSDS and employees must be trained in using these documents appropriately</li> <li>• Hazardous substance spills are to be dealt with in the same manner as hydrocarbon spills</li> <li>• A record of all spills must be kept on site</li> </ul>
	<p>Impact on vehicular traffic from rehabilitation machinery/ vehicle movement</p>	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's license</li> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>
<p>Increase in emissions of greenhouse gases by rehabilitation machinery/vehicles</p>	<ul style="list-style-type: none"> <li>• Rehabilitation machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>	

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Dust generation	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised daily to reduce airborne dust</li> <li>• Dust screens should be erected around working areas if and where practically possible</li> <li>• Employees must be provided with appropriate dust masks</li> </ul>
	Noise generation	<ul style="list-style-type: none"> <li>• Notices must be erected prior to construction, forewarning surrounding land owners/users of construction activities</li> <li>• Construction must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> </ul>



ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Tips should be periodically serviced to ensure they do not overflow</li> <li>• Tips must be serviced by a licensed service provider</li> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	<p>Health and safety impacts of rehabilitation team and surrounding land owners/users</p>	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Unsafe work areas should be identified and marked as such</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Deep excavations must be cordoned off and marked as such</li> <li>• Material Safety Data Sheets (MSDS) for any hazardous substances are to be readily available on site</li> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area if required</li> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>
Emergencies/Incidents	Incidents/Emergencies could impact health and safety or the environment	<ul style="list-style-type: none"> <li>• All incidents and emergencies should be dealt with in line with the Emergency Response Plan for the site</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> <li>• Environmental incidents must be reported to GDARD</li> </ul>
OPERATIONAL PHASE		
Environmental Awareness	Lack of awareness may result in environmental harm and/or non-compliance to the EMPr/EA	<ul style="list-style-type: none"> <li>• Comprehensive induction of all employees on site, including an environmental section which outlines as a minimum the following:                             <ul style="list-style-type: none"> <li>○ Explanation of the importance of complying with the EMPr</li> <li>○ Discussion of the potential environmental impacts of development activities</li> <li>○ Employees' roles and responsibilities, including emergency preparedness</li> <li>○ Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities</li> <li>○ Importance of biodiversity</li> </ul> </li> <li>• Daily safety talks should include environmental topics (at least one environmental topic per week) to increase general and site-specific environmental awareness</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
Monitoring of Compliance	Lack of monitoring may result in environmental harm and/or non-compliance to the EMPr/EA	<ul style="list-style-type: none"> <li>• The operation should be informally monitored on a continual basis by the Applicant’s representative or Site Manager to ensure compliance to the EMPr</li> <li>• Implementation of the EMPr and conditions of the EA must be formally monitored (audited) every five (5) years by an appropriately qualified and experienced ECO</li> </ul>
Occupation of residential structures and use of service infrastructure	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• Areas susceptible to erosion (such as near smooth, hard surfaces) must be monitored</li> <li>• Where necessary, erosion protection measures or stormwater management measures must be adapted to reduce erosion around the site</li> </ul>
	Soil and groundwater contamination from sewage leaks	<ul style="list-style-type: none"> <li>• Sewage leaks must be immediately reported and repaired so as to prevent long-term environmental harm</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• Waste must be appropriately managed by the municipality including timeous removal and disposal in appropriate waste disposal sites</li> <li>• Residents must be encouraged not to litter</li> </ul>
	Edge effects of development on surrounding open spaces	<ul style="list-style-type: none"> <li>• Surrounding natural spaces must be protected as far as possible by measures such as:                             <ul style="list-style-type: none"> <li>○ Prevention of illegal dumping</li> <li>○ Provision of designated pathways</li> </ul> </li> </ul>
	Invasion/ proliferation of alien invasive species	<ul style="list-style-type: none"> <li>• Plant AIS must be removed before seeding to prevent uncontrolled spread into surrounding natural areas</li> <li>• Animal AIS may not be controlled with poison but should be prevented from proliferating through appropriate waste management techniques or controlled using biocontrol methods</li> </ul>
Use of roads	Soil and groundwater contamination from vehicle oil spills	<ul style="list-style-type: none"> <li>• All vehicle repairs and services must take place on sealed surfaces</li> </ul>
	Impact on vehicular traffic	<ul style="list-style-type: none"> <li>• Roads must be appropriately marked and signposted to avoid confusion</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Waste generation	<ul style="list-style-type: none"> <li>Roads should be appropriately developed to help reduce congestion as far as possible</li> <li>Roadside waste bins must be provided and emptied regularly</li> <li>Residents must be encouraged not to litter</li> </ul>
Stormwater Management	Soil and groundwater contamination from improper management of effluent	<ul style="list-style-type: none"> <li>The Stormwater Management Plan must be correctly implemented on site and must be adapted where necessary to site conditions</li> <li>Stormwater must be channelled into a properly constructed drainage system</li> <li>Drains must be regularly inspected for a build up of debris (e.g. litter or leaves) and appropriately cleared</li> <li>No fuels must be allowed to discharge directly into stormwater pipes, drains, sewage manholes/pipes</li> </ul>
Emergencies/Incidents	Incidents/Emergencies could impact health and safety or the environment	<ul style="list-style-type: none"> <li>All incidents and emergencies should be dealt with in line with the Emergency Response Plan for the site</li> <li>A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> <li>Environmental incidents must be reported to GDARD</li> </ul>
<b>DECOMMISSIONING PHASE</b>		
Demolition of residential space and decommissioning of service infrastructure	Loss of housing	<ul style="list-style-type: none"> <li>Alternative options must be in place to provide safe housing for displaced residents</li> </ul>
	Soil and groundwater contamination resulting from hydrocarbon leaks from demolition machinery/equipment	<ul style="list-style-type: none"> <li>Demolition machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>No servicing of machinery/equipment take place on site</li> <li>In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>• Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>• All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>• Fully stocked spill kits must be available in strategic positions on site and inspected weekly to ensure they have all the required elements</li> <li>• Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>• Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> <li>• Significant spills must be reported to GDARD</li> </ul>
	<p>Impact on vehicular traffic from movement of demolition machinery</p>	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's license</li> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>
	<p>Increase in emissions of greenhouse gases by rehabilitation machinery/vehicles</p>	<ul style="list-style-type: none"> <li>• Demolition machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>
	Dust generation	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised to reduce airborne dust</li> <li>• Dust screens should be erected around working areas if and where practically possible</li> <li>• Employees must be provided with appropriate dust masks</li> </ul>
	Noise generation	<ul style="list-style-type: none"> <li>• Notices must be erected prior to demolition, forewarning residents of activities</li> <li>• Demolition must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• The reuse/recycling of building rubble must be explored and undertaken where possible</li> <li>• Non-reusable or recyclable building rubble must be removed by a licensed contractor/service provider and disposed of at the nearest appropriately licensed facility</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> <li>• Tips should be periodically serviced to ensure they do not overflow</li> <li>• Tips must be serviced by a licensed service provider</li> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	<p>Health and safety of construction workers</p>	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Unsafe work areas should be identified and marked as such</li> <li>• MSDSs for any hazardous substances are to be readily available on site</li> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area</li> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>
Rehabilitation	Loss of topsoil	<ul style="list-style-type: none"> <li>• Newly topsoiled areas should be revegetated as soon as possible, using indigenous (and endemic, if possible) plant species</li> <li>• Topsoil should be placed last, after subsoil layers have been replaced</li> <li>• In areas with a high risk of erosion, topsoil should be protected with additional measures such as biodegradable soil blankets until vegetation has re-established</li> </ul>
	Erosion of surrounding soil	<ul style="list-style-type: none"> <li>• The rehabilitated areas should blend into the surrounding vegetation so as to discourage erosion</li> </ul>
	Loss of TOPS, both floral and faunal	<ul style="list-style-type: none"> <li>• Floral species on site must be appropriately marked and cordoned off to prevent damage during topsoiling and revegetation activities</li> <li>• Plant species on site may not be used as fence posts or to hang bags, store waste or as latrines by employees</li> </ul>



ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• No hunting, poaching, fishing, or any other harm to animals by employees is permitted on or around site</li> <li>• Any snakes (or other animals) found on site may not be killed or harmed in any way, but may be removed safely by a professional snake handler or rehabilitation expert</li> <li>• No poisons are to be utilised on site</li> </ul>
	Introduction/ proliferation of AIS	<ul style="list-style-type: none"> <li>• Any plant AIS noted on site must be removed</li> <li>• Rehabilitated areas must be monitored for colonisation of plant AIS</li> <li>• Plant AIS must be removed before seeding and disposed of with general waste</li> <li>• Animal AIS may not be dealt with using poison, but should be controlled through prevention measures (such as keeping waste areas clean) or biocontrol measures</li> </ul>
	Soil and groundwater contamination from hydrocarbon spills from rehabilitation machinery/ vehicles	<ul style="list-style-type: none"> <li>• Rehabilitation machinery and equipment must be inspected weekly by the operator and maintained/serviced regularly to ensure that no preventable leakages occur</li> <li>• Servicing of machinery/equipment may only take place within a designated area which must be appropriately bunded and have an oil separation system in place</li> <li>• In case of emergency repairs, machinery/equipment must be placed on an impermeable surface and drip trays are to be used</li> <li>• A drip tray is to be placed under any potentially leaking elements of any machinery/equipment that is not in use or being stored on site</li> <li>• Drip trays must be in good condition (i.e. no holes and not bent or flattened)</li> <li>• All employees are to be trained in proper spill management techniques and drilled quarterly</li> <li>• Fully stocked spill kits must be available in all working areas on site and inspected weekly to ensure they have all the required elements</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Should hydrocarbons spill on to the ground, the spill should immediately be contained and managed. Contaminated soil must be excavated to the depth of the spill</li> <li>• Any contaminated material (including excavated soil) must be disposed of in an appropriately labelled and sealed container, then transported by a licensed service provider to a licensed hazardous waste disposal facility</li> <li>• Significant spills must be reported to GDARD</li> <li>• A record of all spills must be kept on site</li> </ul>
	<p>Soil and groundwater contamination from hazardous substance spills</p>	<ul style="list-style-type: none"> <li>• All hazardous substances (including hydrocarbons) must be stored in labelled and sealed containers, within a labelled, protected and bunded area</li> <li>• Employees must be trained on appropriate hazardous substance management techniques</li> <li>• All hazardous substances utilised or stored on site must be accompanied by an MSDS and employees must be trained in using these documents appropriately</li> <li>• Hazardous substance spills are to be dealt with in the same manner as hydrocarbon spills</li> <li>• A record of all spills must be kept on site</li> </ul>
	<p>Impact on vehicular traffic from rehabilitation machinery/ vehicle movement</p>	<ul style="list-style-type: none"> <li>• All operators and drivers must possess the appropriate driver's license</li> <li>• Appropriate signage must be placed on the roads around the site to ensure that road users are made aware of construction activities</li> <li>• When large machinery is moving near the roads or entering the traffic stream, an appropriately visible flag person must be stationed next to the road to warn traffic of heavy moving vehicles</li> <li>• Heavy machinery/vehicles should not be parked within the road or on the road verge</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
	Increase in emissions of greenhouse gases by rehabilitation machinery/vehicles	<ul style="list-style-type: none"> <li>• Rehabilitation machinery and vehicles should be kept to a minimal as far as practically possible</li> <li>• Use of car-pooling or public transport by employees must be encouraged</li> <li>• Volumes of petrol and diesel usage should be recorded in order to report on emission data</li> </ul>
	Dust generation	<ul style="list-style-type: none"> <li>• Dust suppression/surface wetting mechanisms (such as use of a water bowser) must be utilised daily to reduce airborne dust</li> <li>• Dust screens should be erected around working areas if and where practically possible</li> <li>• Employees must be provided with appropriate dust masks</li> </ul>
	Noise generation	<ul style="list-style-type: none"> <li>• Notices must be erected prior to construction, forewarning surrounding land owners/users of construction activities</li> <li>• Construction must only take place during working hours (i.e. 07h00 to 17h00 on weekdays and 07h00 to 13h00 on Saturdays)</li> <li>• Excessive noise from employees must be discouraged where possible</li> <li>• Employees must be provided with ear plugs for use when they are in close proximity to noisy machinery</li> </ul>
	Waste generation	<ul style="list-style-type: none"> <li>• A Waste Management Plan must be developed and implemented on site, and all employees must be trained on its contents</li> <li>• Employees must be trained in good housekeeping practices and site must be regularly inspected for state of housekeeping</li> <li>• Reduction, reuse, and recycling of waste should be prioritised in that order, before disposal</li> <li>• Waste must be separated into general recyclable, general non-recyclable, hazardous and building waste streams</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• An appropriate number of separated, labelled and sealed waste bins must be provided in all working areas of site</li> <li>• Waste bins should be periodically inspected to ensure they are not overflowing</li> <li>• When waste bins are full, waste should be disposed of in appropriately separated, labelled tips</li> <li>• Tips should be periodically serviced to ensure they do not overflow</li> <li>• Tips must be serviced by a licensed service provider</li> <li>• Waste must be disposed of in a licenced and appropriate waste disposal sites (i.e. hazardous waste must go a licenced hazardous waste site, recycling must go to a licenced recycling depot and non-recyclable general waste must go to municipal landfill site)</li> <li>• Volumes of waste removed must be monitored and reduced where possible</li> <li>• No waste may be buried or burned on site or anywhere else</li> <li>• An appropriate number of chemical toilets must be provided for employees (at least one (1) per ten (10) employees), must be the only sites used for ablutions by employees, must be secured with rope or otherwise tied down and must be emptied regularly (at least twice a week) by a licensed service provider to prevent bad odours or spillages</li> </ul>
	<p>Health and safety impacts of rehabilitation team and surrounding land owners/users</p>	<ul style="list-style-type: none"> <li>• All relevant Health and Safety legislation should be strictly adhered to, including but not limited to OSHA</li> <li>• Employees, contractors and visitors must undergo induction training on general site safety as well as the Emergency Response Plan</li> <li>• Daily health and safety training must be undertaken to ensure employees remain vigilant</li> </ul>

ASPECT	IMPACT	MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>• Employees must be provided with the necessary Personal Protective Equipment (PPE)- hard hat, safety boots, overalls, safety goggles, dust masks, ear plugs and gloves</li> <li>• An Emergency Response Plan must be available on site at all times</li> <li>• Unsafe work areas should be identified and marked as such</li> <li>• Deep excavations must be cordoned off and marked as such</li> <li>• Material Safety Data Sheets (MSDS) for any hazardous substances are to be readily available on site</li> <li>• Hazardous substances are to be appropriately contained within functional, labelled containers and stored in a bunded area if required</li> <li>• A fully stocked first aid kit must be available on site at all times</li> <li>• A list of emergency contacts, including details of a nearby snake handler, must be kept on site at all times</li> </ul>

#### 4.4 Consequences of Non-Adherence to the EMPr

As outlined in Section 3.1, the Engineer/ Applicant's representative or the ECO may issue fines should any employee not adhere to the conditions within this EMPr. Fines may be recommended by the ECO but must be imposed by the Engineer's representative. Should an employee be suspected of this, a thorough investigation into the incident must take place. Should the employee be found guilty, this must be recorded in the environmental register, along with the corrective action taken.

##### 4.4.1 Spot Fines

Spot fines may be issued on the following basis:

- Littering on site: R50 (first offence) or R250 (further offences);
- Burning waste on site: R250 (first offence) or R1000 (further offences);
- Illegal dumping of waste: R250 (first offence) or R1000 (further offences);
- Violation of a Method Statement: R250 (first offence) or R1000 (further offences); and
- Damage to flora/fauna: R250 (first offence) or R1000 (further offences).

Should the fines not be paid within 14 days of issuance, the Engineer/ Applicant's representative may issue a "Stop Works" order.

##### 4.4.2 Penalty Fines

Should the Contractor repeatedly fail to comply with the conditions within this EMPr or cause high-impact damage to the environment, a penalty fine may be payable as follows:

- Ongoing littering: R2500 plus rehabilitation costs;
- Ongoing illegal dumping: R10000 plus rehabilitation costs;
- Ongoing burning of waste on site: R10000 plus rehabilitation costs;
- Ongoing violation of a Method Statement: R10000 plus rehabilitation costs;
- Ongoing damage to flora/fauna: R10000 plus rehabilitation costs;
- Irreparable damage to the environment: R10000 plus rehabilitation costs; and
- Killing/injury of any wildlife or TOPS: R5000.

## 5 CONCLUSION

This EMP contains practical mitigation measures for all activities that will occur throughout the lifecycle of this project. Should the mitigation measures provided within this EMP be implemented effectively, GCS is of the opinion that no significant environmental or social impacts will be generated. In signing this EMP, the developer accepts responsibility to ensure the measures outlined above are implemented.

## 6 REFERENCE LIST

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**APPENDIX A**

**Curriculum Vitae of Environmental Assessment Practitioner (EAP)**



**Gerda Bothma**

**Senior Environmental Consultant**

## CORE SKILLS

- Project Management
- Technical & Impact Assessment Guidance
- Environmental Assessment
- Water Use Licencing
- Waste Management Licencing
- Environmental & Waste Auditing and Compliance Monitoring

## DETAILS

### Qualifications

- B.Sc. Microbiology (Honours) University of Pretoria 1996
- B.Sc. Biological Sciences University of Pretoria 1994

### Memberships

- International Association for Impact Assessors of South Africa (IAIA)
- Institute of Waste Management of South Africa (IWMSA)
- SACNASP (No.117348) (South African Council for Natural Scientific Professionals)

### Languages

- Afrikaans
- English

### Countries worked in:

South Africa, Zambia, Namibia

## PROFILE

Gerda has over 20 years' experience within the environmental and waste management field and strives to deliver custom environmental services to clients.

Gerda began her career in the environmental field within the government sector, managing environmental aspects and impacts as well as reviewing environmental assessments with the view of authorizing or declining authorization of the developments.

After six years within the government sector she joined a consulting engineering firm where she was ultimately responsible for the Management of the Environmental Sub-Division. Gerda has experience in project and client management, financial management and the compilation and costing of project proposals and tenders. She has been involved in several engineering projects as the Environmental Assessment Practitioner as well as the Environmental Control Officer during construction working closely with the Occupational Health and Safety Officer. Gerda has also been involved in projects where waste licencing as well as water use licencing processes formed an integral part of the services offered. Environmental auditing and compliance monitoring of waste disposal sites also forms part of her experience gained. She also has experience in dealing with projects which involve NEC3 Contracts.

Gerda has specialist skills in the following areas:

- Project proposals, planning, costing and timing
- Project and Client Management
- Authority Liaison
- Basic Assessments & Scoping/EIA Processes
- Compilation
- Amendment of EA's & EMP's
- Facilitation of Public Participation Processes & stakeholder engagement
- IWULA & IWWMP Applications
- Environmental Control Officer (ECO) duties
- Environmental Compliance Auditing (IFC Performance Standards & Equator Principles)
- Mentorship & Guidance

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
<b>Strategic and Environmental Guidance Projects</b>			
1999 to 2003	Gauteng Department of Agriculture, Conservation & Environment	Development of a Health Care Risk Waste Management Strategy for Gauteng.	Part of Development Team
2001 to 2003	Gauteng Department of Agriculture, Conservation & Environment	Development of Minimum Domestic Waste Collection Standards for Gauteng Province.	Part of Development Team
2002	Gauteng Department of Agriculture, Conservation & Environment	Development of new EIA guidelines and regulations for the Gauteng Province.	Part of Development Team
2005	Gauteng Department of Agriculture, Conservation & Environment	GDACE Green Procurement Project: Development of the GDACE Green Procurement Policy, Gauteng	Project Manager & Reviewer
2008	GAUTRAIN Project Engineers (i.e. KV3 Engineers)	Environmental Assistance for the Gautrain Project: Environmental Evaluation of various documentation and engineering designs in terms of their environmental compliance.	Project Manager & Reviewer
2009	Department of Environmental Affairs	Alignment of MIG Project Process with EIA Process: Evaluation of the EIA process as well as the MIG process in order to produce a process alignment guideline to the municipalities to streamline the two processes.	Part of Development Team
<b>Environmental Feasibility and Screening</b>			
2008	Nu Way-property Developments	Management of Environmental Screening and Due Diligence Assessment for several proposed Nu Way-property Developments, Gauteng.	Project Manager
2008	Department of Water Affairs	Mokolo Croc WAP Environmental Feasibility and Screening, Limpopo.	Project Manager & Senior Environmental Assessment Practitioner (EAP)
2016	Kwadukuza Municipality	Environmental Feasibility for Civil Engineering Project Foxhill Road Alignment and Construction, Tongaat, Kwa-Zulu-Natal.	Environmental Project Leader
2016	King Sabata Dalindyebo Local Municipality (C/O OR Tambo District Municipality)	Environmental Screening Investigation of six proposed development corridors for the Mthatha Bulk Water Infrastructure Presidential Intervention - Phase 2: Secondary Bulk Infrastructure project.	Environmental Project Leader
<b>Development Environmental Assessments</b>			
2003 to 2005	ABSA DevCO	Environmental Impact Assessment for a change of land-use from agricultural to Residential and Town Development of the farm Brakfontein 399 JR, Centurion, Gauteng.	Project Manager & Senior EAP
2005 to 2010	Air Traffic Navigation Services	The project entails the upgrading of existing, and the provision of new air navigation	Project Manager & Senior

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
	(ATNS)	sites (27 in total) throughout South Africa. Civil and electrical infrastructure to the sites needed to be upgraded to accommodate the equipment. Various Environmental Impact Assessments for various individual projects in various provinces within South Africa.	EAP
2006 to 2009	Amathole District Municipality	Elliotdale Rural Sustainable Human Settlement Pilot Project Environmental Impact Assessment. Responsible for the environmental assessment process which was based on a strategic approach for the Elliotdale Rural Housing Project, Elliotdale, Eastern Cape.	Project Manager & Senior EAP
2007	Elkem Ferroveld	Environmental Basic Assessment for the upgrading and expansion of the Ferroveld Plant in Ferrometals, Emalaheni, Mpumalanga.	Project Manager & Senior EAP
2008	ABSA DevCO	Environmental Impact Assessment for a change in land use from agricultural to Residential and Town development of Montana X40, Pretoria, Gauteng.	Project Manager & Senior EAP
2012	Transnet Capital Projects	Environmental Basic Assessment and technical environmental investigations for the proposed expansion of the existing tug jetty and construction of a new tug jetty for Transnet Capital Projects in the Port of Durban, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2016	Dube TradePort	Environmental Impact Assessment for the proposed construction of the Dube TradePort TradeZone 2 in La Mercy, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2017	Dube TradePort	Environmental Impact Assessment for the proposed Support Precinct 2 Development in La Mercy, KwaZulu-Natal.	Project Manager & Senior EAP
2016 to 2017	Areena Resort	Application for rectification in terms of S24G and associated Environmental Basic Assessment for the alleged unlawful construction activities at the Areena Resort, Great Kei Municipality, Eastern Cape.	Project Manager & Senior EAP
2016 to 2017	Areena Resort	Application for rectification in terms of S24G and associated Environmental Basic Assessment for the alleged unlawful construction activities on Hillsdrift Farm, Great Kei Municipality, Eastern Cape.	Project Manager & Senior EAP
2018 to 2019	Watchman Properties (Pty) Ltd	Environmental Basic Assessment for the proposed Vendome Residential Development on Portion 1 of Farm 1766 and Portion 2 of Farm 1766, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Keysha Investments 213 (Pty) Ltd	Environmental Basic Assessment for the proposed River Farm Estate Development and associated infrastructure on remainder of farm Rivierplaas No. 1486, Erf 111 and Erf 197, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Paarl Vallei Developments (Pty) Ltd	Environmental Basic Assessment for the proposed Paarl Vallei Retirement Village Development, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
2018 to 2019	Val de Vie Investments (Pty) Ltd	Parallel Substantive Amendment Application process for the authorised Pearl Valley II & Levendal Residential Developments, Paarl, Western Cape, South Africa.	Project Manager & Senior EAP
<b>Renewable Energy Environmental Assessments</b>			
2011	Farmsecure Carbon	Environmental Basic Assessment and Water Use License Application process for a proposed Biogas Waste to Energy project for a pig farm, Moorriver, KwaZulu-Natal.	Project Manager & Senior EAP

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2018 to 2019	GPIPD - Doornfontein Solar Farm (Pty) Ltd	Environmental Impact Assessment for the proposed 230 MW Doornfontein Photovoltaic Solar Energy Facility (PVSEF) located on Remainder of Farm 118, Doornfontein, Piketberg, Bergrivier Local Municipality, Western Cape.	Project Manager & Senior EAP
2018 to 2019	GPIPD - Kruispad Solar Farm (Pty) Ltd	Environmental Impact Assessment for the proposed 150 MW Kruispad Photovoltaic Solar Energy Facility (PVSEF) located on Remainder of Farm 120, Kruispad, Piketberg, Bergrivier Local Municipality, Western Cape.	Project Manager & Senior EAP
2018 to 2019	Brandvalley Wind Farm (Pty) Ltd	Substantive Amendment Application for the authorised 140 MW Brandvalley Wind Energy Facility (WEF) located within the Karoo Hoogland, Witzenberg and Laingsburg Local Municipalities in the Northern and Western Cape Provinces.	Project Manager & Senior EAP
2018 to 2019	Copperton Wind Farm (Pty) Ltd	Non-Substantive Amendment Application to update the information of the Holder of the Environmental Authorisation & an EMPr Amendment Process to update the Airstrip Alignment and to provide an updated "outcomes based" EMPr for the Copperton Wind Energy Facility near Copperton in the Northern Cape.	Project Manager & Senior EAP
2018 to 2019	WKN Windcurrent SA (Pty) Ltd	Environmental Impact Assessment for the proposed 150 MW Haga Haga Wind Energy Facility (WEF) & Environmental Basic Assessment for the associated Haga Haga Overhead Powerline (OHPL) in Haga Haga, Great Kei Local Municipality, Eastern Cape.	Project Manager & Senior EAP
<b>Mining Environmental Assessments</b>			
2007	Chris Hani Municipality	Environmental Assessment and DME Licence Application on behalf of Chris Hani Municipality. Responsible for exemption application from Mining Permit and Environmental Management Programmes for 17 borrow pits in Middelburg, Eastern Cape.	Project Manager & Senior EAP
2010	Samancor Chrome Limited	The Lwala Greenfields Mine and Smelter EIA and EMP. Responsible for the Environmental impact assessment and technical investigations for the waste management issues for the proposed development of a new chrome smelter project in the Steelpoort area, Limpopo.	Project Manager & Senior EAP
2011	Xtrata Alloys	Xtrata Alloys Western Mines PSV application for authorization in terms of the MPRDA. Responsible for the undertaking of the EIA and compilation of the amended EMPr and technical environmental investigations for the proposed development of an open cast mine in Rustenburg, North West.	Project Manager & Senior EAP
<b>Waste Management Environmental Assessments</b>			
2003	Assmang Chrome Machadodorp	Environmental Impact Assessment for the permitting of the H:H Hazardous Waste Disposal Facility at Assmang Chrome, Machadodorp.	Senior EAP
2004	Emfuleni Local Municipality	Environmental Impact Assessment for the closure of the Zuurfontein Landfill site for the Emfuleni Local Municipality, Sedibeng, Gauteng	Senior EAP
2004	Ekurhuleni Municipality	Environmental Impact Assessment for the closure of the Sebenza Landfill Site for the Ekurhuleni Municipality, Gauteng.	Senior EAP
2004	Tzaneen Local Municipality	Application for authorisation and EIA for the permitting of an existing solid waste disposal site for the Tzaneen Local Municipality, Mpumalanga.	Senior EAP

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2006	Samancor Chrome Middelburg	Environmental Basic Assessment for the permitting of the existing Slag Waste Disposal facility for Samancor Chrome Middelburg, Mpumalanga.	Senior EAP
2006	Samancor Chrome Ferrometals	Environmental Basic Assessment for the permitting of the existing Slag Waste Disposal facility for Samancor Chrome Ferrometals Witbank, Mpumalanga.	Senior EAP
2007	Steve Tshwete Municipality	Environmental Impact Assessments for four Solid waste Transfer Stations for the Steve Tshwete Municipality, Mpumalanga.	Senior EAP
2008	Assmang Chrome Machadodorp	Environmental Impact Assessment for the expansion of the existing Slag Waste Disposal Facility at Assmang Chrome. Responsible for the EIA application for authorization for the proposed expansion project in Machadodorp, Mpumalanga.	Project Manager & Senior EAP:
2010	ArcelorMittal	ArcelorMittal BOF Slag Disposal site licensing of new site and closure of old site, Newcastle, KwaZulu-Natal.	Project Manager & Senior EAP:
2010	Lekwa Municipality	Waste Management License Application for authorization and the conducting of an EIA and technical environmental investigation for the proposed development of two landfill sites for the Lekwa Municipality, Mpumalanga.	Project Manager & Senior EAP:
2015 to 2017	Umgungundlovu Municipality	Advanced Solid Waste Management Project for Umgungundlovu Municipality for proposed Materials Recovery Facilities located in various Local Municipalities, Umgungundlovu Municipality, KwaZulu-Natal.	Project Manager & Senior EAP:
<b>Water and Wastewater Environmental Assessments</b>			
2004	Msukaligwa Municipality	Environmental Impact Assessment for the installation of a water reticulation system at Nganga for the Msukaligwa Municipality, Mpumalanga.	Senior EAP
2006 to 2010	eThekweni Municipality: Water and Sanitation	Proposed upgrading of the WWTW capacity in the Northern Areas of the eThekweni Municipality. Responsible for EIA application for authorization, technical environmental investigations, and waste management license application for the proposed expansion of the WWT capacity in Northern eThekweni, KwaZulu-Natal.	Project Manager & Senior EAP
2008	Johannesburg Water	Environmental Management Services for Johannesburg Water: Environmental Impact Assessment (Exemption) for various individual projects related to the upgrading of the Bryanston Water Mains, Gauteng.	Project Manager & Senior EAP
2014 to 2017	eThekweni Municipality: Water and Sanitation	Environmental Basic Assessment and Water Use License Application for the Northern Aqueduct Water Augmentation Project (Phase 5), Durban, KwaZulu-Natal.	Project Manager & Senior EAP
<b>Electrical and Linear Environmental Assessments</b>			
2005	Magallies Water	Application for (exemption) authorisation on behalf of Magallies Water for the installation of the Rising Main from the Roodeplaat Waterworks to the Wallmannsthal Reservoir, in Wallmannsthal, Gauteng.	Senior EAP
2010	Moloto Rail Corridor Development	EIA for the Moloto Rail Corridor Development. Responsible for the EIA application for authorization and technical environmental investigations for the proposed Moloto Rail Corridor Development, Moloto, Gauteng.	Project Manager & Senior EAP

## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2010	ESKOM	Environmental Basic Assessment of for the ESKOM Honingklip 88kV & ESKOM Randjiesfontein 88kV overhead line and Sub-Stations, Johannesburg, Gauteng.	Project Manager & Senior EAP
2010	ESKOM	Environmental Basic Assessment of for the ESKOM Ubertas Strategic Servitude Sub-Station, Johannesburg, Gauteng	Project Manager & Senior EAP
2014 to 2017	Msunduzi Municipality	Environmental Impact Assessment for the proposed Msunduzi IRPTN project, Pietermaritzburg, KwaZulu-Natal	Project Manager & Senior EAP
<b>Environmental and Waste Management Compliance Monitoring and Auditing</b>			
2005 to 2009	Sedibeng District Municipality	Auditing of Zuurfontein and Boitshepi Landfill sites for the Sedibeng District Municipality, Gauteng.	Part of Audit Team
2006 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Amberfield Development on the farm Brakfontein 399 JR, Centurion, Gauteng.	Project Manager & Environmental Control Officer (ECO)
2007 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Zambezi Estate Development, Montana, Gauteng.	Project Manager & ECO
2008 to 2009	Steve Tshwete Municipality	Auditing of Middelburg Landfill Site for the Steve Tshwete Municipality, Mpumalanga.	Part of Audit Team
2008 to 2009	ABSA DevCO	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the Cedar Creek Development, Fourways, Gauteng.	Project Manager & ECO
2017 to 2018	Dube TradePort	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the construction of TradeZone 2, Dube TradePort, La Mercy, KwaZulu-Natal.	Project Manager & ECO
2017	Richards Bay Minerals	Environmental Legal Compliance Audit to determine the level of compliance of Richards Bay Minerals' to their various mining, water and waste licenses and environmental authorisations and permits, Richards Bay, KwaZulu-Natal.	Project Manager & Environmental Auditor
2017 to 2018	eThekwini Municipality	Environmental Compliance monitoring in accordance with relevant authorisation conditions and environmental management plans for the construction of the Northern Aqueduct Phase 5, Durban, KwaZulu-Natal.	Project Manager & ECO
<b>Integrated Water Use License Applications</b>			
2010	FOSKOR	Integrated Water Use License Application for a new storage dam for FOSKOR, Richards Bay, KwaZulu-Natal.	Part of Project Team
2014 to 2015	SANRAL	Integrated Water Use License Applications as required for the proposed SANRAL N2 Road upgrade from Mthunzini to Empangeni, KwaZulu-Natal.	Project Manager & Senior EAP
2014	eThekwini Municipality: Roads	Integrated Water Use License Application for the proposed Realignment of Inanda Arterial Road, Durban, KwaZulu-Natal.	Project Manager & Senior EAP



## Professional Experience

Year	Client	Project Description	Role/ Responsibility
2015 to 2017	SMEC (Umzimkulu Municipality)	Integrated Water Use License Application for the proposed Licensing of the existing Umzimkhulu Waste Water Treatment Works, Umzimkhulu, KwaZulu-Natal.	Project Manager & Senior EAP
2014 to 2016	eThekweni Municipality: Roads	Water Use License Application for the proposed eThekweni BRT Route C1A, Durban, KwaZulu-Natal.	Project Manager & Senior EAP
<b>Management and Master Plans</b>			
2005	Livingstone Municipality	Development of the Livingstone Integrated Development Plan, Zambia.	Part of the Project Team
2008	Steve Tshwete Municipality	Development of an Integrated Waste Management Plan for the Steve Tshwete Municipality, Mpumalanga.	Part of the Project Team
2008	Kungwini Local Municipality	Development of an EMP (Framework) for Kungwini Local Municipality, Mpumalanga.	Part of the Project Team
2010	KZN Department of Public Works - Southern Region	Compilation of an Environmental Management Plan for the Fort Napier sewage upgrading project, Pietermaritzburg, Kwa-Zulu Natal.	Project Manager & Senior EAP



**APPENDIX B**  
**Generic Method Statement**

## Generic Method Statement

Information pertaining to activity which will be undertaken:

What activity will take place?
How will the activity be undertaken (methods)?
Machinery/plant/equipment or vehicles which will be needed?
Materials required and relevant hazard status?
Where on site will activity take place and what will the extent of the activity be?
Timeframes of activity (start and end dates)?

Impact and Risk Assessment of the Activity:

Impact sources	
Receptors	
Objective	
Risks	
Notes	

The following signatures represent a binding agreement to the Method Statement and EMPr by all Contractors and Sub-Contractors involved in the above activity.

Role	Name	Company	Date	Signature
Client				

Engineer/Applicant's representative				
Contractor				
ECO				