

# **DRAFT EIA REPORT FOR THE PROPOSED MINNEBRON X 1 MIXED USE DEVELOPMENT ON PORTIONS 64 – 65, 165 AND THE REMAINDER OF PORTION 3 OF THE FARM WITPOORTJE 117 IR**

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Management of information of specialist studies for the EIA and WULA processes have included amongst others, vegetation, fauna, social, geotechnical, heritage assessments, as well as hydrology, hydrogeology, geomorphology, hydrogeology, water quality analyses, aquatic delineation and rehabilitation studies and risk assessments. The findings of the specialist studies are incorporated into the application and presented to the relevant commenting departments and competent authority as required for each application.

Marli has extensive experience in auditing EMP conditions on construction sites while doing weekly or monthly ECO monitoring, including environmental training with contractors and finding ways to mitigate the impacts of development on the environment. She has also conducted several WUL audits, which includes providing practical measures towards full compliance.

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## EXECUTIVE SUMMARY

Ekurhuleni Metropolitan Municipality (EMM) has appointed **Galago Environmental CC: Environmental Consultants and Specialists** as the independent environmental consultants to identify and assess the potential environmental impacts associated with the proposed establishment of the **Minnebron x 1 Mixed Use Development** through an **Environmental Impact Assessment (EIA)** process.

This Draft EIA Report is for the proposed residential development and associated infrastructure situated on Portions 64 – 65, 165 and the remainder of Portion 3 of the farm Witpoortje 117 IR. The site is ±301ha in extent and situated in the Central East Rand.

The aim of the project is to fast-track formal housing delivery in order to relieve Ekurhuleni's current housing backlog that is estimated to be in the region of 200 000 units and is still growing.

### **Proposed development:**

The proposed development will entail more than 10 000 housing units and a range of community facilities and amenities. The development will consist of 6384 Residential 4 High Density housing, 3772 Residential 2 Medium Density housing, 65 row housing erven, 8 Business and 2 Social Services erven, as well as 2 Combined and 4 Primary School sites with 7 erven for crèches and churches (Community Facilities). Furthermore, the proposed development will include 2 erven for Social Services, i.e. Transportation Facilities, 40 Public Open Space erven which will include wetlands, storm water detention dams and will form part of the open space system.

### **Project process:**

A pre-application meeting was held with GDARD on 26 January 2018 to establish the process under the 2014 EIA regulations, as amended and to establish whether there are any issues identified by GDARD that will need special attention.

A public participation process was followed to inform Interested and/or Affected parties (I&APs) about the proposed development and to gather issues and concerns to be investigated during the EIA process. This process will be discussed further in section 5.

The draft Scoping Report was made available to registered I&APs, State Departments and the EMM for comment on 15 May 2018. All issues and concerns were addressed and included in the Final Scoping Report. The application form was submitted to GDARD on 15 May 2018.

On approval of the Scoping Report in April 2019, the EIA process was started.

During the Environmental Impact Assessment phase the different design and technology alternatives for a residential development on the site were compared in terms of the potential environmental impacts associated with the residential development. Specialist studies were undertaken during the EIA phase in order to determine the potential impacts on the social and biophysical environment and the EIA report was compiled.

### **Specialist studies:**

Specialist studies were undertaken during the EIA phase in order to determine the potential impacts on the social and biophysical environment:

- Biophysical
  - Flora assessment;
  - Fauna study including Mammals, Avifauna and Herpetofauna;
  - Floodline study
  - Aquatic ecosystem delineation
  - Geotechnical Assessment
  - Air Quality Impact Assessment
  - Radon Study
- Social
  - Cultural Heritage Assessment
  - Civil Services Report
  - Traffic impact study
  - Town planning memorandum
  - Stormwater Management report

### **Biophysical:**

The study site lies in the quarter degree square 2628AD (Springs). Mucina & Rutherford (2006) classified the area as Tsakane Clay Grassland, a short, dense grassland on flat to slightly undulating plains and low hills. This vegetation unit is considered endangered.

Several depressions pans are situated along the horizontal centreline of the site, with a single depression pan at the southern corner. A seep and unchannelled valley bottom wetland are situated in the northern corner of the site. One of the central pans and the northern wetlands on site are indicated on the GDARD C-Plan 3.3 as Critical Biodiversity areas and another one of the pans as an Ecological Support Area (ESA).

The **flora study** found that the Wetland vegetation and the Pan vegetation are considered sensitive. The Mixed alien and indigenous vegetation and the cultivated fields study units are not deemed sensitive. The alien invasive species should be removed.

No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species.

The **mammal** study found that the drainage line, wetlands and the two pans, as well as their buffer zones, should be considered as ecologically sensitive.

The **avifaunal** study found that the study area does not offer suitable habitat for the Red Data avifaunal species recorded for the 2628AD q.b.g.c. These Red Data avifaunal species are habitat specific and unable to adapt to areas changed by man. In general, the reporting rate of all Red Data avifaunal species recorded for the q.d.g.c. is very low at 1% and less and if they should occur, they are only likely to move through the area on rare occasions. They are unlikely to make use of the habitat systems on site on a permanent basis. The aquatic

habitat offers suitable habitat for a variety of the more common avifaunal species and should be regarded as medium sensitive to ensure future avifaunal biodiversity in the study area.

The **herpetological** study found that the drainage line, wetlands and the two pans, as well as their buffer zones, should be considered as ecologically sensitive.

It must be clearly noted that any development on the study site will have an impact on the aquatic ecosystems and must be authorised in terms of section 21 of the National Water Act, 1998 (Act No. 36 of 1998).

In terms of GN 1199 of the National Water Act, 1998 any development within 500 meters of a wetland should follow a water use license application process for the release of stormwater from the site. A Water Use Licence Application (WULA) will therefore be submitted to the Department of Water and Sanitation (DWS) for approval.

### **Social and Economic:**

The social environment refers to the environment developed by humans as contrasted with the natural environment.

There is a huge need for housing provision in the area and both positive and negative impact will be experienced due to this development. The negative social impacts associated with the proposed development can, in most cases, be mitigated successfully.

### **Conclusion:**

There is a tremendous need for housing, better services and jobs within the Ekurhuleni Metropolitan Municipality area as well as the surrounding communities. The project team has worked with the different stakeholders, authorities and the local community to ensure that the proposed project address both the social concerns as well as the environmental concerns.

The proposed development will have a low negative and a high positive impact on the environment should all the mitigation measures proposed above be implemented. It is essential that the Environmental Management Programme be implemented during the construction and operational phases of the proposed development.

It is therefore recommended that the **preferred option be authorised by the Department of Agriculture and Rural Development**, in terms of the conditions and requirements of this report and that the township be managed in terms of the recommendations as given in this report.

A protective buffer should be maintained around the population of Red List vegetation species found within 200m of the site. It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive. The site is situated within the urban edge, surrounded by development and the vegetation of the site is transformed.

In terms of GN 509 of the National Water Act, 1998 any development within 500 meters of a wetland should follow a water use license application process for the release of stormwater from the site. A Water Use Licence Application (WULA) will therefore be submitted to the Department of Water and Sanitation (DWS) for approval.

The air quality study assigned a 'low' significance rating to potential inhalation health impacts and dustfall effects at the proposed development. The radon study findings indicate that it is unlikely that members of the public that will reside in the proposed Minnebron Ext 1 residential development area will be exposed to ionizing radiation, as a contribution from the nearby tailings storage facility.

There is a huge need for housing provision in the area and the negative social impacts associated with the proposed development can, in most cases, be mitigated successfully.

The proposed residential development is anticipated to have the following **positive social** impacts:

- The creation of employment (even limited) in an area where job opportunities are scarce and where the unemployment rates are growing, as well as the possible economic spin-offs is an important positive impact.
- The possibility of skills development for temporary and permanent employees exists.
- The provision of houses and mixed use development will reduce the housing need in the area and will provide essential services and socioeconomic opportunities.
- The upgrading of roads and services as well as the removal of waste from a formal township will reduce the environmental impacts in the area.

The proposed residential development could have the following **negative social** impacts:

- An influx of job seekers to the area cannot be excluded, with subsequent negative social impacts.
- A possible inflow of temporary workers to the area during the construction phase, as well as the intrusion impacts associated with the construction activities such as increased construction vehicle activity.
- Should the outfall sewer not be upgraded to accommodate increasing demands in the area, then there is a large risk of environmental pollution to the aquatic systems in the area as well as a health risk to neighbouring communities.
- Should roads and bulk water / sewage systems not be upgraded in the area before construction of the proposed development commence, then this could have a negative impact on the surrounding communities.

The study has shown that the proposed development has no fatal flaws in terms of the institutional, bio-physical or socio-economic environment. There would be no significant impact on the environment, which could not be mitigated by proper mitigation measures. The ensuing Environmental Management Programme (EMPr) as provided in Appendix F could mitigate most of these impacts.

**Recommendations:**

It is recommended that the **preferred option** of a **Residential Development** be approved with the following conditions:

- All the requirements and mitigation measures as described in the Environmental Management Programme (EMPr) appended in Appendix F must be adhered to.
- All the recommendations and mitigation measures as per the specialist reports must be adhered to.
- The Water Use Licence (WUL) must be approved by the DWS before construction can commence near the wetland and aquatic systems.
- It is recommended that an independent Environmental Control Officer (ECO) be appointed to ensure that the ROD and the requirements of the Environmental Management Programme are adhered to.
- The use of local labour should be maximised to ensure that the locals stand to benefit from the proposed project, but also to limit most of the anticipated social impacts associated with the construction phase of the project (e.g. conflict between locals and outsiders about employment).
- The outfall sewer and other essential bulk services as well as the roads or intersections must be upgraded before the construction phase of the proposed development commence.

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## **APPENDICES:**

**Appendix A: Locality Map**

**Appendix B: Sensitivity maps**

Annexure B1: Biodiversity Sensitivity map

Annexure B2: Layout Map overlaid with sensitivity map

**Appendix C: Facility illustration(s)**

**Appendix D: Specialist studies**

Annexure D1: Geotechnical Report

Annexure D2: Biodiversity specialist reports

Annexure D3: Wetland Report

Annexure D4: Air Quality report

Annexure D5: Radon study

Annexure D6: Cultural / Historical Report

Annexure D7: Civil Services report

Annexure D8: Floodline determination

Annexure D9: Stormwater Management plan

Annexure D10: Traffic Impact Assessment report

Annexure D11: City Planning Memorandum and Layout plan

**Appendix E: Public Participation Process**

Annexure E1: Proof of site notice

Annexure E2: Written notices issued as required

Annexure E3: Proof of newspaper advertisements

Annexure E4: Communications to and from I&APs

Annexure E5: Comments and Responses Report

Annexure E6: Copy of the register of I&APs

Annexure E7: Comments from I&APs on Draft EIA Report

**Appendix F: Draft EMPr**

**Appendix G: Details of EAP and experience**

## ABBREVIATIONS:

CCC	Customer Care Centre
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
GDARD	Gauteng Department of Agriculture and Rural Development
EBOSS	Ekurhuleni Biodiversity and Open Space Strategy
EIA	Environmental Impact Assessment
EMM	Ekurhuleni Metropolitan Municipality
EMPr	Environmental Management Programme
EMSDF	Ekurhuleni Metropolitan Spatial Development Framework
F.A.R.	Floor Area Ratio
GPDA	Gauteng Planning and Development Act, 2003
GSDF	Gauteng Spatial Develop Framework
IDP	Integrated Development Plan
MAP	Mean Annual Precipitation
NEMA	National Environmental Management Act, 1998
NEM:BA	National Environmental Management: Biodiversity Act, 2004
NEM:WA	National Environmental Management: Waste Act, 2008
NFEPA	National Freshwater Ecosystem Priority Areas
NHBRC	National Home Builders Registration Council
PET	Potential Evapotranspiration
PRASA	Passenger Rail Agency of South Africa
SAHRA	South African Heritage Resources Act, 1999
TSF	Tailings storage facility
WULA	Water Use Licence Application
WWTW	Waste Water Treatment Works

## DEFINITIONS:

**Affected environment:** Those parts of the socio-economic and biophysical environment impacted on by the development.

**Affected public:** Groups, organizations, and/or individuals who believe that an action might affect them.

**Alternative proposal:** A possible course of action, in place of another, that would meet the same purpose and need. Alternative proposals can refer to any of the following but are not necessarily limited thereto:

- alternative sites for development
- alternative projects for a particular site
- alternative site layouts
- alternative designs
- alternative processes
- alternative materials

**Anthropogenic:** Change induced by human intervention.

**Authorities:** The national, provincial or local authorities, which have a decision-making role or interest in the proposal or activity. The term includes the lead authority as well as other authorities.

**Baseline:** Conditions that currently exist. Also called “existing conditions”.

**Baseline information:** Information derived from data which:

- Records the existing elements and trends in the environment; and
- Records the characteristics of a given project proposal

**Best practical environmental option:** The option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.

**Contaminated:** The presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land, which substance or micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely.

**Cumulative impact:** In relation to an activity, means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts from similar or diverse activities or undertakings in the area.

**Development footprint:** In respect of land means any evidence of physical alteration as a result of the undertaking of any activity.

**Disposal:** Means the burial, deposit, discharge, abandoning, dumping, placing or release of any waste into or onto any land.

**Decision-maker:** The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.

**Decision-making:** The sequence of steps, actions or procedures that result in decisions, at any stage of a proposal.

**Ecology:** The study of the inter relationships between organisms and their environments.

**Environment:** All physical, chemical and biological factors and conditions that influence an object and/or organism. The surroundings within which humans exist and that are made up of –

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;

- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, cultural, historical, and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

**Environmental Assessment (EA):** The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as EIA, strategic environmental assessment, sustainability assessment and risk assessment.

**Environmental consultant / Assessment Practitioner:** Individuals or firms who act in an independent and unbiased manner to provide information for decision-making.

**Environmental Impact Assessment (EIA):** A public process, which is used to identify, predict and assess the potential environmental impacts of a proposed project on the environment. The EIA is used to inform decision-making.

**Environmental Management Programme:** A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

**Environmentally sound management:** The taking of all practicable steps to ensure that waste is managed in a manner that will protect health and the environment.

**Fatal flaw:** Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped.

**General waste:** Waste that does not pose an immediate hazard or threat to health or to the environment, and includes domestic waste, building and demolition waste, business waste and inert waste.

**Hazardous waste:** Any waste that contains organic or inorganic elements or compounds that may owing to inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health or the environment.

**Independent:** In relation to an EAP or a person compiling a specialist report or undertaking a specialised process or appointed as a member of an appeal panel, means – That such EAP or person has no business, financial, personal or other interest in the activity, application or appeal in respect of which that EAP or person is appointed in terms of these Regulations other than fair remuneration work performed in connection with that activity, application or appeal; or that there are no circumstances that may compromise the objectivity of that EAP or person in performing such work.

**Impact:** The positive or negative effects on human well-being and/or on the environment.

**Interested and affected parties (I&APs):** Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. These may include local communities, investors, business associations, trade unions, customers, consumers and environmental interest groups. The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Lead authority:** The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a

proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

**Mitigate:** The implementation of practical measures to reduce adverse impacts.

**Proponent:** Any individual, government department, authority, industry or association proposing an activity (e.g. project, programme or policy).

**Plan of study for environmental impact assessment:** A document, which forms part of a scoping report and sets out how an environmental impact assessment must be conducted.

**Role-players:** The stakeholders who play a role in the environmental decision-making process. This role is determined by the level of engagement and the objectives set at the outset of the process.

**Scoping:** The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

**Significant impact:** An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Stakeholders:** A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Stakeholder engagement:** The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision making process. The term is considered to be more appropriate than the term “public participation”.

**Study area:** Refers to the entire study area encompassing the total area as indicated on the study area map.

**Sustainability:** An attempt to provide the best social, environmental and economic outcomes for the human and natural environments both now and into the indefinite future.

**Visual impact:** Changes to the visual character of available views resulting from the development that include: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the viewshed experienced by visual receptors and intrusion of foreign elements into the viewshed of landscape features thereby detracting from the visual amenity of the area.

**Waste:** Any substance, whether or not that substance can be reduced, re-used, recycled and recovered: -

- (a) That is surplus, unwanted, rejected, discarded, abandoned or disposed of;
- (b) Which the generator has no further use of for the purpose production;



- (c) That must be treated or disposed of;
- (d) That is identified as a waste by the Minister by notice in a Gazette and includes waste generated by the mining, medical or other sector, but-
- (e) A by-product is not considered waste; and
- (f) Any portion of waste, once reused, recycled and recovered, ceases to be waste.

**Waste disposal facility:** Any site or premises used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premise.

**Waste management activity:** Any activity listed in Schedule 1 or published by notice in the Gazette under section 19 of NEM:WA, and includes –

- (g) The importation and exportation of waste;
- (h) The generation of waste, including the undertaking of any activity or process that is likely to result in the generation of waste;
- (i) The accumulation and storage of waste;
- (j) The collection and handling of waste;
- (k) The reduction, re-use, recycling and recovery of waste;
- (l) The trading of waste;
- (m) The transportation of waste;
- (n) The transfer of waste; and
- (o) The disposal of waste.

**Waste management license:** A license issued in terms of section 49 of NEM:WA.

**Waste minimisation programme:** A programme that is intended to promote the reduced generation and disposal of waste.

# 1. INTRODUCTION

Ekurhuleni Metropolitan Municipality (EMM) has appointed Galago Environmental CC: Environmental Consultants and Specialists as the independent environmental consultants to identify and assess the potential environmental impacts associated with the proposed establishment of the Minnebron x 1 Mixed Use Development through an Environmental Impact Assessment (EIA) process.

The EIA process is prescribed by Chapter 5 of the Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the 2014 Environmental Regulations (as amended) published as GN No. R. 982-984. A Scoping Assessment Process must be undertaken for activities as listed in Regulation No. R. 984 that may have a significant impact on the environment. A full public participation process forms part of the EIA and is discussed in further detail in the report.

This Draft EIA Report is for the proposed residential development and associated infrastructure situated on Portions 64 – 65, 165 and the remainder of Portion 3 of the farm Witpoortje 117 IR. The site is ±301ha in extent and situated in the Central East Rand.

The aim of the project is to fast-track formal housing delivery in order to relieve Ekurhuleni's current housing backlog that is estimated to be in the region of 200 000 units and is still growing.

## 1.1 Project location

The study site is situated in the south-central part of Ekurhuleni within the Brakpan Customer Care Area, 1.5km south of the N17/R23 intersection.

The site is excellently located in terms of sub-regional and regional links. Heidelberg Road (R23), which forms its western boundary, is a major north-south arterial route through Ekurhuleni, linking the N12, N17 and N3 freeways which provide access to the eastern seaboard. The R23/N17 interchange is only 1.5km north of the site. Elsburg Road (R554), runs east-west with the Far East Rand industrial areas and Springs CBD to the East (Figure 1).

As far as its sub-regional context is concerned, the site is relatively close to the Carnival Mall node which is one of the fastest growing nodes in Ekurhuleni, and it is also close to a number of regional arterial routes and the N17 freeway which will provide connections to the wider surrounding area.

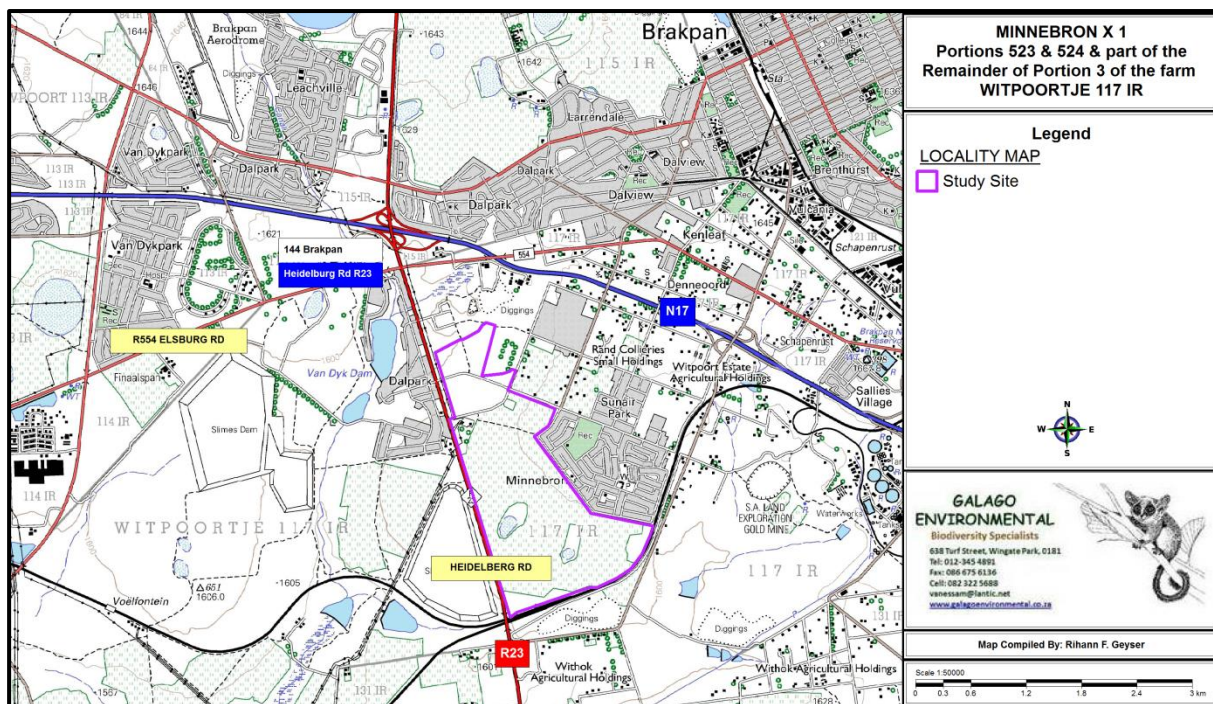


Figure 1: Locality map of the study area

The 1:50 000 map indicating the study site together with all the requirements for a map is included as Appendix A.

## 1.2 Project description

The proposed development will be a major development in the Central East Rand, comprising more than 10 000 housing units and a range of community facilities and amenities. The aim is to develop an integrated and sustainable township catering for communities over the entire socio-economic spectrum and offering a wide range of lifestyle options within an environment which is conducive to social interaction, playing, learning and working.

**High density** residential stands are proposed along the major roads and in the areas abutting the proposed parks and within the Transport Oriented Development (T.O.D.) node adjacent to the future station. Two storey to four walk-up units will be built on these erven at densities of between 100 to 120 units per ha. Rental units, affordable walk-up units, Gap units (affordable housing) and Government subsidized walk-up units can be built on these stands.

A total of 60 erven with “Residential 4” zoning are proposed, a total of 6384 units if a density of 100 units per ha is applied for an area of 63.84 ha.

A total of 3772 **Medium density** residential erven for free standing and semi-detached housing are proposed throughout the township, of approximately 150m<sup>2</sup> and larger erven of 240m<sup>2</sup> are proposed in the northern part of the township abutting Sonneveld.

A total of 65 row housing erven of approximately 80m<sup>2</sup> are proposed along Van Dyk Road, east of the substation.

A total of 8 erven with a total area of 7.58 ha is proposed for “**Business 2 zoning**”.

Two **combined schools** and four **Primary school sites** are provided in the proposed development and a total of seven erven for local community facilities such as crèches and churches as well as two Social Services erven.

A total of 40 “**Public Open Space**” erven are proposed throughout the township, including local play parks, stormwater detention dams, mining shaft buffer zones and the wetlands and their buffers.

**Access and Street system:** A total of 4 access points from Provincial Route K109 abutting the township on the west are proposed. Four east-west collector roads would run through the township, linking it to the areas to the west and the east for mobility. Two north-south collector roads are proposed, namely the extension of West street in Sonneveld north of the township right through it to the future station on its southern edge, and the extension of Vincent van Gogh Street in Van Eck Park industrial area southwards through the township, running roughly parallel to K109.

With the exception of the collector roads and certain wider road reserves adjacent to the school sites and in the T.O.D. node close to the station, internal streets in the township will consist of a hierarchical system of 16.13 and 10m wide streets. Street blocks were designed to maximize northern exposure and reduce east-west exposure where possible.

### **1.2.1 Civil and electrical Infrastructure**

A Civil services report is included in Appendix D: Annexure D7 and a Stormwater management plan is included in Appendix D: Annexure D9 of this report.

#### **Water:**

The proposed development will require approximately 222.55 l/s of clean **water**. Water in this area comes from the existing 600mm Rand Water line that connects the Brakpan reservoir with the Klipriviersberg reservoir system. The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will have to be constructed.

#### **Sewage:**

The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded. It is expected that the proposed development will ultimately be served by the Waterfall WWTP, with a current capacity of 170 ML/d which has to be upgraded by ERWAT.

#### **Stormwater:**

The study site falls within 3 catchments and new stormwater infrastructure would have to be installed to service the proposed development. There are numerous ways in which attenuation can be achieved and below are some examples. On site attenuation will be utilized as well as using all public open spaces. All areas above the environmental buffer zones will also be used for attenuation. The following will be included as part of the stormwater management on site:

- Attenuation Pond

- Permeable Paving
- Soak Away Pits
- Parking Area Low Points
- Rainwater Harvesters

The above-mentioned methods will be used in conjunction with each other to reach the required attenuation volume (see Appendix D: Annexure D9).

#### **Electricity:**

The proposed development may be supplied with electricity from the Van Eck substation situated on the site. The existing capacity of the substation is however inadequate and the planned upgrading of the existing transformers to 160MVA capacity will be required. The planned Helderwyk/Leeuwpoort 88kV substation will also become relevant for other developments in the vicinity.

#### **Solid Waste:**

The proposed development will produce approximately 784 m<sup>3</sup> of solid waste per week. Waste will be removed by Ekurhuleni Metropolitan Municipality on a weekly basis.

#### **Access and Street System:**

A total of 4 access points from Provincial Route K109 abutting the township on the west are proposed. Four east-west collector roads run through the township, linking it to the areas to the west and the east for mobility. Two north-south collector roads are proposed, namely the extension of West Street in Sonneveld north of the township right through it to the future station on its southern edge, and the extension of Vincent van Gogh Street in Van Eck Park industrial area southwards through the township, running roughly parallel to K109.

With the exception of the collector roads and certain wider road reserves adjacent to the school sites and in the T.O.D. node close to the station, internal streets in the township will consist of a hierarchical system of 16, 13 and 10m wide streets.

## **1.3 Statutory and Institutional procedure**

### **1.3.1 National context**

The following legislature is closely linked to the Environment in the National context and will be discussed in more detail in the following table (Table 1).

### **1.3.2 Constitution of Southern Africa Act, 1996 (Act No. 108 of 1996)**

The Constitution of South Africa provides the legal foundation for the republic and sets out the rights and duties of its citizens and defines the structure of the government. In terms of Section 24 of the Constitution every person has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected through reasonable legislative measures.

### **1.3.3 National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014**

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

Other legislative procedures that have been considered or need to be taken into account for the proposed project are the following:

- The National Water Act, 1998 (Act No. 36 of 1998);
- The National Water Act, 1998 (Act No. 36 of 1998), General Notice 509 - development within 500 meters of a wetland;
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
- Gauteng Planning and Development Act, 2003 (Act No. 3 of 2003) (GPDA);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- The Gauteng Draft Red Data Policy;
- The Gauteng Ridges Policy, 2019;
- GDARD Conservation Plan, Version 3.3;
- GDARD minimum requirements for Biodiversity Assessments (Version 3, 2014);
- Gauteng Agricultural Hubs Policy;
- Gauteng Transport Infrastructure Act, 2001 (Act No. 8 of 2001) - Section 7;
- Ekurhuleni Metropolitan Municipality Spatial Development Framework (MSDF) and Integrated Development Plan (IDP)
- EMM Biodiversity and Open Space Strategy (EBOSS), May 2014
- Section 108 of the Town Planning and Townships Ordinance, 1986 (Ord. 15 of 1986);
- The Municipal Systems Act, 2000 (Act No. 32 of 2000) and the Integrated Development Plans (IDP);
- National Environment Management Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Environment Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998);
- National Heritage Recourses Act, 1999 (Act No. 25 of 1999);
- World Heritage Convention Act, 1999 (Act No. 49 of 1999);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983); and
- Land Use Planning Ordinance 15 of 1985 and the planning ordinances depending on the province in South Africa where construction will take place

**Table 1: National legislation and responses to this legislature in terms of the proposed development**

LEGISLATURE	RESPONSE
<b>National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations</b>	
<p>NEMA aims to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith.</p> <p>The Act recognises that many inhabitants of South Africa live in an environment that is harmful to their health and well-being and focuses on the following:</p>	<p>NEMA principles are to be adhered to, with specific reference to development that promotes integrated environmental management, while being socially, environmentally and economically sustainable.</p> <p>The proposed development layout must reflect NEMA principles, such as protection of the environment for present and future generations by preventing pollution and ecological degradation, promoting conservation and securing ecologically sustainable development and utilisation of natural resources.</p>
<p><i>Everyone has the right to an environment that is not harmful to his or her health or well-being</i></p>	<p>Please refer to the <b>EMPr (Appendix F)</b> which discusses health and safety issues during the construction phase.</p>
<p><i>The State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities</i></p>	<p>This proposed development will provide housing as well as employment opportunities (construction and operational phase) for previously disadvantaged communities.</p>
<p><i>Inequality in the distribution of wealth and resources, and the resultant poverty, are among the important causes as well as the results of environmentally harmful practices;</i></p>	<p>The proposed development will result in additional employment opportunities for the local community. The increased tax base will benefit the Ekurhuleni Metropolitan Municipality, in turn enabling EMM to provide infrastructure in areas that need it.</p>
<p><i>Sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations</i></p>	<p>Social and environmental aspects are taken into consideration during the environmental impact assessment process, along with appropriate market feasibility research, to ensure that the project is viable and sustainable.</p> <p>The site abuts an existing residential area. The northern part of the site is earmarked for light industrial/commercial development. The rest of the site is proposed as residential development including a variety of housing typologies at different densities. School sites linked to main transportation routes and open space systems were incorporated into the proposed development.</p> <p>The current zoning for the southern portion of the site is "Agriculture" and "Residential 1" for the northern portion. However, the site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) and for urban development in the draft Ekurhuleni Region BSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p>
<p><i>Everyone has the right to have the environment</i></p>	<p>The proposed development plan ensures that areas of</p>

LEGISLATURE	RESPONSE
<p><i>protected, for the benefit of present and future generations through reasonable legislative and other measures that:</i></p> <ul style="list-style-type: none"> <li>• <i>prevent pollution and ecological degradation</i></li> <li>• <i>promote conservation</i></li> <li>• <i>secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development</i></li> </ul>	<p>cultural and ecological value are maintained.</p> <p>Also, please refer to the <b>EMPr (Appendix F)</b> which thoroughly discusses aspects that are related to ecological preservation, conservation and sustainable development.</p>
<p><i>The environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must co-operate with, consult and support one another</i></p>	<p>Applicable national, provincial and municipal legislation is taken into account and aligned during the environmental impact assessment process</p>
<p>Furthermore, this act develops a framework for integrating good environmental management into all development activities, while establishing principles guiding the exercise of functions affecting the environment.</p> <p>Integrated Environmental Management (IEM) is designed to ensure that the environmental consequences of development proposals are understood and adequately considered in the planning, implementation and management of all developments. It is intended to guide, rather than impede the development process by providing an approach to gathering and analysing information, and ensuring that it can be easily understood by all interested and affected parties in the development. The purpose of IEM is to resolve or lessen any negative environmental impacts and to enhance positive aspects of development proposals.</p>	<p>A thorough impact assessment process has been undertaken – derived from:</p> <ul style="list-style-type: none"> <li>• <i>Public Participation</i></li> <li>• <i>Specialist studies</i></li> <li>• <i>Map assessments</i></li> <li>• <i>Institutional and legal assessment</i></li> </ul> <p>This process allows for adequate planning and mitigation.</p>
<p><b>The National Water Act, 1998 (Act No. 36 of 1998)</b></p>	
<p>The National Water Act:</p> <ul style="list-style-type: none"> <li>• <i>Recognizes that water is a scarce and unevenly distributed national resource which occurs in many different forms which are all part of a unitary, inter-dependent cycle</i></li> <li>• <i>Recognizes that while water is a natural resource that belongs to all people, the discriminatory laws and practices of the past have prevented equal access to water, and use of water resources</i></li> <li>• <i>Acknowledges the National Government's overall responsibility for and authority over the nation's water resources and their use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters</i></li> <li>• <i>Recognizes that the ultimate aim of water resource management is to achieve the sustainable use of</i></li> </ul>	<p>A Water Use Licence Application will be lodged with the Department of Water and Sanitation (DWS) to ensure that the stormwater released from the site will not impact on the wetlands on site.</p> <p>The Act requires that (where applicable) the 1:50 and 1:100 year flood line be indicated on all the development drawings that are being submitted for approval.</p> <p>Please also refer to the <b>Stormwater Management plan in Appendix D: Annexure D9.</b></p>



LEGISLATURE	RESPONSE
<p><i>water for the benefit of all users</i></p> <ul style="list-style-type: none"> <li>• <i>Recognizes that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users</i></li> <li>• <i>Recognizes the need for the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate</i></li> </ul>	
<b>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</b>	
<p>The National Environmental Management: Biodiversity Act aims to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act1, 1998; including the –</p> <ul style="list-style-type: none"> <li>• <i>Protection of species and ecosystems that warrant national protection</i></li> <li>• <i>The sustainable use of indigenous biological resources</i></li> <li>• <i>The fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources</i></li> <li>• <i>The establishment and functioning of a South African National Biodiversity Institute; and for matters connected therewith</i></li> </ul>	<p>An ecological specialist team was appointed to undertake the flora and general fauna biodiversity assessment, with specific attention to Red Listed plant and animal species, habitats and biodiversity. The specialist studies (<b>Appendix D: Annexure D2</b>) are aligned to the requirements of this Act as well as the requirements for Biodiversity Assessments compiled by GDARD.</p> <p>The proposed development aligns to the purpose of this Act and the above-mentioned specialist reports, conserving areas of high sensitivity for red listed species, endemic species and sensitive habitats.</p> <p>Mucina &amp; Rutherford (2006) classified the area as Tsakane Clay Grassland, a short, dense grassland on flat to slightly undulating plains and low hills. In general this vegetation type is considered to be Endangered. The flora study found that the <i>Eragrostis – Cynodon</i> grassland and the <i>Imperata – Eragrostis</i> grassland study units are secondary grassland and not considered sensitive, no wetland were found in the <i>Imperata – Eragrostis</i> grassland. The <i>Elephantorrhiza – Ledebouria</i> veld, the Mixed alien and indigenous vegetation and the Slimes dam vegetation study units are not deemed sensitive.</p> <p>The flora study found that the Wetland vegetation and the Pan vegetation are considered sensitive. The Mixed alien and indigenous vegetation and the Cultivated fields study units are not deemed sensitive. No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species.</p> <p>It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is</p>

LEGISLATURE	RESPONSE
	<p>therefore not deemed sensitive.</p> <p>Please refer to <b>Appendix D: Annexure D2 – Biodiversity specialist studies</b> for additional information.</p>
<p>Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.</p> <p>One of the objectives of the act as indicated is the control of weeds and invaders plants. The weeds and invader plants have been categorised:</p> <ul style="list-style-type: none"> <li>• <i>Category 1a: Invasive species which must be combatted and eradicated. Any form of trade or planting is strictly prohibited.</i></li> <li>• <i>Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form of trade or planting is strictly prohibited.</i></li> <li>• <i>Category 2: Invasive species, or species deemed to be potentially invasive, in that a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees. Plants in riparian areas are Category 1b.</i></li> <li>• <i>Category 3: Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is however prohibited. Plants in riparian areas are Category 1b.</i></li> </ul>	<p>A Flora specialist study was commissioned for the study site and list all category 1, 2 and 3 weeds and alien invasive plants. Mitigation measures for the management of these species are included in this report.</p> <p>Please refer to <b>Appendix D: Annexure D2 – Biodiversity specialist studies</b> for additional information.</p>
<b>The South African Heritage Resources Act, 1999 (Act No. 25 of 1999) (SAHRA)</b>	
<p>The SAHRA focuses on the following, that have reference to the development of land:</p> <ul style="list-style-type: none"> <li>• <i>To introduce an integrated and interactive system for the management of the national heritage resources</i></li> <li>• <i>To promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations</i></li> <li>• <i>To lay down general principles for governing heritage resources management throughout the Republic</i></li> <li>• <i>To introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa</i></li> <li>• <i>To establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level</i></li> </ul>	<p>The proposed development should respond to the requirements of the National Heritage Resources Act as well as that of the South African Heritage Resources Agency.</p> <p>Section 38 of the SAHRA makes provision for application by developers for permits before any heritage resources may be damaged or destroyed.</p> <p>A specialist in the field was appointed to conduct a Cultural Heritage Resources Impact Assessment (<b>Appendix D: Annexure D6</b>). SAHRA's comments on this study are also attached in <b>Appendix E: Annexure E7</b>.</p> <p>No sites of heritage significance were identified within the proposed study area, however cognisance of the stone walled ruins outside of the development area should be taken to ensure that it will not be damaged during the construction phase.</p> <p>In the event that artefacts / graves / areas of cultural significance are discovered during the construction</p>

LEGISLATURE	RESPONSE
<ul style="list-style-type: none"> <li>• <i>To set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance</i></li> <li>• <i>To provide for the protection and management of conservation-worthy places and areas by local authorities; and to provide for matters connected therewith</i></li> </ul>	<p>phase, all work should be halted and a cultural heritage practitioner should be appointed to examine the site and make appropriate recommendations.</p> <p>Please refer to <b>Appendix D: Annexure D6 – Cultural/Historical specialist study</b> for additional information.</p>
<p>This legislation aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations. It recognises that our heritage is unique and precious and it cannot be renewed as it –</p> <ul style="list-style-type: none"> <li>• <i>Helps us to define our cultural identity and therefore lies at the heart of our spiritual well-being and has the power to build our nation</i></li> <li>• <i>Has the potential to affirm our diverse cultures, and in so doing shape our national character</i></li> <li>• <i>Celebrates our achievements and contributes to redressing past inequities</i></li> <li>• <i>Educates and deepens our understanding of society and encourages us to empathise with the experience of others</i></li> <li>• <i>Facilitates healing and material and symbolic restitution and it promotes new and previously neglected research into our rich oral traditions and customs.</i></li> </ul>	<p>The importance of cultural heritage and its related preservation is discussed within the Cultural/Historical specialist study (<b>Annexure D6</b>) and EMPr (<b>Appendix F</b>).</p> <p>The EMPr (<b>Appendix F</b>) places focus on the education of people regarding places of heritage value and artefacts, should they come across them during their work activities.</p>
<b>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)</b>	
<p>The Conservation of Agricultural Resources Act (Act 43 of 1983) – (CARA) is an act which provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation.</p>	<p>The site falls outside the agricultural hubs as identified per Gauteng Agricultural Potential Atlas.</p>

### 1.1.1. Provincial context

The following legislature/policies are closely linked to the Environment in the Provincial context and will be discussed in more detail in the following table (Table 2):

**Table 2: Provincial context and responses to this legislature in terms of the proposed development**

DOCUMENT	RESPONSE
<b>Gauteng Planning and Development Act, 2003 (Act No. 3 of 2003) (GPDA)</b>	
The GPDA states that Policy, administrative practice and law in the Province shall promote development and land use which:	
<i>Promotes the more compact development of urban areas and the limitation of urban sprawl and the protection of agricultural resources;</i>	The principle of compacting the city structure, by the optimised use of scarce infrastructure (engineering services, roads, etc.) forms an important part of the principles in the Development Facilitation Act, 1995.  Since the site is surrounded by industries, informal settlements, residential areas and roads, this development can therefore also be seen as compacting.
<i>Supports the correction of historically distorted spatial patterns of settlement in Gauteng;</i>	To be addressed as far as possible with regard to the provision of job opportunities and housing.
<i>Promotes integrated land development in rural and urban areas in support of each other;</i>	This proposal forms part of a greater planning framework for the area and integration is ensured via appropriate service and infrastructure provision, the provision of linking transport corridors and the continuity of ecological corridors.
<i>Results in the use and development of land that optimises the use of existing resources such as engineering services and social facilities; and</i>	Existing bulk services are to be utilised as far as possible with appropriate upgrades where necessary.
<i>Owns positive development qualities, particularly with regard to public environments.</i>	The urban design framework and planning methodologies cater for inclusive design at a pedestrian scale, incorporating public open spaces and positive streetscapes.
<i>Policy, administrative practice and law in the Province shall with due regard to the principles of the National Environmental Management Act, 1998 (Act 107 of 1998) promote sustainable development that:</i>  <ul style="list-style-type: none"> <li>• <i>Is within the fiscal, institutional and administrative means of the Province</i></li> <li>• <i>Meets the basic needs of all citizens in an affordable way</i></li> <li>• <i>Establishes viable communities with convenient access to economic opportunities, infrastructure and social services</i></li> <li>• <i>Optimises the balanced use of existing resources, including resources relating to agriculture, land,</i></li> </ul>	Sustainable principles are to be incorporated as far as possible within the planning, design, construction and operational phases therefore ensuring an appropriate balance between social, economic and environmental contexts.  The environmental impact assessment process ensures that sound land development practices are implemented, creating a balance between environmental, social and economic requirements.

DOCUMENT	RESPONSE
<p><i>water, minerals, services infrastructure, transportation and social facilities</i></p> <ul style="list-style-type: none"> <li><i>Balances environmental considerations of preserving natural resources for future generations with economic development practices and processes</i></li> <li><i>Ensures the safe utilisation of land by taking into consideration its biophysical factors such as geology and undermined or hazardous areas</i></li> </ul>	
<b>The Gauteng Draft Red Data Policy</b>	
<p>The primary purpose of the Draft Red Data Policy is to protect red data plant species in Gauteng Province. The Red Data plant policy is based on the following basic principles:</p> <ul style="list-style-type: none"> <li><i>Species endemic to the province of Gauteng must be afforded the utmost protection, as they occur nowhere else in the world. As the relevant provincial agency, this Department's responsibility towards Gauteng endemics is absolute;</i></li> <li><i>Conservation of only one population essentially ignores the lowest level of biodiversity that is genetic diversity. It is therefore imperative that all populations of Red Data plant species are protected;</i></li> <li><i>In situ conservation is preferable to ex situ conservation. Removing a population from its natural habitat and placing it under artificial conditions results in the erosion of the inherent genetic diversity and characteristics of that species;</i></li> <li><i>In order to ensure the persistence of a population, it is imperative that the ecological processes maintaining that population persist;</i></li> <li><i>In order to ensure the persistence of a plant population, it is vital that pollinators are conserved. To conserve pollinators, the habitat must be managed to provide appropriate nest sites for pollinators and a seasonal succession of suitable forage and host plants. Pollinators must be protected from herbicide and pesticide application and soil disturbance must be prevented;</i></li> <li><i>Translocation of Red Data species is an unacceptable conservation measure since the translocated species may have undesirable ecological effects;</i></li> <li><i>Rural parts of the province should be protected from insensitive developments and urban sprawl/encroachment should be discouraged. Policy guiding developments should therefore be</i></li> </ul>	<p>Biodiversity specialists were appointed to assess the proposed development site in terms of fauna and flora biodiversity, with specific attention to Red Listed species.</p> <p>Mucina &amp; Rutherford (2006) classified the area as Tsakane Clay Grassland, a short, dense grassland on flat to slightly undulating plains and low hills. In general this vegetation type is considered to be Endangered. The flora study found that the <i>Eragrostis – Cynodon</i> grassland and the <i>Imperata – Eragrostis</i> grassland study units are secondary grassland and not considered sensitive, no wetlands were found in the <i>Imperata – Eragrostis</i> grassland. The <i>Elephantorrhiza – Ledebouria</i> veld, the Mixed alien and indigenous vegetation and the Slimes dam vegetation study units are not deemed sensitive.</p> <p>No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species.</p> <p>It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive. Please refer to <b>Appendix D2</b>.</p>

DOCUMENT	RESPONSE
<p><i>less lenient in rural areas;</i></p> <ul style="list-style-type: none"> <li>• <i>Red Data plant species historically recorded on a site, but not located during searches within species flowering seasons may be dormant (as a seed bank or subterranean structures such as bulbs/tubers/etc.) due to unfavourable environmental conditions;</i></li> <li>• <i>Suitable habitat adjacent to known populations of Red Data plant species has a high probability of being colonized;</i></li> <li>• <i>In order to protect a plant population that occurs in a fragmented landscape from edge effects, it is necessary to protect it with a buffer zone that extends from the edge of the population; and</i></li> <li>• <i>The transformation of natural vegetation to crops is considered as permanent as urbanization and may cause the extinction of Red Data plant populations and their pollinators.</i></li> </ul>	
<b>The Gauteng Ridges Policy, 2019</b>	
<p>The quartzite ridges of Gauteng are one of the most important natural assets in the northern provinces of South Africa. This is because these ridges, and the area immediately surrounding the ridges, provide habitat for a wide variety of fauna and flora, some of which are Red List, rare or endemic species or, in the case of certain of the plant species, are found nowhere else in South Africa or the world. The ridges also fulfil functions that are necessary for the sustainability of ecosystems such as the recharging of groundwater, wetlands and rivers, wildlife dispersal and providing essential habitat for pollinators. Ridges also have a socio-cultural role in that they provide aesthetically pleasing environments that are valued by residents, tourists and recreational users. Human activities such as urbanization, mining and the planting of alien vegetation may undermine the contribution that ridges make to the environment.</p> <p>The conservation of ridges falls within the ambit of the environmental right and this policy comprises one of the measures that GDARD has taken to give effect to the environmental right in respect of ridges, therefore ensuring that:</p> <ul style="list-style-type: none"> <li>• <i>The use of ridges is sustainable;</i></li> <li>• <i>Members of the public are able to make informed decisions regarding proposals for development on ridges and the use of ridges;</i></li> <li>• <i>Officials make consistent decisions in respect of planning and environmental applications that involve negative impacts on ridges; and</i></li> <li>• <i>The Department's responsibility in respect of the protection of the environment is carried out in an</i></li> </ul>	<p>The study site is relatively flat with no ridge present on the site or surroundings.</p>

DOCUMENT	RESPONSE
<i>efficient and considered manner.</i>	
<b>GDARD Conservation Plan, Version 3.3</b>	
<p>A comprehensive Provincial Conservation Plan (C-Plan) was launched as a decision support tool in September 2005 to protect the province's ecosystems and associated biodiversity and to act as an information tool for the conservation of sensitive areas. The C-Plan was an outcome of the Gauteng Biodiversity Gap Analysis Project (BGAP).</p> <p>The C-Plan system maps important biodiversity areas in Gauteng and provides information to protect important and sensitive areas within the province. This information is used by government as a decision-making tool with regard to EIA approvals.</p> <p>The second version (C-Plan version 2) indicated that 25 percent of Gauteng needs to be conserved to meet the Province's biodiversity targets. The C-Plan includes protected areas, irreplaceable and important sites due to the presence of Red Data species, endemic species and potential habitat for these species to occur.</p> <p>At this stage the current version of C-plan is version 3.3</p>	<p>According to the Gauteng Conservation Plan (C-Plan 3.3) a depression pan in the center of the site and the seepage and unchannelled valley bottom in the northern corner of the site is a Critical Biodiversity area with one depression pan on site considered an Ecological Support area.</p> <p>However it was confirmed during the specialist Biodiversity studies that the vegetation of the site is either severely disturbed or in places even transformed. The site is not considered sensitive, except for the wetland areas. Please refer to <b>Appendix D: Annexure D2 – Vegetation Assessment</b></p>
<b>Gauteng Agricultural Hubs Policy</b>	
<p>The Department view land with a high agricultural potential as a scarce, non-renewable resource and accordingly applies a risk averse and cautious approach when development of such land for purposes other than agricultural production is proposed. This risk averse and cautious approach should be the basis of decision-making on the transformation of high potential agricultural land and land deemed as irreplaceable in terms of meeting Agri-BBBEE and national food security targets and thus legally protected from transformation.</p> <p>Each of the hubs will be developed to align with its agricultural potential and preferred land use and will be supported by current economic indicators.</p> <p>As such, the land that has been identified as having a high agricultural potential, but also including the moderate and low agricultural potential land within a demarcated Agricultural Hub will be evaluated and reviewed should a change of land use (other than agriculture) be proposed within the hub. This is to ensure that land use within a demarcated Agricultural hub is compatible with the strategic objectives of the specific hub.</p> <p>Therefore, should a change of land use be proposed within an identified and classified Agricultural hub a complete agricultural potential specialist study must be undertaken for the site.</p>	<p><b>Note: The Gauteng Agricultural Hubs Policy is a draft document which has not been proclaimed.</b></p> <p>According to this policy the site is not situated within any agricultural hub (GAPA IV)).</p> <p>The agricultural potential of the property is low, and the site falls outside all the agricultural hubs.</p> <p>It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive.</p>

DOCUMENT	RESPONSE
<b>Protection of Agricultural Land in Gauteng Revised Policy (June 2006)</b>	
<p>The purpose of this policy is to protect land that has been identified as high agricultural potential from development, for the exclusive use of agricultural production to:</p> <ul style="list-style-type: none"> <li>• <i>Feed the nation;</i></li> <li>• <i>Provide upcoming farmers with access to productive land; and</i></li> <li>• <i>Meet national targets set in this regard.</i></li> </ul> <p>Land with high agricultural potential is a scarce non-renewable resource and the need to protect it is a high priority for GDARD. GDARD applies a risk averse and cautious approach when development of such land for purposes other than agricultural production is proposed. The risk averse and cautious approach should be the basis of decision-making on the transformation of high potential agricultural land and land deemed as irreplaceable in terms of meeting Agri-BBBEE and national food security targets and thus legally protected from transformation.</p> <p>GDARD is not in support of development on high potential agricultural land that resides outside the urban edge. Seven agricultural hubs have been identified in the Gauteng Province. All the hubs are located outside the urban edge. The hubs are regarded as areas with a large amount of high agricultural potential land that should be preserved for agricultural use and will accordingly be planned and managed as a holistic agricultural unit. Each of the hubs will be developed to align with its agricultural potential and preferred land use and will be supported by current economic indicators.</p>	<p>The proposed development site, according to the Gauteng Agricultural Potential Atlas (GAPA Version 4), is situated within a region that is not categorised as an Agricultural hub.</p>
<b>Gauteng Spatial Development Framework (GSDF)</b>	
<p>The GSDF seeks sound provincial development. The development framework is focussed on achieving development by implementing spatial planning principles and improving urban form.</p>	
<p>The GSDF based the Province's future development on five critical factors, which are resource based economic development, contained urban growth, re-direction of urban growth, rural development beyond the urban edge and mobility and accessibility. The critical factors include:</p> <ul style="list-style-type: none"> <li>• <i>Resource-based economic development</i></li> <li>• <i>Contained urban growth: Sprawl and unnecessary urban expansion are widely discouraged, owing to direct and indirect costs to government and distortion of the urban form. To contain unwanted growth, a provincial urban edge has been</i></li> </ul>	<ul style="list-style-type: none"> <li>• The proposed residential development as indicated would fall within the urban edge for EMM.</li> <li>• A Traffic Impact Assessment (TIA) was conducted for the proposed development to determine the impact of the development on the local network and recommendations were made on the need to upgrade or improve public transport routes or major access routes to the site. The proposed development plan would also take cognizance of public transport and transportation nodes planned for the area and honour such servitudes to</li> </ul>



DOCUMENT	RESPONSE
<p><i>delineated, which aims to compact the city, improve the utilization of resources, preserve the rural environment and give structure and form to the city.</i></p> <ul style="list-style-type: none"> <li>• <i>Re-direction of urban growth</i></li> <li>• <i>Rural development beyond the edge: Rural development is to be protected by the urban edge, thereby creating distinctive urban and rural areas. Mobility and accessibility: The GSDF indicates that people in Gauteng will always be reliant on a high level of mobility and accessibility because of the presently dispersed settlement pattern and a culture of private transport. Mobility must be enhanced to improve the movement of people, goods and services, both for public and private transport.</i></li> </ul>	<p>enhance mobility and accessibility to the area for potential residents (<b>See Annexure D10 for the Traffic impact assessment report</b>).</p>
<b>Gauteng Environmental Management Framework (GEMF)</b>	
<p>The EMF is one of a range of tools provided for in the Biodiversity Act that can be used to facilitate biodiversity conservation in priority areas outside the protected area network. The purpose of a EMF is to inform land-use planning, environmental assessments and impacts of decisions on biodiversity.</p> <p>The objectives of the EMF are to support integrated development planning and sustainable development by identifying an efficient set of Critical Biodiversity Areas that are required to meet biodiversity objectives.</p> <p>The EMF, in terms of the Environmental Impact Assessment Regulations, 2010, must be taken into account in the consideration of applications for environmental authorisation.</p> <p>Five environmental constraint zones were identified within the GEMF. The environmental constraint factors would be taken into consideration and assessed in the EIA study. These constraint zones include:</p> <ul style="list-style-type: none"> <li>• <i>Zone 1: Urban Development zone;</i></li> <li>• <i>Zone 2: High control zone (inside the urban development zone);</i></li> <li>• <i>Zone 3: High control zone (outside the urban development zone);</i></li> <li>• <i>Zone 4: Normal control zone; and</i></li> <li>• <i>Zone 5: Industrial and Commercial Focus Zone.</i></li> </ul>	<p>According to the Gauteng Environmental Management Framework (GEMF) from GDARD the study site consist of <b>Zone 1</b>, except for the wetlands on site that fall in <b>Zone 2</b>. Although activities in Zone 1 may have been exempted from the full EIA process, the Zone 2 areas on site require a full EIA process.</p> <ul style="list-style-type: none"> <li>• The intention with <b>Zone 1</b> is to streamline urban development activities in it and to promote development infill, densification and concentration of urban development within the urban development zones as defined in the Gauteng Spatial Development Framework (GSDF), in order to establish a more effective and efficient city region that will minimise urban sprawl into rural areas.</li> <li>• The intention with Zone 2 is to conserve sensitive areas within the urban development zone and where linear development (roads etc.) cannot avoid these areas, a proper assessment and implementation of alternatives must be undertaken.</li> </ul>

### 1.1.2. Local context: Planning frameworks / Strategies / Guidelines

The following legislature/policies are closely linked to the Environment in the Local context and will be discussed in more detail in the following table (Table 3):

**Table 3: Local context and responses to this legislature in terms of the proposed development**

DOCUMENT	RESPONSE
<b>EMM Environmental Management Framework</b>	
<p>The EMF, in terms of the Environmental Impact Assessment Regulations, 2010, must be taken into account in the consideration of applications for environmental authorisation.</p> <p>Five environmental constraint zones were identified within the EMM. The environmental constraint factors would be taken into consideration and assessed in the EIA study. These constraints include:</p> <ul style="list-style-type: none"> <li>• <i>Low to no constraint zone;</i></li> <li>• <i>Agricultural constraint zone;</i></li> <li>• <i>Geotechnical constraint zone;</i></li> <li>• <i>Hydrological constraint zone; and</i></li> <li>• <i>Ecological constraint zone</i></li> </ul>	<p><i>According to the Environmental Parameters for Development as set out in the EMF the site is located in an area with <b>Ecological, Hydrological and Geological Development Constraint Zones.</b></i></p> <p>According to the Gauteng Environmental Management Framework (GEMF) from GDARD the study site consist of Zone 1, except for the wetlands on site that fall in Zone 2. Although activities in Zone 1 may have been exempted from the full EIA process, the Zone 2 areas on site require a full EIA process.</p> <p>No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species.</p> <p>It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive.</p> <p><u>Geographical Areas:</u> C-Plan 3, depression pans, seepage and unchannelled valley bottom wetlands.</p> <p><u>Environmental Sensitivity:</u> Medium to high due to wetlands and wet grasslands occurring to the east of the proposed development.</p>
<b>EMM Biodiversity and Open Space Strategy (EBOSS), 2014</b>	
<p>The objectives of EBOSS are to:</p> <ul style="list-style-type: none"> <li>• <i>Meet the open space needs of the population of Ekurhuleni in a way that will ensure adequate access to a variety of types of open spaces in Ekurhuleni that will fulfil the physical and psychological needs of the community;</i></li> <li>• <i>meet the national biodiversity targets for vegetation types in the area in an appropriate</i></li> </ul>	<p>A total of 40 “Public Open Space” erven are proposed throughout the township, including local play parks, stormwater detention dams, and the buffer area and 100 year floodline of the wetlands. The major part of the open space system consists of the wetlands and buffers.</p> <p>It is proposed that these erven be zoned for “Public open Space” purposes as per the Ekurhuleni Town</p>

DOCUMENT	RESPONSE
<p><i>manner that focuses on attainable priorities;</i></p> <ul style="list-style-type: none"> <li>• <i>consider and integrate the conservation plan needs of the province in a practical way;</i></li> <li>• <i>consider and take land needed for development into account in an objective and equitable manner;</i></li> <li>• <i>contribute as an integrated element in the proper functioning of Ekurhuleni as a city;</i></li> <li>• <i>set implementation targets in a manner that is realistic, affordable and achievable; and</i></li> <li>• <i>provide objective implementation performance measures that will accurately indicate performance and ensure accountability of officials.</i></li> </ul> <p>The purpose of the policy is to:</p> <ul style="list-style-type: none"> <li>• <i>Ensure that the biodiversity conservation priorities of EMM and GDARD are aligned to protect and conserve biodiversity;</i></li> <li>• <i>promote biodiversity;</i></li> <li>• <i>recognise biodiversity as an essential natural resource;</i></li> <li>• <i>increase the area under formal protection; and</i></li> <li>• <i>ensure the substantial management of this resource.</i></li> </ul>	<p>Planning Scheme, 2014, subject to the standard development restrictions.</p>
<p>In Ekurhuleni, because of its topographical nature, extent and position on the continental divide, the hydrological system provides a strong and distinct natural backbone to open space. Due to the importance of the hydrological systems in terms of both biological and hydrological functioning of the area, it must remain intact and no further development (with the exception of linear infrastructure that has to cross these areas) will be allowed in these areas.</p> <p>The natural open space system represented in this strategy includes highly stressed and sensitive natural environments such as wetlands, rivers/streams and remnant patches of representative indigenous fauna and flora that are necessary to maintain bio-diversity and forms the primary open space network in Ekurhuleni and must be considered as “no go” areas for development.</p>	<p>The current zoning for the site is “Agriculture” and “Residential 1”, however the site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) and for urban development in the draft Ekurhuleni Region BSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p> <p>A total of 40 “Public Open Space” erven are proposed throughout the township, including local play parks, stormwater detention dams, and the buffer area and 100 year floodline of the wetlands. The major part of the open space system consists of the wetlands and buffers.</p> <p>It is proposed that these erven be zoned for “Public open Space” purposes as per the Ekurhuleni Town Planning Scheme, 2014, subject to the standard development restrictions.</p>

## 1.4 Project process

A pre-application meeting was held with GDARD on 26 January 2018 to establish the process under the amended 2014 EIA regulations and to establish whether there are any issues identified by GDARD that will need special attention.

A public participation process was followed to inform Interested and/or Affected parties (I&APs) about the proposed development and to gather issues and concerns to be investigated during the EIA process. This process will be discussed further in Section 8.

The draft Scoping Report was made available to registered I&APs, State Departments and the EMM for comment on 5 May 2018. All issues and concerns were addressed and included in the Final Scoping Report. The application form was submitted to GDARD on 15 May 2018.

On approval of the Scoping Report on 4 July 2018 the EIA process was started and specialist studies commissioned that took some time and the process was on hold for a short while. GDARD has however confirmed on 8 April 2019 that since the Final Scoping Report was authorised within 2 years, that the EIA process may continue without re-submitting the Scoping Report, but that the Application form must be resubmitted (**See Appendix E: Annexure E4**).

During the Environmental Impact Assessment phase the different design and technology alternatives for the residential development on the site were compared in terms of the potential environmental impacts associated with the proposed development. Specialist studies were undertaken during the EIA phase in order to determine the potential impacts on the social and biophysical environment and the EIA report was compiled.

### **Specialist studies:**

Specialist studies were undertaken during the EIA phase in order to determine the potential impacts on the social and biophysical environment:

- Biophysical
  - Flora assessment;
  - Fauna study including Mammals, Avifauna and Herpetofauna;
  - Floodline study
  - Aquatic ecosystem delineation (wetland study)
  - Geotechnical Assessment
  - Air Quality Impact Assessment
  - Radon Study
- Social
  - Cultural Heritage Assessment
  - Civil Services Report and Infrastructure provision study
  - Stormwater Management report
  - Traffic impact study

## 1.5 Project need and desirability

The table below provides a summary of the need and desirability considerations for this project (Table 4).

**Table 4: Need and desirability considerations**

<b>NEED (TIMING)</b>		
<p><b>QUESTION A1:</b> Is the land use (associated with the activity being applied for considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority.</p>		
Yes X	No	<p>The site is situated inside the Urban Development Boundary and falls within the “Metro Core Support Zone” as outlined in the MSDF Development concept. The Carnival Node adjacent to it is earmarked as a “Primary Node”, and is seen as an important link between the southern development areas and the central established zone of Ekurhuleni.</p> <p>The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and will not compromise the integrity of these respective forward planning documents. Specific reference is made to the Provincial Strategic Priorities identified for Gauteng and the West Rand District Municipality:</p> <ul style="list-style-type: none"> <li>• Job Creation</li> <li>• Investment Creation</li> <li>• Rural/Urban Development</li> <li>• Infrastructure Development</li> <li>• Combating Crime</li> <li>• Skills Development</li> <li>• Combating the impact of HIV/AIDS</li> <li>• Poverty Alleviation</li> </ul> <p>The mixed use development and associated operational activities and impacts are aligned with these provincial priorities and will contribute in achieving the strategic priorities set for the province.</p>
<p><b>QUESTION A2:</b> Should the development concerned, in terms of the land use (associated with the activity being applied for) occur here at this point in time?</p>		
Yes X	No	<p>The current zoning for the site is “Agriculture” (RE of Portion 3) on the southern side of the site and the southern part of the site is zoned for “Residential 1” purposes. The site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) and for urban development in the draft Ekurhuleni Region BSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p> <p>Ekurhuleni’s current housing backlog is estimated to be in the region of 200 000 units and is still growing. The obvious need and huge demand for formal housing is an indisputable fact. Fast-tracking housing delivery is one of the top priorities of central, provincial and local government. Providing industrial/commercial development in the area will further contribute to the integrated development of the region, in combination with the integrated open spaces and public amenities, including schools.</p>

		An integrated, sustainable township will be developed, offering a range of housing typologies and tenure options as well as various community facilities and urban amenities. Functional urbanism and the creation of a sense of place/community are some of the main principles of the township design.
<b>QUESTION A3:</b> Does the community/area need the activity and the associated land use concerned (is it a societal priority)?		
Yes X	No	<p>Unemployment is a major problem within the Ekurhuleni Metropolitan Municipality and is as high as 28.8% (Source: Census 2011 Municipal Fact Sheet, published by Statistics South Africa). The proposed mixed use development will employ a large amount of people during construction, which will have a significant positive impact on the baseline socio-economic conditions of the local communities involved. The development will contribute towards the socio-economic development of the region as a whole through social upliftment and job creation as primary agents.</p> <p>The future incomes earned by these employees will translate into spending power, benefiting businesses and entrepreneurs not only in the area surrounding the operation where the employees spend their working week, but also in those economies further away. Besides the positive impact the development will have on the livelihoods of the households of its future employees in the neighbouring and labour sending communities, the development will contribute to the upliftment of the beneficiaries receiving houses in this development. In addition to a contribution to the economy, the development will also pay significant amounts in annual taxes, which will be used by the Government for social upliftment.</p> <p>The construction sector will also benefit from a large residential development such as this.</p>
<b>QUESTION A4:</b> Are the necessary services with the adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?		
Yes	No X	<p>Electricity, sewage system and water are not currently available on site. Internal roads and stormwater systems will have to be built as part of the proposed development. Upgrading of the Waterfall WWTP and the Van Eck substation is required. The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will have to be constructed, which is currently at detail design stage.</p> <p>A total of 4 access points from Provincial Route K109 abutting the township on the west are proposed. Four east-west collector roads run through the township, linking it to the areas to the west and the east for mobility. Two north-south collector roads are proposed, namely the extension of West Street in Sonneveld, north of the township, right through to the future station on its southern edge, and the extension of Vincent van Gogh Street in Van Eck Park industrial area, southwards through the</p>

		township, running roughly parallel to K109.
<b>QUESTION A5:</b> Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?		
Yes X	Ne	<p>The proposed development will require approximately 222.55 l/s of water. Water in this area comes from the existing 600mm Rand Water line that connects the Brakpan reservoir with the Klipriviersberg reservoir system. The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will have to be constructed, which is currently at detail design stage.</p> <p>The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded. It is expected that the proposed development will ultimately be served by the Waterfall WWTP, with a current capacity of 170 ML/d (Annexure X – update email) which has to be upgraded by ERWAT.</p> <p>The proposed development will drain toward the Brakpan-Vlakplaats drainage system with a spare capacity of 97.94 l/s (0.0979 m<sup>3</sup>/3). The internal sewage network was analysed, and it was found that the system does have spare capacity for the proposed development.</p> <p>There is no stormwater infrastructure on the site. Stormwater run-off from the site must be controlled in terms of the EMM requirements. A number of stormwater attenuation ponds will thus have to be constructed.</p> <p>The proposed development will be supplied with electricity from the Van Eck substation on the site. The existing capacity of the substation is however inadequate and the planned upgrading of the existing transformers to 160MVA capacity will be required. The planned Helderwyk/Leeuwpoort 88kV substation will also become relevant for other developments in the vicinity.</p>
<b>QUESTION A6:</b> Is this project part of a national programme to address an issue of national concern or importance?		
Yes X	Ne	Ekurhuleni's current housing backlog is estimated to be in the region of 200 000 units and is still growing. The obvious need and huge demand for formal housing is an indisputable fact. Fast-tracking housing delivery is one of the top priorities of central, provincial and local government.
<b>B) DESIRABILITY (PLACING)</b>		
<b>QUESTION B1:</b> Is the development the best practicable environmental option for this land/site?		
Yes X	Ne	<p>The site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) as well as in the draft Ekurhuleni Region RSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p> <p>Ekurhuleni's current housing backlog is estimated to be in the region of</p>

		<p>200 000 units and is still growing. The obvious need and huge demand for formal housing is an indisputable fact. Fast-tracking housing delivery is one of the top priorities of central, provincial and local government.</p> <p>An integrated, sustainable township will be developed, offering a range of housing typologies and tenure options as well as various community facilities and urban amenities. Functional urbanism and the creation of a sense of place/community lie at the heart of the township design.</p>
<p><b>QUESTION B2:</b> Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities?</p>		
Yes	No X	<p>The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and will not compromise the integrity of these respective forward planning documents.</p> <p>The site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) and for urban development in the draft Ekurhuleni Region BSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p>
<p><b>QUESTION B3:</b> Would the approval of this application compromise the integrity of the existing environmental management priorities of the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?</p>		
Yes	No X	<p>Specialist studies have determined sensitive areas on site, also described as Critical Biodiversity areas, and these areas have been excluded from the proposed development.</p>
<p><b>QUESTION B4:</b> Do location factors favour this land use (associated with the activity applied for) at this place, etc.)?</p>		
Yes X	No	<p>A total of 4 access points from Provincial Route K109 abutting the proposed township on the west are proposed. Four east-west collector roads run through the township, linking it to the areas to the west and the east for mobility. Two north-south collector roads are proposed, namely the extension of West street in Sonneveld north of the township right through it to the future station on its southern edge, and the extension of Vincent van Gogh Street in Van Eck Park industrial area southwards through the township, running roughly parallel to K109.</p> <p>The site is earmarked for urban development in the Ekurhuleni Metropolitan Spatial Development Framework (SDF) and for urban development in the draft Ekurhuleni Region BSDF. The site is situated within the demarcated Ekurhuleni Urban Edge.</p> <p>Ekurhuleni's current housing backlog is estimated to be in the region of 200 000 units and is still growing. The obvious need and huge demand for formal housing is an indisputable fact. Fast-tracking housing delivery is one of the top priorities of central, provincial and local government.</p> <p>An integrated, sustainable township will be developed, offering a range of</p>



		housing typologies and tenure options as well as various community facilities and urban amenities. Functional urbanism and the creation of a sense of place/community lie at the heart of the township design.
<b>QUESTION B5:</b> Will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?		
Yes	No X	<p>The sensitive areas on site include the depression pans, the seepage and unchannelled valley bottom wetlands, which are incorporated, with buffer zones, into the open space system.</p> <p>No sites of heritage significance were identified within the proposed study area, however cognisance of the stone walled ruins outside of the development area should be taken to ensure that it will not be damaged during the construction phase.</p> <p>In the event that artefacts / graves / areas of cultural significance are discovered during the construction phase, all work should be halted and a cultural heritage practitioner should be appointed to examine the site and make appropriate recommendations.</p>
<b>QUESTION B6:</b> Will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?		
Yes X	No	<p>Noise, dust and visual impacts will increase during the construction phase, but with the proper mitigation measures and good practice environmental management measures, it will result in minimal. Once the development is completed it is expected that there will be a large improvement.</p> <p>The tailings dam to the west of the site have been rehabilitated to a large extent and will not have a significant impact on the proposed development in terms of air quality and radiation (See Appendix D: Annexures D4 and D5).</p>
<b>QUESTION B7:</b> Will the proposed land use result in unacceptable cumulative impacts?		
Yes	No X	As already mentioned, through the implementation of good practice environmental management measures as well as mitigation measures, all direct and cumulative impacts which may result from the proposed development will be addressed and ensure that the environment is affected to the minimum.

## 2. NEMA REQUIREMENTS AND LISTED ACTIVITIES TO BE APPLIED FOR AND DETAILS OF EAP

### 2.1 NEMA requirements

In accordance with the Regulations in terms of Chapter 5 of the NEMA, 1998, Appendix 3, of the 2014 regulations states that an Environmental Impact Assessment Reports require the following:

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-
- (a) details of-
    - (i) the EAP who prepared the report; and
    - (ii) the expertise of the EAP, including a curriculum vitae;
  - (b) the location of the activity, including:
    - (i) the 21 digit Surveyor General code of each cadastral land parcel;
    - (ii) where available, the physical address and farm name; and
    - (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;
  - (c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-
    - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;
    - (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;
  - (d) a description of the scope of the proposed activity, including-
    - (i) all listed and specified activities triggered and being applied for; and
    - (ii) a description of the associated structures and infrastructure related to the development;
  - (e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
  - (f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
  - (g) a motivation for the preferred development footprint within the approved site;
  - (h) a full description of the process followed to reach the proposed development footprint within the approved site, including:
    - (i) details of the development footprint alternatives considered;
    - (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;
    - (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
    - (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
    - (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-
      - (aa) can be reversed;
      - (bb) may cause irreplaceable loss of resources; and
      - (cc) can be avoided, managed or mitigated;
    - (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

- (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - (viii) the possible mitigation measures that could be applied and level of residual risk;
  - (ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and
  - (x) a concluding statement indicating the preferred alternative development location within the approved site;
- (i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-
    - (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and
    - (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;
  - (j) an assessment of each identified potentially significant impact and risk, including-
    - (i) cumulative impacts;
    - (ii) the nature, significance and consequences of the impact and risk;
    - (iii) the extent and duration of the impact and risk;
    - (iv) the probability of the impact and risk occurring;
    - (v) the degree to which the impact and risk can be reversed;
    - (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
    - (vii) the degree to which the impact and risk can be mitigated;
  - (k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;
  - (l) an environmental impact statement which contains-
    - (i) a summary of the key findings of the environmental impact assessment;
    - (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and
    - (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
  - (m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMP as well as for inclusion as conditions of authorisation;
  - (n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
  - (o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation
  - (p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

- (q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- (r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
- (s) an undertaking under oath or affirmation by the EAP in relation to:
  - (i) the correctness of the information provided in the reports;
  - (ii) the inclusion of comments and inputs from stakeholders and I&APs;
  - (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and
  - (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
- (t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;
- (u) an indication of any deviation from the approved scoping report, including the plan of study, including-
  - (i) any deviation from the methodology used in determining the significance of potential
    - (i) environmental impacts and risks; and
    - (ii) a motivation for the deviation;
- (v) any specific information that may be required by the competent authority; and
- (w) any other matters required in terms of section 24(4)(a) and (b) of the Act.

## **2.2 Listed activities applied for**

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

In April 2006 the Minister of Environmental Affairs and Tourism passed Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (NEMA). The regulations replaced the Environmental Impact Assessment (EIA) regulations which were promulgated in terms of the Environment Conservation Act, 1989 in 1997. These regulations were again replaced on 18 June 2010 and on 4 December 2014, as amended. Therefore, all new applications must be made in terms of the New NEMA regulations of Notice R.982 of 2014. The purpose of this process is to determine the possible negative and positive impacts of the proposed development on the surrounding environment and to provide measures for the mitigation of negative impacts and to maximise positive impacts.

Notice No. R 983 and R 984 of the New Regulations list activities that indicate the process to be followed. Notice No. 985 list activities that required a Basic Assessment process in terms of Critical Biodiversity Areas and Ecological Support areas in the Gauteng Province. The Activities listed in Notice No. R 983 requires that a Basic Assessment process be followed and the Activities listed in Notice No. R 984 requires that the Scoping and EIA process be followed. However, the guidelines document supplied by DEA states that if any

activity being applied for is made up of more than one listed activity and the scoping and EIA process is required for one or more of these activities, the full EIA process must be followed for the whole application.

The proposed development includes a number of listed activities and therefore it will be necessary to follow a full EIA process (as an independent process) in terms of NEMA (See Table 5).

**Table 5: The activity is covered by the following sections of the 2014 Environmental Regulations**

Regulation No:	Activity No:	Description of the activity
983, 4 December 2014	9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;  excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or (b) where such development will occur within an urban area.
983, 4 December 2014	10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes - (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;
983, 4 December 2014	24	The development of – (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.
984, 4 December 2014	15	The clearance of an area of 20 hectares or more of indigenous vegetation.
985, 4 December 2014	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres on -  iv) Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.
985, 4 December 2014	12	The clearance of an area of 300 square metres or more of indigenous vegetation  ii) Within critical biodiversity areas.

**This description encompasses all relevant infrastructures, which will be associated with the construction of the proposed development and related supporting infrastructure.** The legislation requires that the Environmental Impact Assessment (EIA) procedure for the proposed development has to be followed. This procedure entails a permitting process meeting various environmental reporting requirements.

## 2.3 Environmental assessment practitioner (EAP)

The Environmental Assessment Practitioner is Vanessa Marais who is a registered member of ILASA (Institute of Landscape Architects South Africa) and IAIA (International

Association for Impact Assessments) and has 20 years of relevant experience in the field of environmental impact assessments. Please see expertise on the first page of this document and CV in Appendix G.

### 3. ENVIRONMENTAL BASELINE DESCRIPTIONS

The following section provides a description of the baseline, or status quo assessment of the environmental and socio-economic parameters of the site. From this assessment the specific and pertinent issues to be addressed by the assessment were identified, together with issues identified by interested and affected parties and the authorities.

#### 3.1 Biophysical descriptions

Drainage of the site is affected by topography and is divided into three zones. The south eastern zone drains toward the eastern corner of the site at an average slope of 4.4%. The south-western zone drains toward the western corner of the site at an average slope of 2.5%. The northern zone drains toward the northern corner of the site at an average slope of 2.5%.

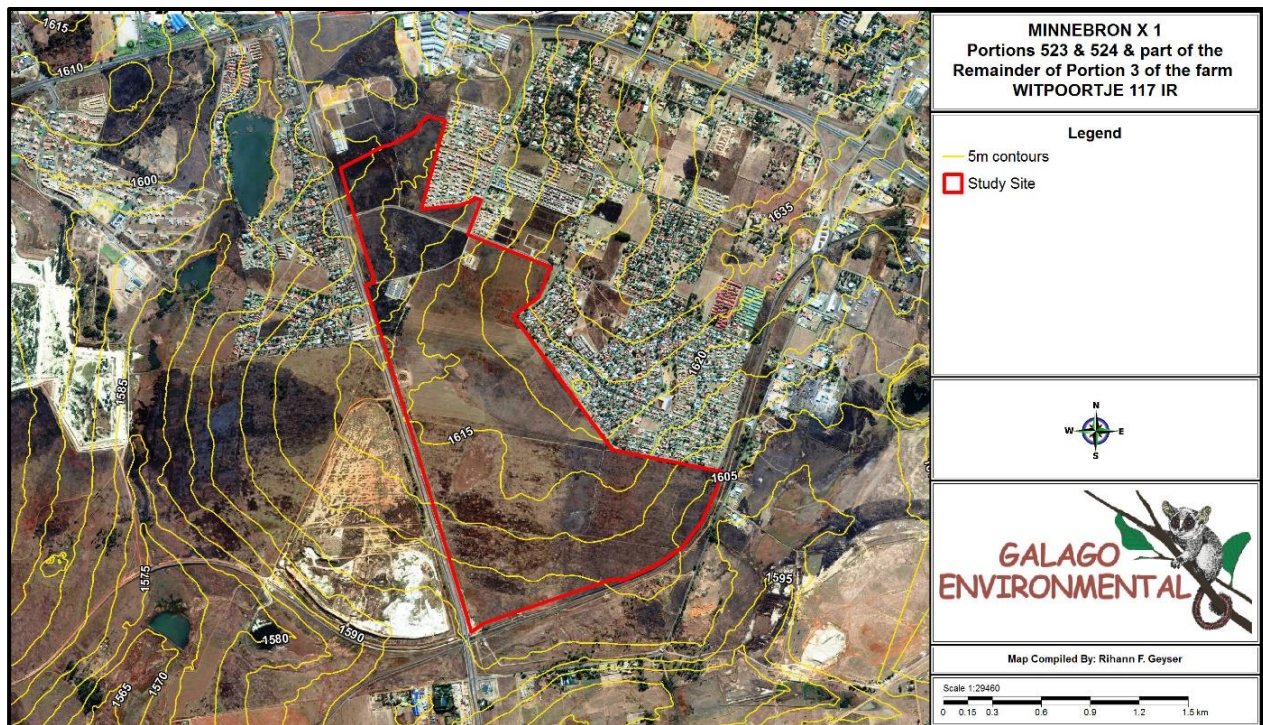


Figure 2: Topographical map showing the contours on the site

#### 3.1.1 Climate and rainfall

The climate of the site is typical of the Highveld region. Precipitation is usually in the form of thundershowers, often accompanied by hail in the summer months followed by dry winters. The mean annual precipitation for the area is between 600 and 700 mm, with the dominant precipitation received during the months of October to March.

The area generally receives little rainfall during the months from April to September. The highest monthly temperature of 35.3°C is recorded in January and the lowest monthly temperature of -3.3°C is recorded in July. The area is significantly colder than Pretoria itself,

with winter temperatures easily dropping to 4 degrees below freezing point with extensive frost during winter months (Mucina and Rutherford, 2006).

### 3.1.2 Geology

According to the 1:250 000 Geological Series, Sheet No: 2628 East Rand (1983), the site is underlain by sediments of the Dwyka and Ecca (Vryheid Formation) Groups of the Karoo Supergroup. The Dwyka Group sediments are mainly diamictite and subordinate conglomerate with overlying Vryheid Formation sediments of mudrock (shale), sandstone and coal.

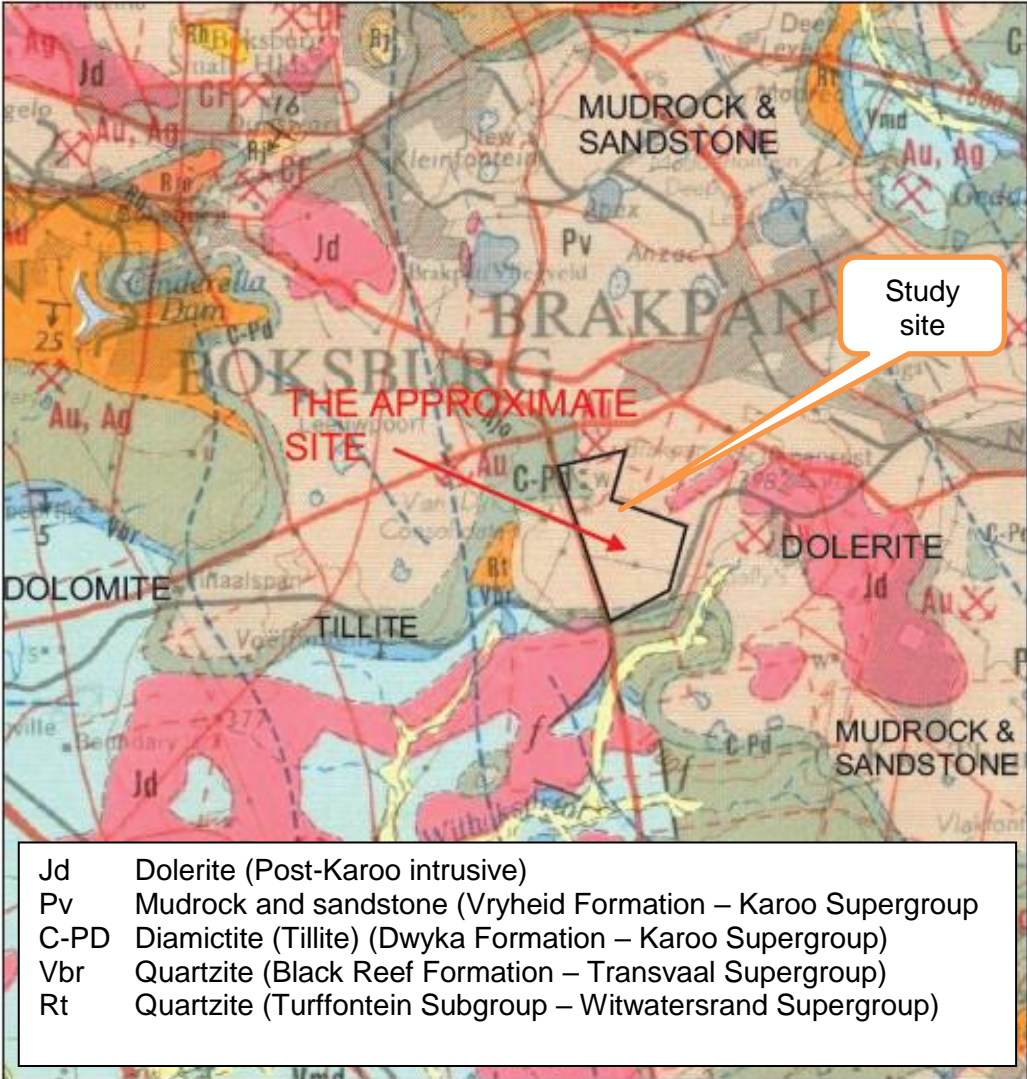


Figure 3: Geotechnical map

The Geotechnical investigation study confirmed that the **site is not undermined at a shallow level and will therefore be deemed to be suitable for development by the Department of Mineral Resources (DMR)** (see Appendix D: Annexure D1).

### **3.1.2.1 Geotechnical information**

No major geotechnical conditions preventing township establishment are encountered on the site. The potential for collapse settlement and excessive normal (compressible) settlement represents the most serious geotechnical conditions that need to be addressed. Minor, short duration perched water tables may hamper construction in and just after a wet season. Geotechnical information

Field evidence suggested the colluvium blanketing the site to be potentially collapsible. The layer is generally more than 1.5m thick except for pockets of clay next to wetlands or areas underlain by shallow ferricrete or slightly ferruginised colluvium.

Consolidometer test results confirm the field observations with Collapse Potential (CP) values ranging from between 5.37% (TP 18) and 7.8% (TP 5). Some degrees of “trouble” may be expected for light structures founded in/or on a potentially collapsible layer. The total settlement expected for a single storey house founded on normal strip footings at a depth of 0.5m below the surface in a layer of collapsible soil. The site has been delineated into three classes namely Class C, C1 and C2 based on the thickness of the potentially collapsible layer.

Perched water tables of short duration are likely to develop in the wet season and may result in flooded excavations if construction is undertaken in and just after summer. These conditions are likely to be most prevalent where shallow ferricrete horizons are present or where stormwater drains discharge onto the site. Extensive development of ferruginised layers within the colluvium shows to a possibility of perched water tables.

No evidence of erosion features such as gulleys, dongas or erosion channels was observed on the site. The overall slope of the land is too gentle to create high velocity runoff.

A TLB should be able to excavate trenches to depths of about 2.0m over most of the site except for isolated pockets of difficult excavation where shallow test pits occur. A 20 ton excavator should be capable of excavating service trenches to a depth of 2.5m to 3.0m without too much difficulty.

Pneumatic equipment and blasting are unlikely to be required for excavations less than 3m deep.

No dolomite, undermining, steep slopes or unstable natural slopes occur and no geotechnical conditions preventing township establishment are encountered on the study site.

### **3.1.2.2 Soils**

The wetlands identified consisted mostly of soils that are structured and are of the Sepane form and gleyed Katspruit soils. These soils are recognised by the National Water Act, 1998 as being seasonally saturated. The Sepane form showed no signs of being saturated and has no gley properties within the top 500mm.

The site is characterised by a fairly similar soil profile throughout, except for small pockets of ferruginised colluvium that are encountered on the eastern and southern edges of the site. The silty colluvium grades with depth into a silt with soft, silt kernels and then into very



slightly to slightly ferruginised silt with traces to abundant hard and soft ferruginous concretions. The extensive development of slightly ferruginised horizons and pockets of hardpan ferricrete indicates that minor perched water tables do form at certain times of the year. The development of ferricrete requires a fluctuating water table. The development reaches a maximum around pans where groundwater tends to accumulate in the wet season. Flooding beyond wetland areas is unlikely to occur as the natural ground slopes to the south-west and north-west at a reasonable gradient. Surface drainage should take place as sheetwash.

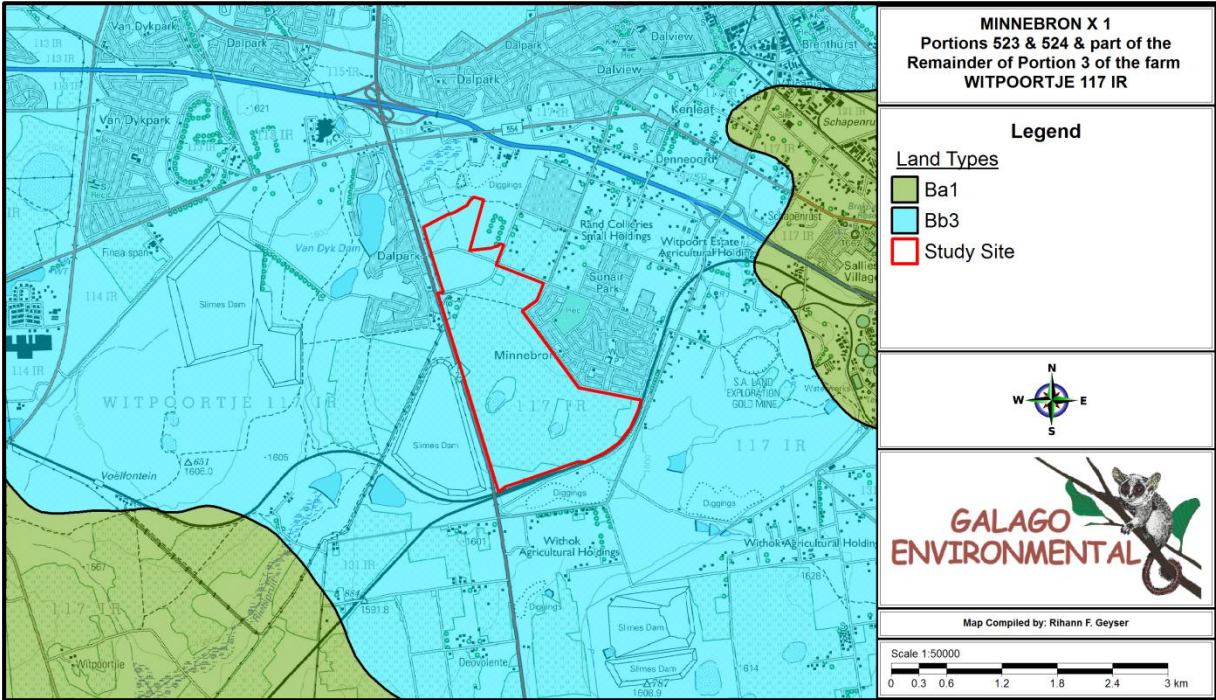


Figure 4: Land types of the study area

**3.1.3 Agricultural potential**

The site falls outside the agricultural hubs as identified by the Gauteng Agricultural potential Atlas, Version 4.

**3.1.4 Hydrology**

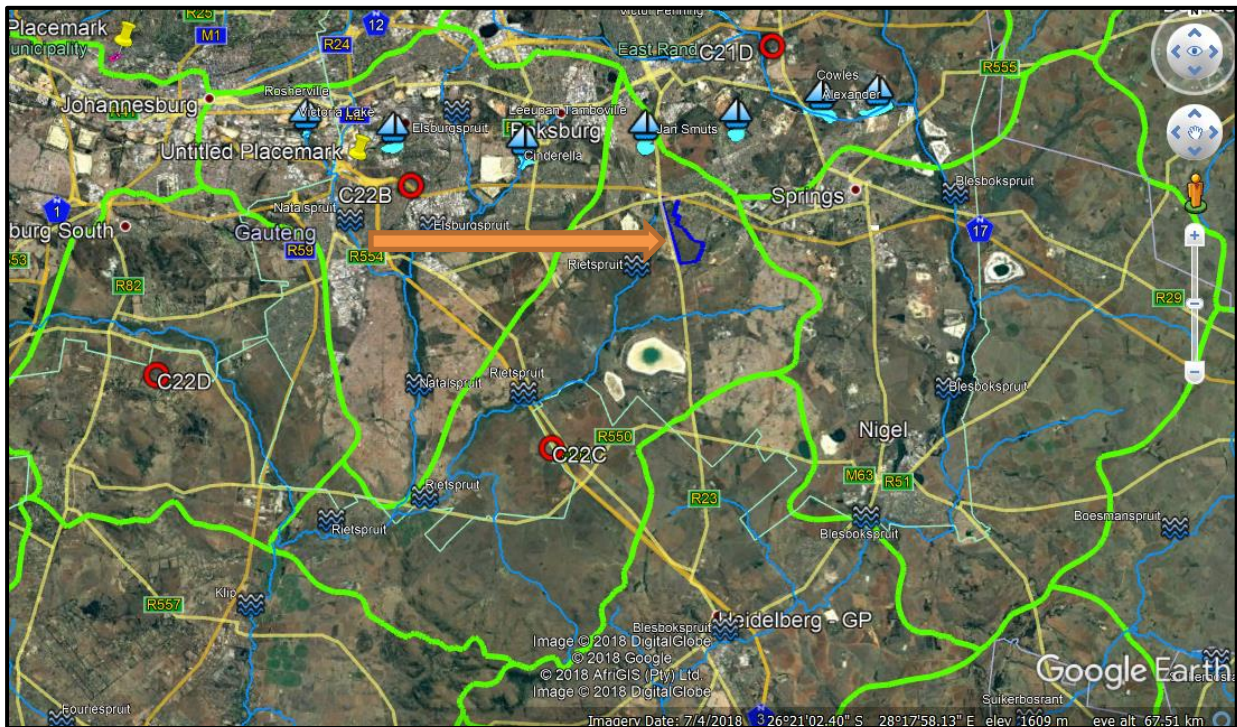
The site has no clear watercourses and water drains as surface flows into the depressions during rain events.

The study area falls in the Upper Vaal Water Management area (WMA no 9), and is located in quaternary catchment C21D. The predominant HGM classes identified on site were depressions. This implies that the site drains internally towards a pan. There are very little catchment around each pan with the result that only the rainfall that falls directly onto the depression feeds the wetland and has to sustain wetland plant communities. This had the result that the pans have not developed as wetlands.

Wetlands were identified from a topographical perspective. They occur as depressions and in the unchannelled sections of the valley floor in the south western and south eastern portions of the site. The latter is adjacent to the Heidelberg Road and where the water

drains under the railway line. The site is split up into three drainage zones, namely the south-eastern zone, south-western zone and the northern zone.

See Figure 5 below for the Google Earth description of the site, as provided by the Department of Water Affairs's Resource Quality Services (RQS) department.



**Figure 5: The Catchment and hydrological data for the study site, as available from DWA RQS services.**

The site falls within the **Highveld Ecoregion** as described in the Level 1 Ecoregions by the Department of Water Affairs and Forestry (DWA, 2005): Plains with a moderate to low relief, as well as various grassland vegetation types (with moist types present towards the east and drier types towards the west and south), define this high lying region.

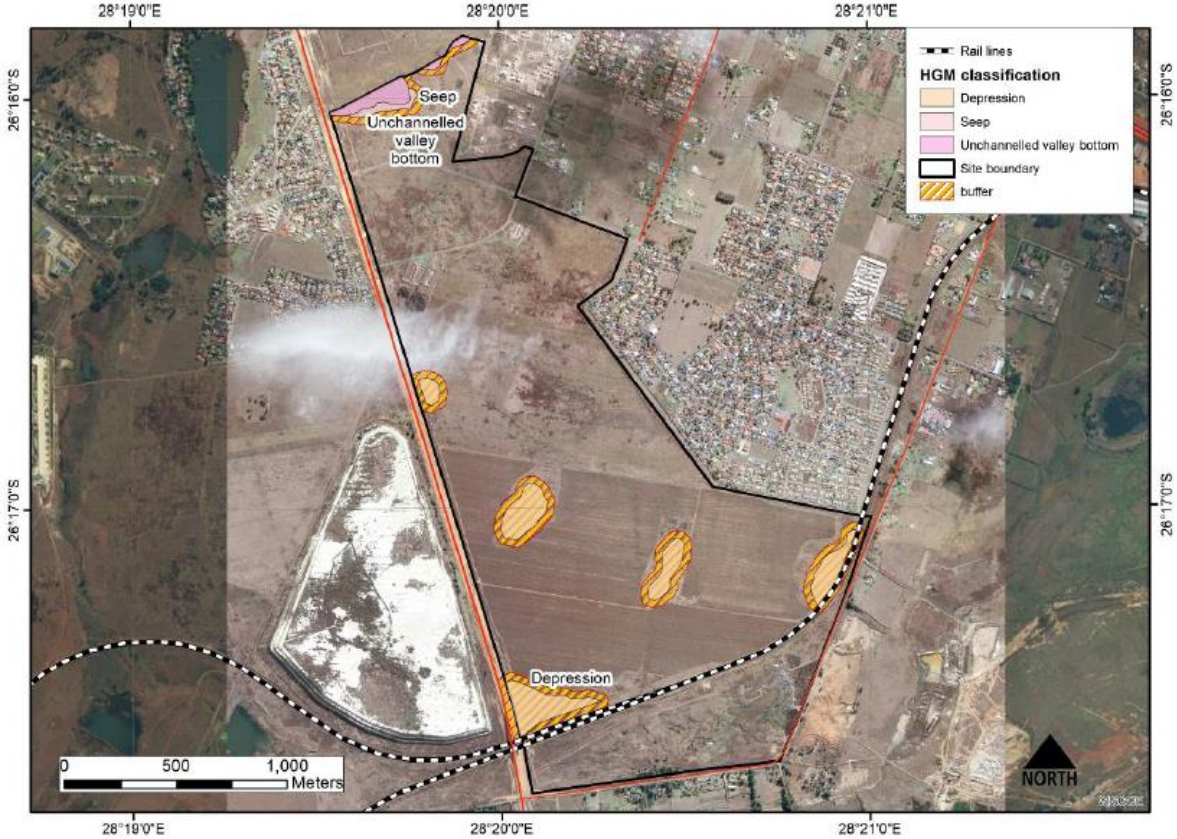
### 3.1.4.1 Wetlands

Five depression wetlands, a seepage and unchannelled valley bottom wetland were found on site (Figure 6).

The wetlands on the property are classified as **Low/Marginal - Category D** because they are not ecologically important and sensitive at any scale. The Present Ecological Score (PES) status for the aquatic system on the site indicated the system to be **largely modified** "A large change in ecosystem processes and loss of natural habitat and biota has occurred".

The depressions, together with a buffer of 32 metres along their boundaries were delineated and should be protected or incorporated into the open space planning. Further, while the soils in the south eastern part of the site don't show gleyed properties or contain wetland plants they are also potentially within the 1:50 year floodline.

The Ecological Importance and Sensitivity (EIS) of the aquatic system was calculated (see the Aquatic ecosystem delineation in Appendix D3). The wetland found within the extended study area can be considered to be of moderate ecological management class. The REMC was calculated to be in **Low/ Marginal** condition “Aquatic ecosystems that is not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers”.



**Figure 6: The aquatic ecosystems of the study site**

It must be clearly noted that any development on the study site will have an impact on the aquatic ecosystems and must be authorised in terms of section 21 of the National Water Act, 1998 (Act No. 36 of 1998).

**3.1.5 Air quality**

Airshed Planning Professionals (Pty) Ltd (Airshed) was appointed by Aquisim Consulting (Pty) Ltd (Aquisim) to do an air quality impact assessment for the proposed Minnebron Extension 1 development. The tailings storage facility (TSF) adjacent to the proposed development could possibly impact on the proposed development. Since it is assumed that naturally occurring radionuclides are associated with this TSF, one of the parameters considered as part of the air quality study was the exhalation of radon gas (**See appendix D: Annexures D4 and D5**).

Aquisim facilitated the radon exhalation rates of the TSF located adjacent to the proposed development area. Aquisim further proposed to assess the potential radon inhalation dose because of the TSF.

The purpose of this investigation was to determine baseline air quality conditions, identify sensitive receptors and assess potential impacts from air quality on the proposed development area.

The following tasks, typical of an air quality impact assessment, were included in the scope of work:

- A review of surrounding activities in order to identify sources of emission and associated pollutants;
- A study of regulatory requirements and inhalation thresholds for identified key pollutants against which compliance need to be assessed and health risks screened;
- A study of the environment in the vicinity of the proposed development; including:
  - The identification of potential air quality sensitive receptors (AQSRs);
  - A study of the atmospheric dispersion potential of the area taking into consideration local meteorology, land-use and topography; and
  - The analysis of all available ambient air quality information/data to determine pre-development ambient pollutant levels and dustfall rates.
- The compilation of a comprehensive emissions inventory:
  - Pollutants quantified will include particulate matter (TSP, PM<sub>10</sub> and PM<sub>2.5</sub>).
- Atmospheric dispersion modelling to simulate ambient air pollutant concentrations and dustfall rates as a result of the TSF.
- A screening assessment to determine:
  - Compliance of simulated criteria pollutant concentrations with ambient air quality standards; and
  - Nuisance dustfall.
- The compilation of a comprehensive air quality specialist report detailing the study approach, limitations, assumption, results and recommendations.

The air quality impact assessment included a study of the receiving environment and the quantification and assessment of the impact of the TSF on human health and the environment. The receiving environment was described in terms of local atmospheric dispersion potential, the location of potential AQSRs in relation to proposed activities as well as existing ambient pollutant levels and dustfall rates.

An atmospheric emissions inventory was compiled for the TSF. Pollutants quantified included particulate matter (TSP, PM<sub>10</sub>, and PM<sub>2.5</sub>). PM<sub>10</sub> is defined as particulate matter with an aerodynamic diameter of less than 10 µm and is also referred to as thoracic particulates. Respirable particulate matter, PM<sub>2.5</sub>, is defined as particulate matter with an aerodynamic diameter of less than 2.5 µm. Whereas PM<sub>10</sub> and PM<sub>2.5</sub> fractions are taken into account to determine the potential for human health risks, total suspended particulate matter (TSP) is included to assess nuisance dust effects.

All PM emissions were quantified using the Airshed in-house model ADDAS. This model is based on the dust emission scheme of Marticorena and Bergametti (1995) and Shao *et al.* (2011).

The main findings of the assessment are summarised below:

- The receiving environment:
  - In the absence of on-site surface meteorological data, hourly meteorological data from the Weather Research and Forecasting model (WRF) data set used for the City of Johannesburg (CoJ) air quality management plan (AQMP) was extracted for the site for 2014 and was utilised for the study. Validation statistics for this data can be seen in the CoJ AQMP Status Quo report (CSIR Climate Studies, 2016).
  - The proposed development area is dominated by winds from the north-westerly and north-easterly sectors. An average wind speed of 3.9 m/s was extracted for the site.
  - Ambient air pollutant levels in the proposed development area are currently affected by the following sources of atmospheric emissions; mining; industries, vehicle tailpipe emissions; agriculture; domestic fuel combustion and open areas exposed to wind erosion.
  - Limited ambient air quality data is available for the proposed development site. However, surrounding areas where data is available from the Ekurhuleni Metropolitan Municipality (EMM) show elevated PM<sub>10</sub> concentrations.
  - AQSRs around the proposed development site include residential settlement, townships, schools, mosques and churches.
- Impact of the TSF:
  - Sources of emissions quantified included windblown dust from the TSF.
  - PM emissions (PM<sub>2.5</sub>, PM<sub>10</sub> and TSP) were quantified and utilized in dispersion simulations.
  - For wind erosion to occur, the wind speed needs to exceed a certain threshold, called the friction velocity. The threshold wind speed for this study is 6.7 m/s.
  - A summary of compliance with the relevant legislation can be seen in the table below:

Impact Description	Compliance at the proposed development	Compliance at boundary of TSF
PM <sub>2.5</sub> daily	√	X
PM <sub>2.5</sub> annual	√	√
PM <sub>10</sub> daily	√	X
PM <sub>10</sub> annual	√	√
Nuisance effects due to dustfall deposition	√	√

- Simulated PM<sub>2.5</sub> and PM<sub>10</sub> concentrations (as a result of the TSF) at the proposed development, are low and below the NAAQS.
- Simulated dustfall rates (as a result of the TSF) at the proposed development, are low and below the NDCR.
- The area of non-compliance (on a daily basis) is for a small portion just south of the TSF, but this area is not part of the proposed development.
- A significance rating of 'low' was assigned to potential inhalation health impacts and dustfall effects at the proposed development.

It was concluded by the air quality specialist that the proposed development may be authorised as there is no significant air quality aspects that could impact on the residents of the proposed development.

It is recommended that a short term ambient monitoring campaign be carried out to verify the ambient levels at the site.

The mandate of the National Nuclear Regulator (NNR), amongst others, is to ensure that members of the public are protected against exposure to ionizing radiation. This means that, in terms of issuing a ROD, they must be convinced that the proposed development will not result in members of the public being exposed to radiation above the criteria specified in the national safety standards.

The **Radon study** in Annexure D5 found that with the available information presented that it is unlikely that members of the public that will reside in the proposed Minnebron Ext 1 residential development area will be exposed to ionizing radiation, *as a contribution from the nearby TSF*, above the regulatory compliance criteria. From the results, it can be concluded that the radon inhalation dose contributed by the TSF will be less than 5  $\mu\text{Sv}\cdot\text{year}^{-1}$ .

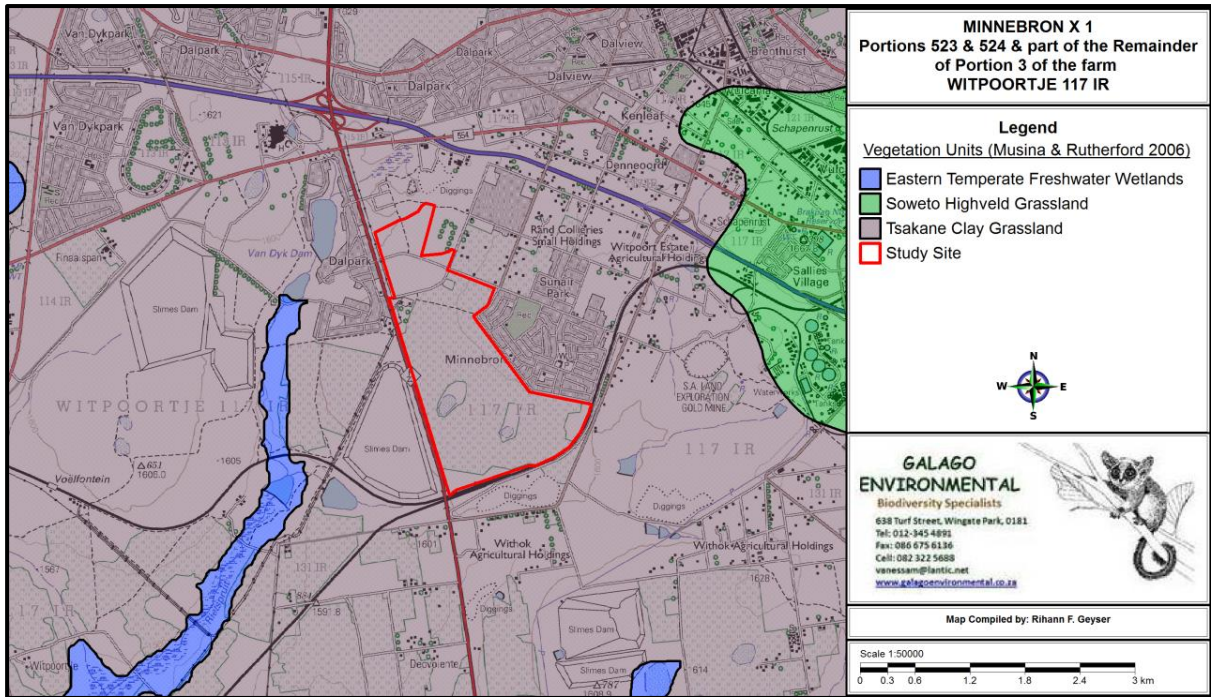
This conclusion is based on the assumption and understanding that the study site currently is a greenfield site that was not impacted by mining-related activities in the past. From a radiation protection perspective, it can be recommended that the proposed development continues.

## **3.2 Biological environment**

### **3.2.1 Regional Vegetation**

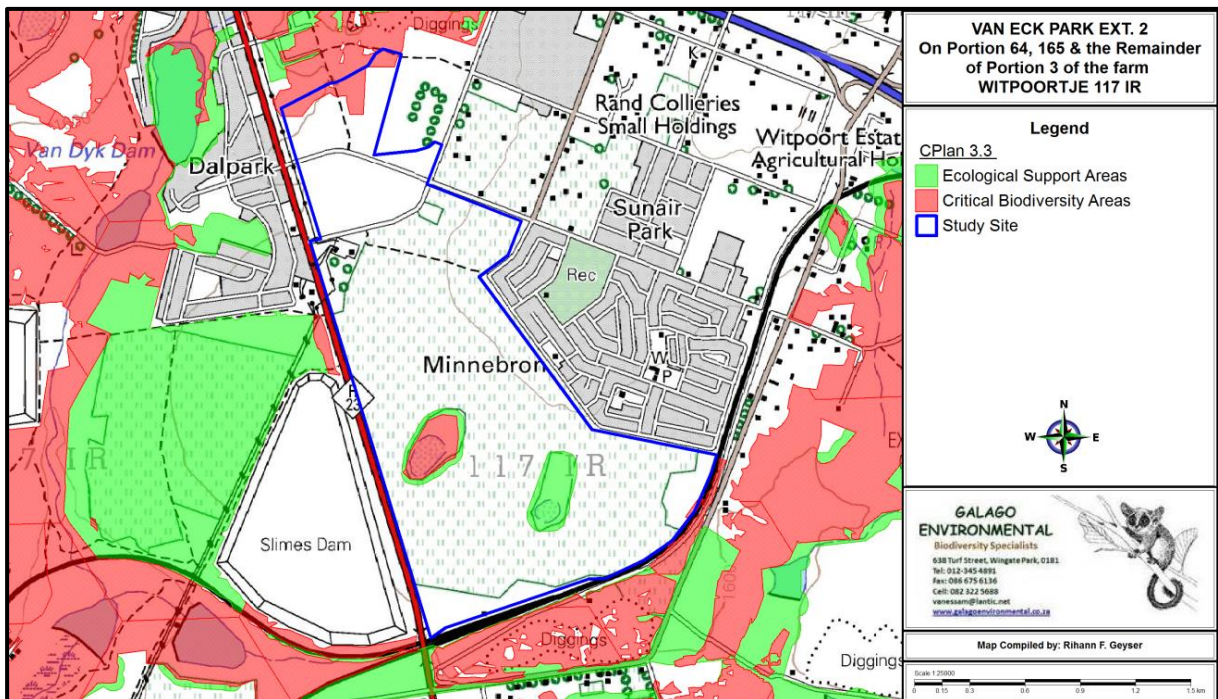
The study site lies in the quarter degree square 2628AD (Springs). Mucina & Rutherford (2006) classified the area as Tsakane Clay Grassland, a short, dense grassland on flat to slightly undulating plains and low hills. A mixture of grasses such as *Themeda triandra*, *Elionurus muticus* and *Eragrostis* species dominates the vegetation. The most prominent herbaceous species are of the families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae. The area has strongly seasonal summer rainfall with very dry winters and frequent winter frosts.

This vegetation unit is considered endangered. Its conservation target is 24%. Only 1.5% is conserved in statutory reserves such as Suikerbosrand, Olifantsvlei, Klipriviersberg and Marievale and a small portion in private nature reserves. More than 60% of the unit is already transformed by cultivation, urbanization, mining, dam-building and roads (Figure 7).



**Figure 7: Vegetation units according to Mucina and Rutherford, 2006**

According to the GDARD C-Plan 3.3 a Critical Biodiversity Area is situated along the northern boundary of the site. One of the pans and the area south of the site are also situated within Critical Biodiversity Areas. The other pan lies within an Ecological Support Area (Figure 8).



**Figure 8: Critical Biodiversity Areas and Ecological Support Areas**

### 3.2.2 Flora

A specialist flora assessment was undertaken to determine the detailed vegetation communities, sensitive areas and impacts on red listed plant species on site (**Appendix D: Annexure D2**).

Four vegetation study units were identified on the study site (Figure 9):

- Mixed alien and indigenous vegetation;
- Wetland vegetation;
- Cultivated fields; and
- Pan vegetation

The flora study found that the Wetland vegetation and the Pan vegetation are considered sensitive. The Mixed alien and indigenous vegetation and the Cultivated fields study units are not deemed sensitive. The alien invasive species should be removed. No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species.

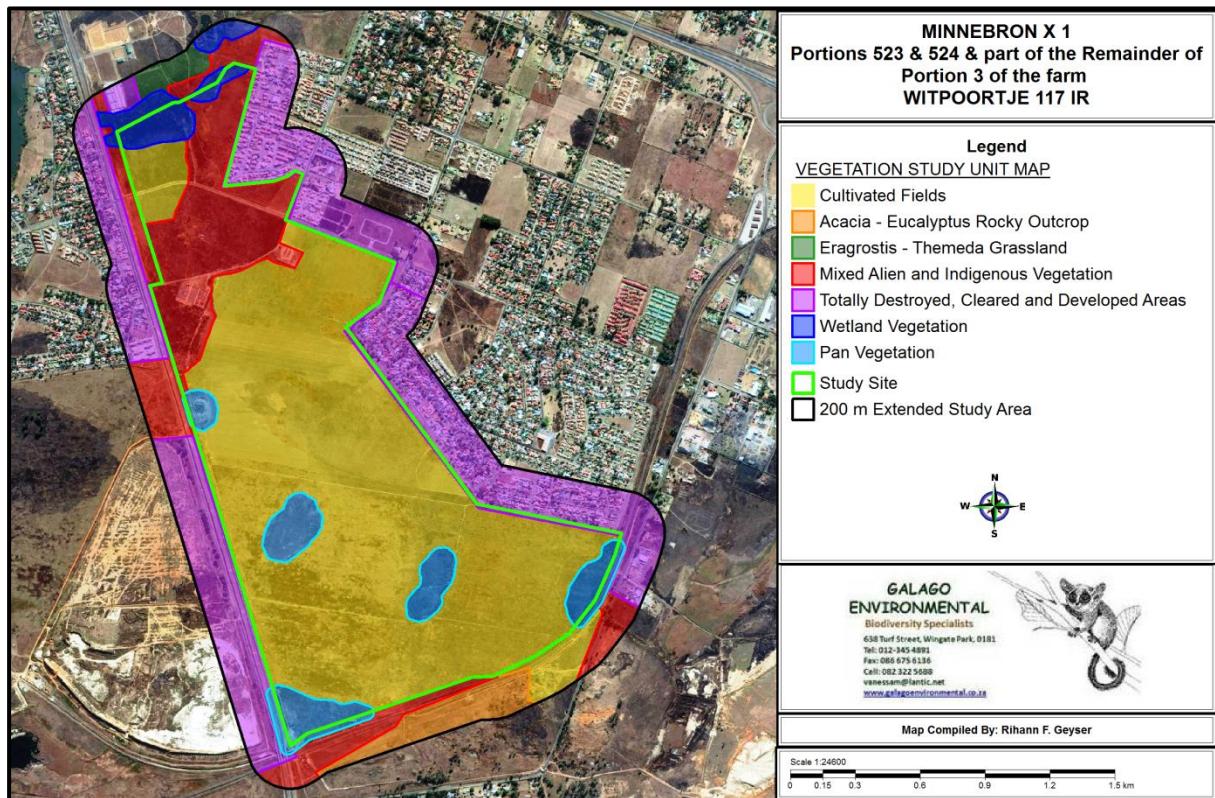


Figure 9: Vegetation study units identified on the study site

#### 3.2.2.1 Species of conservation concern, Red data species, NEMBA species, protected trees

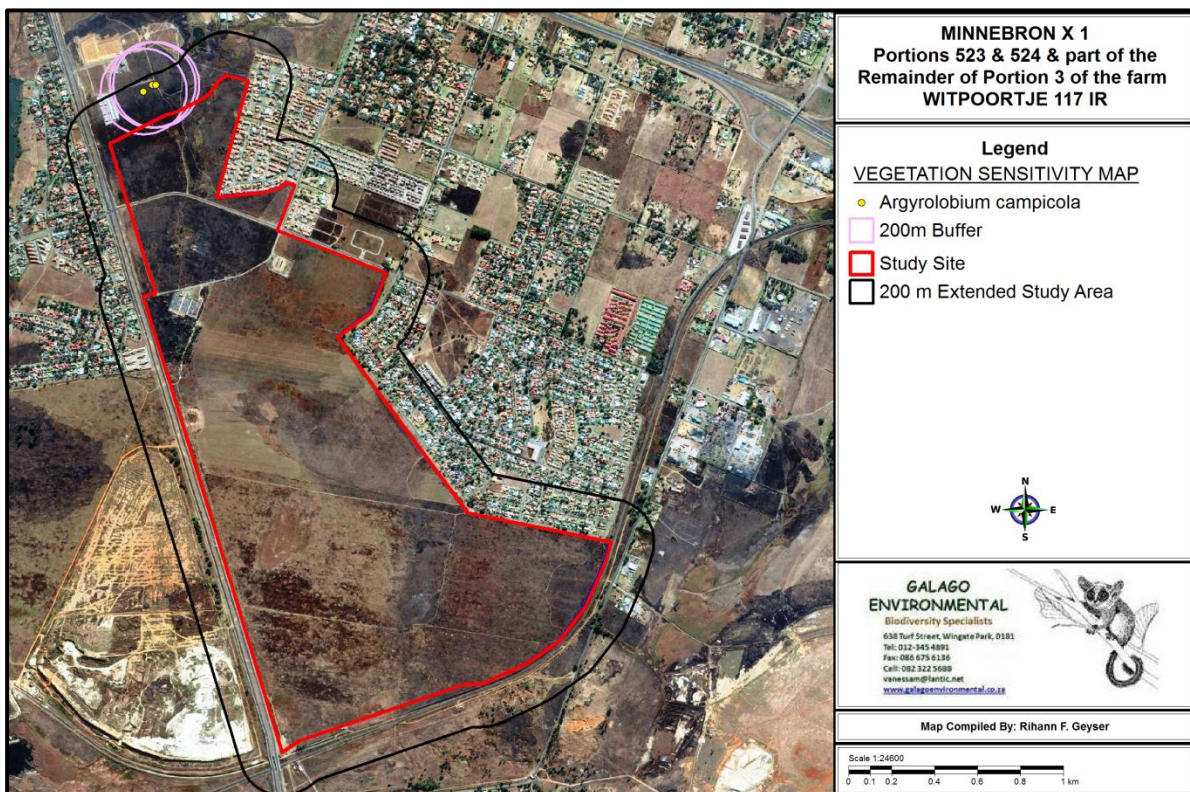
Fourteen Red List plant species are known to occur in the 2628AD quarter degree square, two of these within 5 km of the site. The study site has suitable habitat for one of these species, but it was not found during the survey. Annexure A indicates the two Red List species previously found within 5 km of the site. The Red List species *Argyrolobium campicola*, which has not previously been recorded in the 2628AD q.d.s. was found just



outside the northern boundary of the site. A 200-meter protective buffer must be maintained around this Red List species (Figure 10).

GDARD requires biodiversity studies for *Gnaphalium nelsonii* and *Kniphofia typhoides*. The study site does not have suitable habitat for *Gnaphalium nelsonii*, but has suitable habitat for *Kniphofia typhoides*. It was not found during the survey. No Red List species or protected species were recorded on the study site.

Vegetation species are evaluated against the list published in the Department of Environmental Affairs, Notice No. 2007 of the National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act No. 10 of 2004). No NEMBA species were found on the site.



**Figure 10: Position of the Red List species and 200-meter protective buffer**

Protected trees are identified in accordance with the list of nationally protected trees published in Government Notice No. 29062 3 (2006) of the National Forests Act, 1998 (Act No. 84 of 1998), as amended (Department of Water Affairs Notice No 897, 2006). One tree species listed as a Protected tree in terms of the National Forests Act, 1998 is known to occur in the 2628AD quarter degree square. However, the study site does not have suitable habitat for this species and none were found.

### 3.2.2.2 Medicinal Plants

South Africa has a wide diversity of plant species and a rich cultural heritage. A large number of species are still used in traditional medicine and several species were also investigated for medicinal development. Indigenous vegetation is mostly used, but a few alien species are also used for medicinal purposes.

Eleven species observed on site with known medicinal uses are included in Annexure D2. None of these species are of conservation importance or is considered to be rare.

### 3.2.2.3 Alien Plants

A list of alien and invasive species has been published in the Government Gazette of 1 August 2014 in the Alien and Invasive Species Regulations (AIS) under the NEMBA. Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014 and consist of:

- **Category 1b:** Invasive species which must be controlled and wherever possible, removed and destroyed. Any form of trade or planting is strictly prohibited.
- **Category 2:** Invasive species, or species deemed to be potentially invasive, in that a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees. Plants in riparian areas become Category 1b invasive species.
- **Category 3:** Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is prohibited. Plants in riparian areas become Category 1b invasive species.

Forty alien plant species, of which 13 species are Category 1b invasive species, two are Category 2 invasive species and three are Category 3 invasive species, were recorded on the site.

## 3.2.3 Fauna

### 3.2.3.1 Mammals

Of the 46 mammal species expected to occur on the study site, three were confirmed during the site visit (see Mammal study in Appendix D: Annexure D2). The **mammal** study found that the drainage line, wetlands and the two pans, as well as their buffer zones, should be considered as ecologically sensitive.

The Endangered Species treat the site as part of their home ranges / territories. There is a possibility that about 13 species of mammals with a Red Data status may occur on the study site. Most of these species include bats, which move over huge distances, and a few shrew species. It is very difficult to confirm whether any of these species are present on any study site, but there is a possibility that some of these two groups of species do occur on this particular study site.

In optimum conditions the possibility exists that the Southern African hedgehog may occur on the study site. There is very small chance that the rough-haired golden mole and the White-tailed mouse could occur on this particular study site.

Measures will have to be taken to prevent development near the drainage line, wetlands and the two pans. The removal of invasive plants will increase the habitat for mammals.

### 3.2.3.2 Avifauna

Three major avifaunal habitat systems were identified within the study area. These habitat systems are as follow:

- Wetlands and small pans
- Open Grassland, Disturbed Grassland and Fallow Fields
- Disturbed and Transformed Area

#### **Wetlands and small pans:**

A total of  $\pm 6\%$  of the total surface area of the study area consists of wetlands and small pans. Only the more common avifaunal species associated with aquatic and semi-aquatic vegetation are likely to make use of this habitat system. No suitable habitat was identified for aquatic or semi-aquatic Red Data avifaunal species.

#### **Open Grassland and Fallow Fields:**

A total of  $\pm 34\%$  of the total surface area of the study area consists of natural grassland, disturbed grassland and fallow fields. The largest portion of the study site consists of grassland that varies between patches with natural grassland and areas where the natural grassland areas have been disturbed by past and present human activities. The disturbed grassland areas take up the largest area of the grassland habitat and natural grassland areas are reduced to small and/or fragment patches in the northwest corner of the study site. In the disturbed areas vegetation is dominated by such alien species as *Tagetes minuta* (Khaki weed), *Bidens formosa* (Cosmos), *Cirsium vulgare* (Scottish thistle) and *Verbena brasiliensis*.

The presence and abundance of bird species in this habitat will vary from season to season - lush and green in summer after summer rains and dry, brown, frosted or burnt during winter. The habitat favours ground-living bird species, such as lapwings, francolins, pipits, longclaws, larks and chats. These birds hunt for insects and/or breed on the ground, in burrows in the ground, or between the grasses. Weavers and widowbirds make use of such habitat for feeding on ripe seeds during late summer and early winter when the grass is not burnt, and widowbirds and cisticolas will also breed in the tall grass during summer. Species such as weavers and bishops that breed in the wetland habitat during summer will also make use of the open grassland habitat for feeding during winter after the grasses have seeded. Aerial feeding birds such as martins, swifts and swallows will also hunt for insects over the grasslands.

Due to the mainly disturbed state of the open grassland within the study area and the disturbed areas surrounding it, only the more common avifaunal species associated with open grassland are likely to make use of this habitat system. The natural grassland area is small and highly fragmented and will not favour any Red Data avifaunal species.

#### **Disturbed and Transformed Areas:**

The rest of the study area  $\pm 60\%$  is disturbed and has been transformed by past and present human activities. These areas include built-up areas interspaced with garden vegetation, graded areas, roads and railways, areas with severe dumping and areas overgrown by alien and invasive trees and vegetation.

The study area does not offer suitable habitat for the Red Data avifaunal species recorded for the 2628AD q.b.g.c. These Red Data avifaunal species are habitat specific and unable to adapt to areas changed by man. In general the reporting rate of all Red Data avifaunal species recorded for the q.d.g.c. is very low at 1% and less and if they should occur, they are only likely to move through the area on rare occasions. They are unlikely to make use of the habitat systems on site on a permanent basis. The aquatic habitat offers suitable habitat for a variety of the more common avifaunal species and should be regarded as medium sensitive to ensure future avifaunal biodiversity in the study area.

### **3.2.3.3 Herpetofauna**

From a herpetological habitat perspective, it was established that mainly two of the four major habitats are naturally present on the study site, namely terrestrial and wetland-associated vegetation cover.

The grassland north of the drainage is fairly pristine; however most of the study site consists of transformed grassland. The natural grasslands were first transformed for agricultural purposes and later by other anthropogenic influences such as diggings, invasive plants, building rubble, rubbish dumping, garden refuse, veld fires in winter, ground clearing, buildings and roads. The study site is thus ecologically disturbed in many parts. Moribund termitaria were recorded in the pristine grassveld area on the study site. These structures are generally good indicators of the occurrence of small herpetofauna.

Due to the R23, N17, other roads and developments connectivity ranges from fair to poor. The site itself, and some of its undeveloped adjoining properties, are collectively surrounded by other properties and busy roads. Real opportunities for migration exist along the drainage line in the north.

Of the 40 reptile species which may occur on the study site, one was confirmed during the site visit and of the 13 amphibian species which may possibly occur on the study site, two were confirmed during the site visit. The species assemblage is typical of what can be expected of habitat that is severely disturbed, but with sufficient habitat to sustain populations. Most of the species of the resident diversity are fairly common and widespread (viz. the common house snake, mole snake, speckled rock skink, Cape gecko, guttural toad, Boettger's caco, common platanna and the common river frog).

### **3.2.4 Biophysical sensitivity map**

The GDARD C-plan 3.3 was consulted and it was found that a depression wetland and seepage and unchannelled valley bottom wetlands on site fall within a Critical Biodiversity area with one depression pan identified as an Ecological support area (Figure 8 and Appendix D2). The biodiversity and wetland studies have however shown that the site is very disturbed and transformed as a result of past activities that took place on the site and except for the wetland areas and their buffers, the site has a low sensitivity (Figure 11 and Appendix B1).

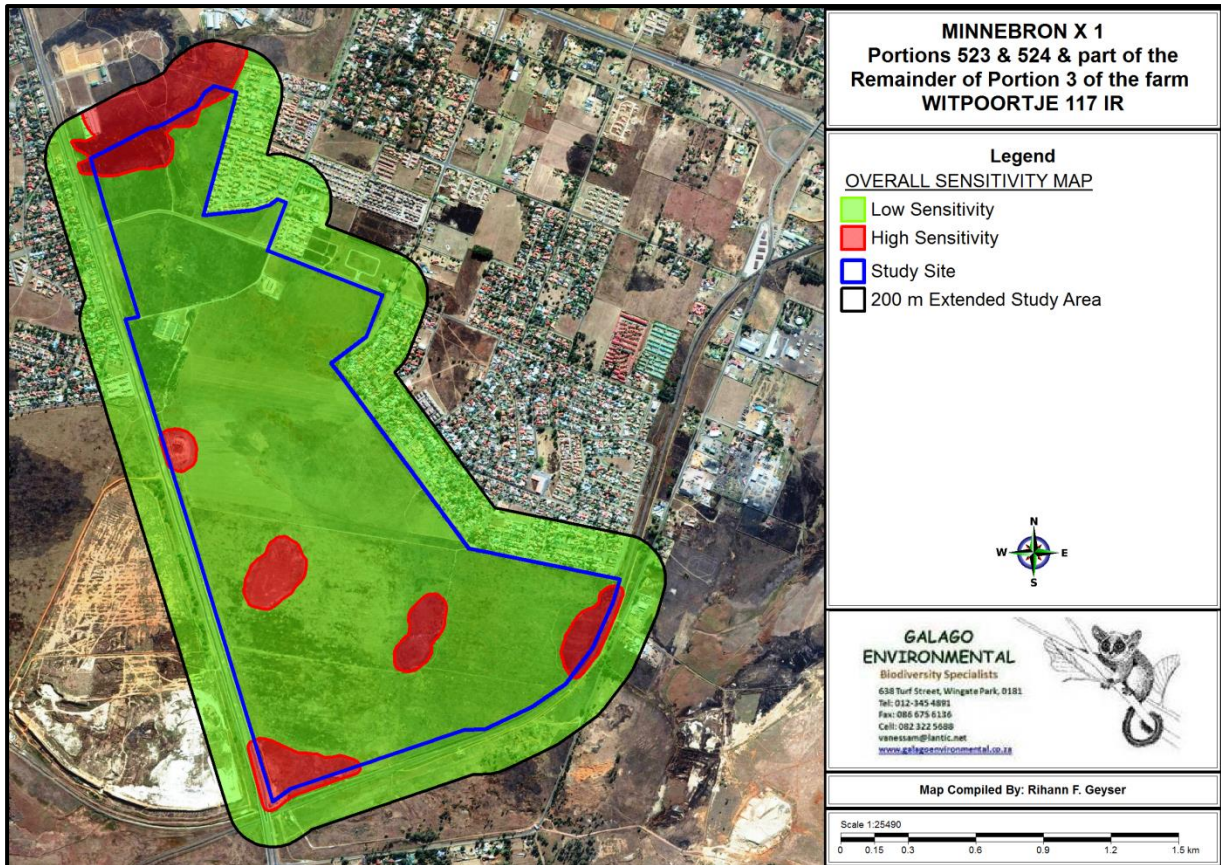


Figure 11: The overall biodiversity map of the study site

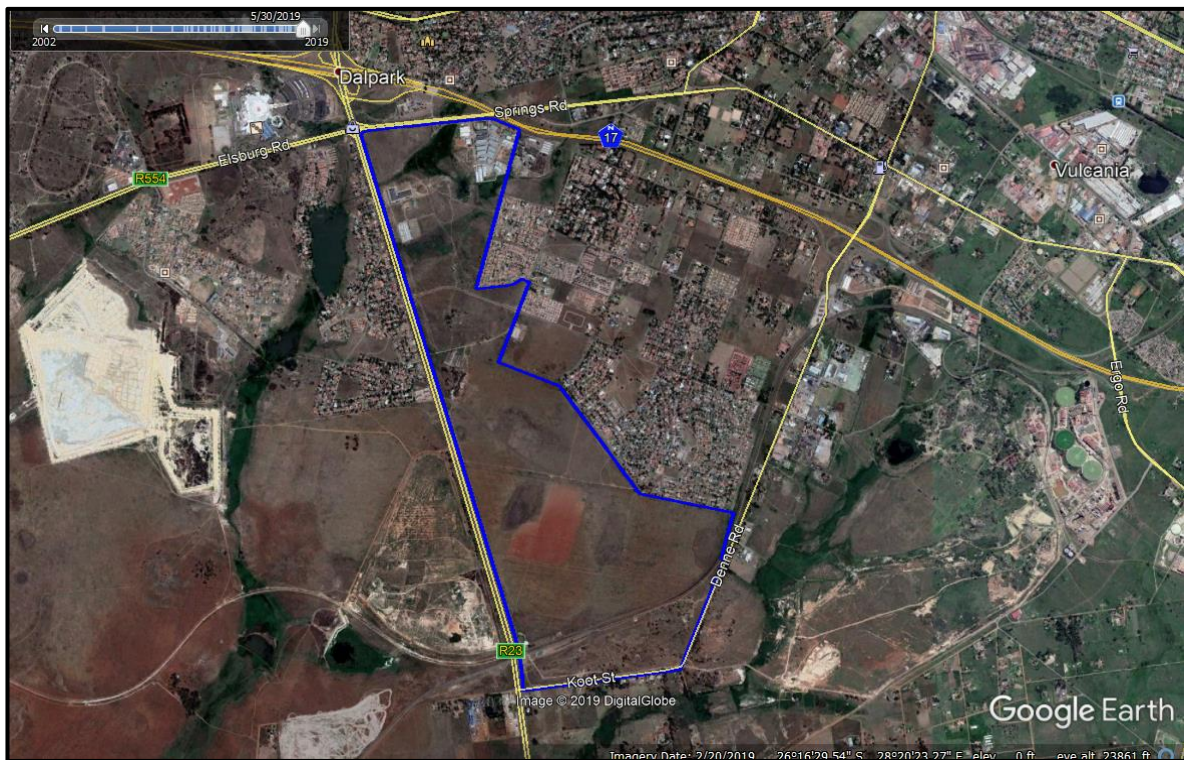
### 3.3 Social Environment

#### 3.3.1 Historical and current land use of the property

Google Earth's Timeline function was used as reference imagery. Google Earth imagery from 2002 (Figure 12) to early 2019 (Figure 13) is available and was used to determine the historical land use and whether the site was extensively altered in the past or to detect large changes in the land use of the catchment.



**Figure 12: The oldest usable Google Earth image of the site from 2002**



**Figure 13: Google Earth Image from 2019**

From these images, it is clear to see the site has not altered much over the past 17 years.

### 3.3.2 Socio-economic profile

Minnebron falls within the Ekurhuleni Metropolitan Municipality. The following demographic information is available, according to the Census 2011 Municipal Fact Sheet, published by Statistics South Africa (Table 6).

**Table 6: Demographic information for Ekurhuleni metropolitan Municipality, 2011**

<b>Population</b>	3 178 470
<b>Age Structure</b>	
Population under 15	24.30%
Population 15 to 64	71.70%
Population over 65	4.00%
<b>Dependency Ratio</b>	
Per 100 (15-64)	39.40
<b>Sex Ratio</b>	
Males per 100 females	105.00
<b>Population Growth</b>	
Per annum	2.47%
<b>Labour Market</b>	
Unemployment rate (official)	28.80%
Youth unemployment rate (official) 15-34	36.90%
<b>Education (aged 20 +)</b>	
No schooling	3.60%
Higher education	14.60%
Matric	35.40%
<b>Household Dynamics</b>	
Households	1 015 465
Average household size	2.90
Female headed households	31.30%
Formal dwellings	77.40%
Housing owned	44.00%
<b>Household Services</b>	
Flush toilet connected to sewerage	85.00%
Weekly refuse removal	88.40%
Piped water inside dwelling	57.20%
Electricity for lighting	82.20%

The study site's locality close to the Brakpan and Springs CBD's, as well as the major Far East Rand industrial areas, makes it very suitable for residential infill development aimed at poor communities who have to rely on public transport.

The study area falls in the Eastern region of Ekurhuleni comprising of Benoni, Daveyton, Etwatwa, Springs, Nigel, KwaThema, Tsakane, Duduza and Brakpan. The economic

structure of the Eastern Region is focussed on the established but declining industrial areas of the Far East Rand, characterised by heavy industries. It borders onto the Mpumalanga Province in the east.

There are 5 main areas that was identified for infill development where EMM wants to use un/underdeveloped land in central locations. These are the areas previously occupied by mining activities in areas such as Springs and Brakpan.

According to EMM census information unemployment figures for EMM is approximately 28.8%. In the entire EMM, 3.6% of the adult population have no schooling (see Table 6).

The economic targets for the EMM are the following and will be taken into consideration when the proposed development is designed and implemented:

- Economic diversification
- Job creation
- Skills development
- Tourism promotion
- Investment promotion; and Economic transformation.

### **3.3.3 Cultural / Historical Heritage**

A cultural heritage study was undertaken during the EIA phase (**see Appendix D: Annexure D6**).

The study found that no sites of heritage significance were identified within the study area. It is not anticipated that the proposed development will be bedrock intrusive and as such Paleontological deposits will not be affected.

In the event that artefacts / graves / areas of cultural significance are discovered during the construction phase, all work should be halted and a cultural heritage practitioner should be appointed to examine the site and make appropriate recommendations.

### **3.3.4 Land use**

The site is excellently located in terms of sub-regional and regional links. Heidelberg Road (R23), which forms its western boundary, is a major north-south arterial route through Ekurhuleni, linking the N12, N17 and N3 freeways which provide access to the eastern seaboard. The R23/N17 interchange is only 1.5km north of the site. Elsburg Road (R554), running east-west with the Far East Rand industrial areas and Springs CBD to the East.

The study area has been transformed to a large degree, and is zoned for "Agriculture" (RE of Portion 3) on the southern side of the site and the southern part of the site is zoned for "Residential 1" purposes. Alternatives for the site include grazing and farming activities, but the agricultural potential is low.



The major land uses surrounding the site include:

- To the North and Northwest: Van Eck Park Ext.2 industrial area, Carnival City Casino, Carnival Mall and Dalview residential area. On site the Van Eck Substation.
- To the East: Sonneveld Extensions and Minnebron middle income and upmarket residential townships as well as Rand Collieries Agricultural Holdings. The majority of the residential units are conventional detached houses. On site find the Municipal Transfer facility.
- To the South: Withok Estates Agricultural Holdings
- To the West: An old removed slimes dam abutting the southern part of the site, Dalpark middle income residential township abutting the northern part of the site. The majority of the residential units are conventional detached houses.

According to the Gauteng Environmental Management Framework (GEMF) from GDARD the study site falls within Zone 1 – urban development zone and Zone 2 – high urban control zone (Figure 14). According to the GEMF Standard, 2018 there are certain guidelines for development that pertains to these zones.

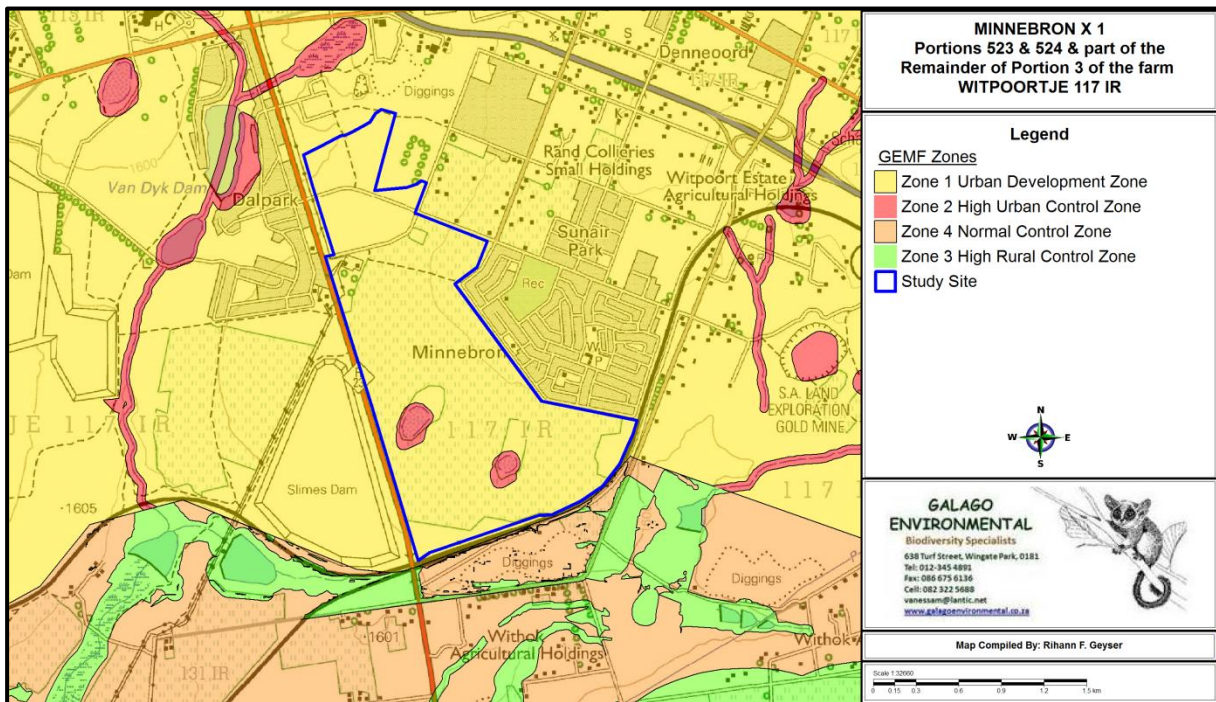


Figure 14: Map of the GEMF Zones on the study site

### 3.3.5 Visual character

Most of the site area is degraded with a low ecological sensitivity. The visual status of the area is influenced by: alien vegetation establishment and expansion; road crossings; dumping and litter; mining (mine tailings) and frequency of fire events.

The site has several wetlands and is surrounded by residential areas and mine tailings (see Figure 15 – Figure 19).



**Figure 15: The wetland to the north of the site**



**Figure 16: View of the residential area adjacent to the site**



**Figure 17: View of the Van Eck substation on site**



**Figure 18: One of the major intersections on site showing roads, traffic, powerlines etc.**



**Figure 19: View of industrial / mining areas near the site**

## **4. TECHNICAL INFORMATION ON THE PROPOSED RESIDENTIAL DEVELOPMENT**

The proposed Minnebron x 1 will be a major development in the Central East Rand, comprising more than 10 000 housing units and a range of community facilities and amenities. The aim is to develop an integrated and sustainable township catering for communities over the entire socio-economic spectrum and offering a wide range of lifestyle options within an environment which is conducive to social interaction, playing, learning and working.

The proposed Layout Plan of Minnebron x1 is a refinement of the Van Eck Park/Witpoortje Precinct Plan which was undertaken for the City of Ekurhuleni Human Settlements Department in 2015/16 (See Appendix C and Appendix D: Annexure D11).

**High density** residential stands are proposed along the major roads and in the areas in some areas abutting the proposed parks and within the T.O.D. node adjacent to the future station. Two storey to four walk-up units will be built on these erven at densities of between 100 to 120 units per ha. Rental units, affordable walk-up units, GAP units and Government subsidized walk-up units can be built on these stands.

A total of 60 erven with an area of 63.84 ha are proposed, a total of 6384 units if a density of 100 units per ha is applied. It is proposed that these erven be zoned for "Residential 4" purposes with a maximum height of 4 storeys.

A total of 3772 **Medium density** residential erven for free standing and semi-detached housing are proposed throughout the township, with a ruling size of 150m<sup>2</sup> and larger erven of 240m<sup>2</sup> are proposed in the northern part of the township abutting Sonneveld. It is proposed that these erven be zoned "Residential 2".

A total of 65 row housing erven with a ruling size of 80m<sup>2</sup> are proposed along the Van Dyk Road east of the substation. It is proposed that these erven be zoned “Residential 2”.

A total of 8 erven with a total area of 7.58 ha is proposed for “**Business 2 zoning**” in two nodes with a maximum height of 4 storeys and 120 Units/ha.

Two **combined schools** and 4 **Primary school sites** are provided for in the proposed development and a total of 7 erven for local community facilities such as crèches and churches as well as 2 Social Services erven are proposed.

A total of 40 “**Public Open Space**” erven are proposed throughout the township, including local play parks, stormwater detention dams, shaft buffer zones and the wetlands and their buffers.

The existing Van Eck substation is accommodated in the proposed “Public Services” erf and allows for future extensions of the substation. The municipal transfer facility will be moved to a more suitable site where it will not pose a nuisance to the residents.

## 5. ROADS AND SERVICES

### 5.1 Roads

#### 5.1.1 Existing major road networks

A total of 4 access points from Provincial Route K109 abutting the township on the west are proposed. Four east-west collector roads run through the township, linking it to the areas to the west and the east for mobility. Two north-south collector roads are proposed, namely the extension of West Street in Sonneveld north of the township right through it to the future station on its southern edge, and the extension of Vincent van Gogh Street in Van Eck Park industrial area southwards through the township, running roughly parallel to K109.

With the exception of the collector roads and certain wider road reserves adjacent to the school sites and in the T.O.D. node close to the station, internal streets in the township will consist of a hierarchical system of 16, 13 and 10m wide streets. Street blocks were designed to maximize northern exposure and reduce east-west exposure where possible.

#### 5.1.2 Proposed access routes

The site is surrounded by the following road network:

- **Gert Bezuidenhout Street:** This road runs along the eastern boundary of the site.
- **Heidelberg Road:** This road is along the western boundary of the proposed development.
- **Farquharson Road:** This road runs along the eastern boundary of the site.
- **Lower Road:** This road runs along the eastern boundary of the site.
- **Rembrant Van Rijn Street:** This road runs along the northern boundary of the site.

#### 5.1.3 Traffic impact study

A traffic impact study was done (see Appendix D: Annexure D10) and found that according to the existing and base traffic volumes as well as the capacity analyses, it is concluded that the traffic of the proposed development will have some impact but with the proposed mitigation measures, which includes road network expansions and upgrades, the traffic from the proposed development can be accommodated.

Heidelberg Road (K109) forms the western boundary of application site. The proposed development will not affect any other provincial roads. Denne Road is planned as K163 and is east of the proposed development. Both K109 and K163 have accepted preliminary designs.

Elsburg Road is an essential east-west link in the area and with no viable alternative. Sections of the road are very congested. The extension of Farquharson Road to Trichardts Road is proposed with an intersection on K155 (Barry Marais Road). This will create an alternative east-west link.

The N17, running north of the study area, forms a barrier restricting north-south linkage in the area. Creating more links is essential to create capacity for future developments. Improving the connectivity between the area north and the area south of the N17 will take traffic off the N17 and will relief capacity problems at the interchanges. The implementation of a section of K163 will increase north-south capacity which is very limited currently.

The extension of Morethema Road eastwards to link with Vlakfontein Road will improve integration access to the area east (Kwa-Thema, Langaville, Tsakane and Geluksdal). This link will also assist in providing alternative routes to Heidelberg road and the N12 and will enable the usage of the interchange on Ergon Road instead of the interchange on Heidelberg Road (which is very congested).

The townships layout makes provision for sufficient road reserves along different roads.

## **5.2 Rail**

### **5.2.1 Existing rail network**

A freight rail line bisects the southern part of the site. The rail reserve makes provision for a station abutting the site.

## **5.3 Water**

A total demand of 222.55 l/s is required for the proposed development. See the civil services report in Appendix D: Annexure D7.

### **5.3.1 Existing services**

#### **5.3.1.1 Water distribution zone**

Currently the northern section of the development falls under the Brakpan-RW0082 distribution zone. The southern section of the development will fall under the Brakpan-RW2811 distribution zone. Currently the site is bounded by a 150 dia water line on the northern and eastern section. The southern side of the study site has a 125 diameter line at relative close proximity, that is currently servicing the existing developments on the eastern boundary of the site.

### **5.3.1.2 Reservoir capacities**

The proposed development will require approximately 222.55 l/s. Water in this area comes from the existing 600mm Rand Water line that connects the Brakpan reservoir with the Klipriviersberg reservoir system.

### **5.3.1.3 Main Feeder Pipes**

The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will have to be constructed, which is currently at detail design stage.

### **5.3.1.4 Internal Water Reticulation**

The materials for the proposed water reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality. The water pipelines will be constructed with class 12 (SABS 1283), uPVC material with cast iron fittings as required.

## **5.3.2 Future Provision**

The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will be constructed, which is currently at detail design stage.

## **5.4 Sewage**

The site is split up into three drainage zones, namely the south-eastern zone, south-western zone and the northern zone. The south eastern zones drain toward the eastern corner of the site at an average slope of 4.4 %. The south-western zones drain toward the western corner of the site at an average slope of 2.5 %. The northern zone drains toward the northern corner of the site at an average slope of 2.5 %.

Currently the whole development drains toward the Brakpan-Vlakplaats drainage system with a spare capacity of 97.94 l/s. The internal sewage network was analysed, and it was found that the system does have spare capacity for the proposed development. See the civil services report in Appendix D: Annexure D7.

### **5.4.1 Sewage Pump Stations**

No pump station will be affected.

### **5.4.2 Main Outfall Sewers**

The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded. It is expected that the development will ultimately be served served by the Waterfall WWTP, with a current capacity of 170 ML/d which has to be upgraded by ERWAT.

### **5.4.3 Network Sewers**

Currently the whole development drains toward the Brakpan-Vlakplaats drainage system with a spare capacity of 97.94 l/s. The internal sewage network was analysed, and it was found that the system does have spare capacity for the proposed development.

#### 5.4.4 Future Provision

The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded.

#### 5.4.5 WWTP Capacity

The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded. It is expected that the development will ultimately be served by the Waterfall WWTP, with a current capacity of 170 ML/d which has to be upgraded by ERWAT.

Currently the entire development drains toward the Brakpan-Vlakplaats drainage system with a spare capacity of 97.94 l/s. The internal sewage network was analysed, and it was found that the system does have spare capacity for the proposed development.

### 5.5 Domestic waste

During the construction phase solid building rubble would be generated monthly. The construction waste would need to be disposed of at a municipal waste disposal site by the contractors.

The proposed development will produce approximately 784 m<sup>3</sup> of solid waste per week. Waste will be removed by Ekurhuleni Metropolitan municipality on a weekly basis.

### 5.6 Stormwater runoff and drainage

The site is split up into three drainage zones, namely the south-eastern zone (**Catchment 1**), southwestern zone (**Catchment 2**) and the northern zone (**Catchment 3**). The south eastern zones drain toward the eastern corner of the site at an average slope of 4.4 %. The south-western zones drain toward the western corner of the site at an average slope of 2.5 %. The northern zone drains toward the northern corner of the site at an average slope of 2.5 %. Please find attached layout drawing in **Appendix B**. Based on the contours and Ekurhuleni GISS data the site is affected by a 1:100-year flood line. The site has light vegetation with no built up or informal developments. See Appendix D: Annexure D9 for the Stormwater management plan.

#### 5.6.1 Existing conditions

##### **Catchment 1:**

The catchment currently drains toward a 6 x 1.5 m culvert underneath the current Spoornet railway. Stormwater is further conveyed below Denne Road and towards a river reach south of the Spoornet railway.

##### **Catchment 2:**

The catchment currently drains toward the Heidelberg Road & Spoornet Railway crossing corner in the south-west corner of the development. There is no formal stormwater infrastructure on the corner and as a result a wetland has been formed.

##### **Catchment 3:**



The catchment currently drains toward the northern boundary of the development towards a manmade wetland. Water currently concentrates on the northern boundary of the development. There is currently no stormwater infrastructure that can drain the northern section of the development.



**Figure 20: Stormwater catchment areas as provided by JT Evolve, 2018 (Appendix D9)**

### 5.6.2 New stormwater system

It is a requirement from Ekurhuleni Metropolitan Municipality the stormwater runoff from the site must be retained in such a way that the runoff before development for a 5 year or a 25 year storm be retained after development to restrict the flows to values before development.

From a services point of view, the proposed township can be serviced and therefore the township should be supported subject to the following infrastructure being upgraded:

#### **Catchment 1:**

The existing stormwater culvert was analysed and it was found to have sufficient capacity for the increased runoff subject that it is maintained on a regular basis.

#### **Catchment 2:**

The south -west corner does not have sufficient stormwater infrastructure to service catchment 2, it is proposed to design a new stormwater outlet structure to drain the development.

#### **Catchment 3**

The northern section of the development has no existing infrastructure that could be used to service the development. It is proposed to construct new stormwater infrastructure below Heidelberg Road to service the development.

### **5.6.2.1 Detention Ponds**

The catchment area and runoff from the proposed township was calculated for 5 year and 25 year storms (see the Stormwater management plan in Annexure D9).

On site attenuation will be utilized as well as using all public open spaces. All areas above the environmental buffer zones will also be used for attenuation.

### **5.6.2.2 Outlet from Detention Facilities**

There are no existing stormwater facilities to connect into the outlet pipes from the detention facilities. The attenuation ponds will overflow into the buffer strip. The overflow water will eventually discharge on the eastern side of the development into the spruit from the buffer strip, thus also simulating the additional pre-developed flow up and to a 1:25 year recurrence interval

### **5.6.2.3 Materials**

The materials for the proposed stormwater reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality and SANS 1200.

### **5.6.3 Stormwater**

The following precautions need to be taken by Ekurhuleni Metropolitan Municipality: Stormwater will accumulate at low points during construction. This water will carry silts that can damage wetland areas when it concentrates on these areas.

### **5.6.4 Stormwater management guidelines**

The following design standards will be applied for the civil services:

- Guidelines for the provision of engineering services and amenities in residential township development by the National Housing Board (Blue Book).
- Guidelines for human settlement planning and design (2000) compiled under patronage of the Department of Housing and published by the CSIR Building and Construction Technology (New Red Book).
- Design guidelines by Ekurhuleni Metropolitan Municipality to limit flows.
- Applicable SANS 1200 standards.

### **5.6.5 Design Principles**

#### *Minor System*

The internal stormwater network will be designed using a storm with a recurrence interval of 5 years. Where water can concentrate, the piped system will be designed for a 25 year storm.

#### *Major System*

The internal roads and paved area will be designed in combination with the minor system to handle a storm with a recurrence interval of 25 years. The 25 year storm will be discharged through the piped system and on the road surface.

Larger order storms will be handled as sheet flow over the area and discharged through the road reserve to lower lying areas.

## 5.7 Electricity supply

The proposed development may be supplied with electricity from the Van Eck substation situated on the site. The existing maximum demand at Van Eck already exceeds safe capacity. Additional space capacity will have to be installed and the planned upgrading of the existing transformers to 160MVA will be required. The planned Helderwyk/Leeuwpoort 88kV substation will also become relevant for other developments in the vicinity.

## 6. DESCRIPTION OF ALTERNATIVES

The National Department of Environmental Affairs stresses that the no-go option be considered as a base case against which to measure the relative performance of the other alternatives. The impacts of other alternatives are expressed as changes to the base case or status quo. If considered viable the decision not to act may be considered in the evaluation and assessment process against the other alternatives. The following table (Table 7) describes the different alternatives that were investigated in more detail during the EIA phase and comments on potential implementation.

**Table 7: The different alternatives that were investigated in more detail during the EIA phase and comments on potential implementation**

Alternatives	Description	Comments on project implementation
Activity alternatives	Alternatives to considering other activities to address the same ends	A short summary of activity alternatives will be included in section 6.1.
Location or site alternatives	The property on which the proposal is intended and possible location for certain activities within the property. This can also include other sites to commission the project.	Site alternatives were investigated by the EMM during the feasibility phase of the project. Sites with significant environmental sensitivities were excluded from further investigations. The remaining sites are now going through EIA processes to consider the environmental impacts.
Layout / Design alternatives	Placement of land uses and infrastructure within the area available for development to optimise the site and also provide environmental safeguard to sensitive features identified. Design alternatives could also include different architectural designs of housing units, engineering designs of infrastructure services and roads.	<p>These alternatives were investigated during the EIA phase after the finalization of all the specialist studies. The layout attempted to avoid environmentally sensitive areas, such as wetland areas.</p> <p>A protective buffer should be maintained around the population of Red List vegetation species found within 200m of the site.</p> <p>It was determined through all the biodiversity specialist studies that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and</p>

Alternatives	Description	Comments on project implementation
		<p>unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive. The site is situated within the urban edge, surrounded by development and the vegetation of the site is transformed.</p> <p>A total of 40 “<b>Public Open Space</b>” erven are proposed throughout the township, including local play parks, stormwater detention dams, and the buffer areas of the wetlands. The major part of the open space system consists of the buffers (Appendix C – alternative layouts).</p> <p>The air quality study determined that a buffer of 100m should be enforced around the tailings dam to the west of the site to reduce potential impacts associated with air quality. This buffer was also implemented in the proposed layout.</p>
Scale alternatives	Refers to actual size of the development proposed and social housing components.	Scale alternatives were investigated during the EIA phase after the finalization of all the specialist studies.
Technology alternatives	The use of solar instead of electricity to diminish the demand on the municipal electricity provision must be considered.	Technology alternatives were investigated during the EIA phase after the finalization of all the specialist studies. Section 0 gives a summary of potential alternative technologies that could be used.
Land use alternatives	Consideration of alternative land uses on the development site aside from housing.	A short comparable analysis of land use alternatives follow in section 6.1
No-go option	The status quo remains and no development takes place.	The no-go option will be investigated in section 6.3

## 6.1 Land use/activity alternatives

Site alternatives were investigated during the feasibility phase of the project and site alternatives will not be further investigated since the applicant is the landowner and has no other land available for residential development in the area (Table 8). The following table is a summary of activity alternatives.

**Table 8: A comparable summary of the activity alternatives**

Activity	DISQUALIFYING CONSIDERATIONS
Industrial / Commercial development	The current demand in Ekurhuleni Municipality is for mixed use residential developments that include some land for commercial use. There is currently no need for more industrial sites in residential areas.
Agriculture	The site has been earmarked for housing and does not have a high agricultural potential due to historical mining use in the area.
Residential Development	<p>There is a tremendous need for housing in the area. The site is on the edge of existing development and the expansion of the infrastructure can be easily incorporated. There is already a road network for easy access to the surrounding areas.</p> <p>People have different lifestyles and a choice of unit types and tenure options will be provided to fit individual preferences and a range of income groups.</p> <p><b>High density</b> residential stands are proposed along the major roads and in the areas in some areas abutting the proposed parks and within the T.O.D. node adjacent to the future station. Two storey to four walk-up units will be built on these erven at densities of between 100 to 120 units per ha. Rental units, affordable walk-up units, GAP units and Government subsidized walk-up units can be built on these stands.</p> <p>A total of 60 erven with an area of 63.84 ha are proposed, a total of 6384 units if a density of 100 units per ha is applied. It is proposed that these erven be zoned for "Residential 4" purposes as per the Ekurhuleni Town Planning Scheme of 2014.</p> <p>A total of 3772 <b>Medium density</b> residential erven for free standing and semi-detached housing are proposed throughout the township, with a ruling size of 150m<sup>2</sup> and larger erven of 240m<sup>2</sup> are proposed in the northern part of the township abutting Sonneveld.</p> <p>A total of 65 row housing erven with a ruling size of 80m<sup>2</sup> are proposed along the Van Dyk Road east of the substation.</p>

	<p>A total of 8 erven with a total area of 7.58 ha is proposed for “<b>Business 2 zoning</b>”.</p> <p>Two <b>combined schools</b> and 4 <b>Primary school sites</b> are provided in the development and a total of 7 erven for local community facilities such as crèches and churches as well as 2 Social Services erven are proposed.</p>
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## 6.2 Technology Alternatives - energy sources

Appropriate structural designs, energy effective building construction and orientation, have not been considered to date. The following recommendations regarding structural designs are however made by the EAP:

- Use of building materials that requires excessive amounts of energy to manufacture should be minimized.
- Use of building materials originating from sensitive or scarce environmental resources should be minimized. E.g. no tropical hardwood may be used.
- Building materials should be legally obtained by the supplier, e.g. wood must have been legally harvested, and sand should be obtained only from legal borrow pits and from commercial sources.
- Building materials that can be recycled / reused should be used rather than building material that cannot.
- Use highly durable building material for parts of the building that is unlikely to be changed during the life of the building (unlikely to change due to e.g. renovation, fashion, changes in family life cycle) is highly recommended.
- Local building materials instead of imported building materials should be used as much as possible (this will reduce transportation impacts and enhance local job creation).

**Passive Thermal Design** is based on the principle of energy efficient techniques in housing, that involve the application of energy flow principles and climatic characteristics of a region in the design, construction and management of houses so as to achieve thermal comfort with minimal conventional energy input.

The basic principles of passive thermal design incorporate the following:

- i. Orientation of the house
- ii. Optimizing natural sunlight through day lighting and
- iii. Utilizing thermally efficient building materials.

These principles are a low cost intervention, and are applicable to all climatic regions of South Africa.

**Orientation:** Passive solar design by orientating the houses towards geographic north can reduce heating expenditure by up to 48%. Houses which are north orientated and have most windows facing north, would have the least heat gain in summer and the least heat loss in winter. “Daylighting” refers to optimizing natural sunlight through glazed areas during daylight hours in such a way that heat gain is minimized in summer and heat loss is minimized in winter. Solar radiation transmitted through glass converts to heat. This is

applicable for instance with concrete floors. Hence, at least 20% of the total floor area should be glazed – preferably on the northern side of a house.

**Building Materials:** Passive thermal design also entails using appropriate building materials, such as materials with a high thermal capacity, which are able to store heat during the day and release this heat slowly at night. Materials of high reflectance should be used to reflect solar heat.

**Walls:** There are various methods available to insulate a wall. Building a cavity wall is seen as the most effective method of insulation, but it is also the most expensive method. The use of hollow cement blocks for walls and concrete surface beds for flooring have reasonable thermal capacities. Alternative materials such as earth bricks have higher thermal capacities. Another means of insulating walls is plastering. A plastered wall is better resistant to moisture and prevents the mortar of a wall from cracking. Subsequently, plastering reduces maintenance costs and energy usage costs. Construction boards can also function as insulation. They are made of polystyrene or fibre-cement, and when placed outside of the cement blocks wall, place the thermal mass of the wall on the inside of the house.

**Ceilings:** Installing the correct ceiling is critical in order to achieve a thermally efficient low cost house. Ceilings ensure a reduction of heat flow into and out of the house. As a result, with the use of the correct ceiling material, the house is warmer in winter and cooler in summer. Building products containing asbestos must be avoided wherever possible. Metal sheeting is an alternative to asbestos for roofing, but the heat loss and gain of metal sheeting is too extreme. Ceiling insulation is a moderate to high cost intervention, but should be seen as an absolute necessity.

These principles shall be included as far as possible in the designs, within the budget framework, for the proposed development.

### **6.3 No-go alternative**

The situation where the environment is left in the present condition and no interference is attempted; therefore the status quo is maintained. Most of the site area is degraded a low ecological sensitivity, except for the wetlands that are considered to be of medium sensitivity.

Should this site not be developed then the housing shortage in the area would increase the demand for resources in the area. Illegal hunting and harvesting of medicinal plants on the site could then further reduce the biodiversity on site. The housing shortage also place increasing demand on infrastructure and the social environment of surrounding areas. The surrounding schools and health facilities are not designed to deal with the influx of people.

At present there is uncontrolled access to the site, causing increased dumping on the site and a great possibility of a squatter camp establishing on the site. This situation has an increasing security risk for the surrounding properties.

## 6.4 Preferred option

The preferred option is to develop the site into a residential development with a mixture of high and medium density residential erven together with community facilities and parks to facilitate a proper working township catering for the housing need in the area without compromising on the community sense of place. All sensitive areas as well as buffers were incorporated in the proposed layout as open space areas (See Appendix C for the alternative layout plan). The recommended layout of this option is the following:

**High density** residential stands are proposed along the major roads and in the areas in some areas abutting the proposed parks and within the T.O.D. node adjacent to the future station. Two storey to four walk-up units will be built on these erven at densities of between 100 to 120 units per ha. Rental units, affordable walk-up units, GAP units and Government subsidized walk-up units can be built on these stands.

A total of 60 erven with an area of 63.84 ha are proposed, a total of 6384 units if a density of 100 units per ha is applied. It is proposed that these erven be zoned for "Residential 4" purposes as per the Ekurhuleni Town Planning Scheme of 2014.

A total of 3772 **Medium density** residential erven for free standing and semi-detached housing are proposed throughout the township, with a ruling size of 150m<sup>2</sup> and larger erven of 240m<sup>2</sup> are proposed in the northern part of the township abutting Sonneveld.

A total of 65 row housing erven with a ruling size of 80m<sup>2</sup> are proposed along the Van Dyk Road east of the substation.

A total of 8 erven with a total area of 7.58 ha is proposed for "**Business 2 zoning**".

Two **combined schools** and 4 **Primary school sites** are provided in the development and a total of 7 erven for local community facilities such as crèches and churches as well as 2 Social Services erven are proposed

A total of 40 "**Public Open Space**" erven are proposed throughout the township, including local play parks, stormwater detention dams, shaft buffer zones and the wetlands and their buffers (also see Figure 17 and Annexure D11).

## 6.5 Conclusion

See Table 9 below for a summary of the feasible alternatives identified for the study site.



**Table 9: Summary of the feasible alternatives identified**

ALTERNATIVE	EVALUATION
<p><b>No-go option</b></p>	<p><b>Positive:</b></p> <ul style="list-style-type: none"> <li>o Uncontrolled open space function of site will prevail and continue.</li> <li>o Biodiversity on the site will continue, but will probably decrease with illegal dumping on site.</li> <li>o Visual character of area will remain intact.</li> </ul> <p><b>Negative:</b></p> <ul style="list-style-type: none"> <li>o Infrastructure services in the area will not be upgraded to accommodate the current demand in the area.</li> <li>o Congested roads in the area will not be upgraded in the foreseeable future.</li> <li>o Uncontrolled dumping and continued degradation of land.</li> <li>o There is a potential for informal settlement to occur on site which poses associated health impacts.</li> <li>o The continued harvesting of the flora and fauna on the site will reduce biodiversity over the long run.</li> <li>o Visual character of area will remain intact with increasing signs of dumping.</li> <li>o Social impacts on neighbouring properties due to uncontrolled access to the site will continue and/or increase.</li> <li>o A huge capital investment will be needed in the future for rehabilitation of the site due to increased deterioration through dumping of domestic and construction rubble.</li> <li>o Security risk of vagrants.</li> </ul>
<p><b>Preferred alternative:</b> Mixed use residential development of the area with conservation of the sensitive areas and their buffers</p>	<p><b>Positive:</b></p> <ul style="list-style-type: none"> <li>o Open space areas that will be conserved will include sensitive wetland areas and their buffers.</li> <li>o Local Authority receives taxes and income from service provision.</li> <li>o Shortage in housing demand will be reduced.</li> <li>o Infrastructure services in the area will be upgraded to accommodate the demand for the new residential development.</li> <li>o Upgrade of living conditions of the people living in informal townships in surrounding areas</li> <li>o Installation of infrastructure (especially sewage lines) will improve the quality of living and reduce the impact to the environment.</li> <li>o The visual character or “sense of place” of the area will be improved.</li> </ul> <p><b>Negative:</b></p> <ul style="list-style-type: none"> <li>o Increasing pressure may be placed on resources such as clinics and schools until these increased demands are accommodated into new facilities in the future, however the development will provide for some of these facilities.</li> <li>o Traffic impacts may as a result of increased amount of residents using already congested roads if not upgraded before the proposed development is built.</li> <li>o Potential for increased crime during the construction phase of the proposed development.</li> <li>o Increasing pressure on infrastructure in an area that is already under pressure with sewage and other services that have not been upgraded in recent years, should infrastructure not be upgraded before the proposed development is constructed.</li> </ul>

**This study therefore recommends that the preferred alternative be instituted, as negative impacts could be mitigated with proper planning and infrastructure upgrades.** This assessment is not strictly conducted on the conventional impact assessment process, but integrates strengths of environmental planning from the inception phase to ensure that sensitive environmental features are excluded from development, and

that environmental opportunities and constraints are integrated into the planning and design of the scheme.

It is important to remember that there are also other types of alternatives that were investigated throughout the process as described in the tables 7-9 under Section 6.

## 7. METHODOLOGY AND APPROACH

An impact can be defined as any change in the physical-chemical, biological, cultural, and/or socio-economic environmental system that can be attributed to human activities relative to alternatives under study for meeting a project need.

There are numerous assessment methodologies and approaches within the international sphere of assessing the potential impact of development activities on the environment.

When a particular method for environmental impact analysis is selected or used certain general principles must be kept in mind to avoid the mystique and pseudo-science, which cloud many planning procedures. In general terms an environmental assessment evaluation comprises four main tasks:-

- a. Collection of data;
- b. Analysis and interpretation of this data;
- c. Identification of significant environmental impacts;
- d. Communication of the findings.

Further to the above the proposed mitigation and management options for the identified impacts must be provided. The selected impact evaluation method must enable these four tasks. Impact methodologies provide an organised approach for predicting and assessing these impacts. Any one methodology and approach will have opportunities and constraints, as well as resource and skill demands, and no one method is appropriate for all circumstances. The selected methodologies proposed by this document are appropriate for most situations, taking the above criteria into account.

Impact assessment methodology should comply with the following set of criteria:

- a. *Be comprehensive:* The environment consists of intricate systems of biotic and abiotic factors, bound together by complex relationships. The methodology must consider the impact on these factors.
- b. *Be flexible:* Flexibility must be contained in the methodology, as projects of different size and scale result in different types of impacts.
- c. *Detect true impact:* The actual impact that institutes environmental change, as opposed to natural existing conditional changes. Long-term and short-term changes should be quantified.
- d. *Be objective:* The methodology must be objective and unbiased, without interference from external decision-making.
- e. *Ensure input of required expertise:* Sound, professional judgement must be assured by a methodology.
- f. *Utilize the state of the art:* Draw upon the best available analytical techniques.

- g. *Employ explicitly defined criteria:* Evaluation criteria used to assess the magnitude of environmental impacts should not be arbitrarily assigned. The methodology should provide explicitly defined criteria and explicitly stated procedures regarding the use of these criteria, including the documented rationale.
- h. *Assess actual magnitude of impacts:* A method must be provided for an assessment based on specific levels of impact for each environmental concern.
- i. *Provide for overall assessment of total impact:* Aggregation of multiple individual impacts is necessary to provide an evaluation of overall total environmental impacts.
- j. *Pinpoint critical impacts:* The methodology must identify and emphasize particularly hazardous impacts.

Methods for identification of environmental impacts (Table 10) can assist in specifying the range of impacts that may occur, including their spatial dimensions and time period. Identification methods answer questions concerning the components of the project and what elements of the environment may be affected by these components.

**Table 10: Methods for identification of environmental impacts**

<b>Function</b>	<b>Methodology</b>
Identification	Description of the existing environmental system Determination of the components of the project Definition of the environment modified by the project
Prediction	Identification of environmental modifications that may be significant Forecasting of the quantity and/or spatial dimensions of change in the identified environment Estimation of the probability that the impact (environmental change) will occur (time period)
Evaluation	Determination of the incidence of costs and benefits to user groups and populations affected by the project Specification and comparison of the trade-offs (costs or effects being balanced) between various alternatives

## 7.1 Evaluation methods in environmental assessment

Defined as a formal procedure for establishing an order of preference among alternatives. The use of multiple evaluation methods may seem excessively demanding. However, it is usually obtaining the inputs to evaluation methods that are demanding. Once these inputs are available, application of the methods themselves is often relatively straightforward. A particular evaluation obviously should not be seen as equivalent to a decision. Evaluation methods are designed as decision *aids* for decision makers. They do not replace the need for decisions to be made, particularly where issues such as fairness and distribution of costs and benefits are involved. Ultimately evaluation methods should serve as convenient means of connecting assumptions to consequences so that decision-makers can explore and more fully appreciate different alternatives and value sets and ultimately they can make better decisions.

### 7.1.1 Formal Procedure

An evaluation method is a formal, explicit, and thorough way of organising and describing choices. The amount and complexity of data characteristic of evaluations for projects, including small ones, means that the iterative Environmental Assessment process requires a method too comprehensive to be applied casually or intuitively. Methods are intended to be applied repeatedly, each time with deliberate changes in assumptions or data that produce changes in preferences. This evaluation process gradually shows how differences in environmental preferences result in different ratings among alternatives.

Where affected interests conflict, evaluation methods are used to assist in reconciling differences as far as possible and reach compromises.

### 7.1.2 Methodology Types

The following lists the most frequently used categories of assessment methodologies. From this schedule those most appropriate and frequently used will be selected for the specific assessment requirements. More than 50 impact analysis methodologies have been developed. Of those considered we have selected the two primary methods and variations on them, being checklists and matrices.

Checklists can be divided into simple, descriptive, scaling, and scaling-weighting checklists. Matrices are subdivided into simple and stepped matrices.

The key point with regard to all environmental impact analysis methodologies is that they are useful tools for examining relative environmental impacts of alternatives. They represent a tool that must be applied with professional judgement, and their results must also be interpreted using professional judgement.

## 7.2 Implementation methodology used for the impact identification

1. Establish checklists for a.) Environmental characteristics and b.) Human development activities. These lists should be comprehensive and feature all the necessary items on which to base an informed decision.
2. The checklists are further categorised by single assessment sheets for each individual activity impacting on specific environmental parameters.
3. These are evaluated in terms of the following (see Table 11 -16):

### 7.2.1 Criteria for rating the extent or spatial scale of impacts

**Table 11: Criteria for rating the extent or spatial scale of impacts**

Extent Rating	
High	Widespread Far beyond site boundary Regional/national/international scale
Medium	Beyond site boundary Local area
Low	Within site boundary

## 7.2.2 Criteria for rating the intensity or severity of impacts

**Table 12: Criteria for intensity rating**

Intensity Rating	
High	Disturbance of pristine areas that have important conservation value. Destruction of rare or endangered species.
Medium	Disturbance of areas that have potential conservation value or are of use as resources. Complete change in species occurrence or variety.
Low	Disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety.

## 7.2.3 Criteria for rating the duration of impacts

**Table 13: Criteria for duration rating**

Duration Rating	
High (Long term)	Permanent. Beyond decommissioning. Long term (More than 15 years).
Medium (Medium term)	Reversible over time. Lifespan of the project. Medium term (5 – 15 years).
Low (Short term)	Quickly reversible. Less than the project lifespan. Short term (0 – 5 years).

## 7.2.4 Categories for Probability (likelihood) of the occurrence of an impact

Some of the potential impacts are associated with risk or conjecture (based on other scenarios developing during the period of impact) rather than the actual impact. It is important to establish the probability of the impact actually materialising.

**Table 14: Probability categories**

Category	Definition
Probable - High likelihood	Greater than 50:50 chance of occurrence
Improbable – Low likelihood	Less than equal to 50:50 chance, but at least a 1:20 chance of occurrence
Negligible	Less than 1:20 chance of occurrence

## 7.2.5 Categories for the rating of impact magnitude and significance

**Table 15: Impact Magnitude and significance rating**

<b>Impact Magnitude and Significance Rating</b>	
High	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible. Social, cultural and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.
No impact	Zero impact.

4. Together with the above, integrated in the evaluation checklist sheet provision is made for the:
  - Description of the impact  
Nature, what causes the effect and how is it affected.
  - Intervention specifications  
Design, precautionary, management, rehabilitation and documentation.
5. Once the above assessment has been completed an objective evaluation of the potential impact of the activity can be assured. The activity impact is then offset against the list of environmental characteristics in the cause-effect interaction matrix, which will be the evaluated significance.
6. Affected environmental components will be categorised as primary effect and secondary or peripheral effect.

## **7.3 Conclusion**

A combination of the above methodologies was used in section 9 to determine the significance of the potential impacts associated with the proposed development. The following section would describe how the potential impacts were identified and what actions should be taken to ensure that the potential environmental impacts of the proposed development are reduced to the minimum.

## **8. ADVERTISING AND PUBLIC INVOLVEMENT PROCESS**

### **8.1 Press advertising and site notices**

The Public Participation Process forms the corner stone for detailing the Scoping and EIA reports. The process identifies potential interested and affected parties on the project and solicits inputs and comments pertaining to the matter/activity proposed from such parties. Public Participation allows the public to contribute to the project and provides for better decision making by collective inputs from stakeholders, organs of state and specialists. In terms of the EIA Regulations, 2014, Section 21 and Appendix 2 and Appendix 3, a Scoping and EIA report must contain details of the public participation process undertaken for the project.

The public participation process is conducted in accordance to Chapter 6, Regulation 39 to 44 of Government Notice R982 of the NEMA Regulations 2014. The process provides the public access to necessary information on the project throughout the scoping and EIA phase of the study. The public participation process for the Minnebron x 1 Development kicked off on 15 March 2018.

### **8.2 Newspaper advertisement**

The project was advertised in the local press as per the GDARD requirements. The proposed activity was advertised on 15 March 2018 in the Brakpan Herald (regional paper) in English. Refer to Annexure 3 for a proof of the newspaper advertisement within Appendix E: Public participation process.

### **8.3 Site notices**

Three A2 - sized on-site notices were placed, one on the northwestern boundary of the site on the corner of Rembrant Van Rijn Street and Heidelberg Road, a second notice on the corner of West Road and Rembrant van Rijn Street, and a third notice on Gert Bezuidenhout Street on the eastern boundary of the site. Refer to Annexure 1 for a proof of the notice within Appendix E: Public participation process.

### **8.4 Background information documents and notices/flyers**

As part of the identification of landowners and tenants on the project site, Galago Environmental provided Background Information Documents 13 March 2018 through hand delivery to residents within the neighbouring area as well as to landowners of the neighbouring agricultural holdings. BIDs were also handed to pedestrians encountered on the site. The proposed project was also discussed and explained to the residents who received the background information documents (Please refer to Annexure E2 for the BID within Appendix E: Public participation process).

The BID provides an Interested and/or Affected Party (I&AP), with background information on the proposed project, as well as information regarding the Environmental Impact Assessment process that will be undertaken. It further indicates how you can become actively involved in the project, receive information and raise issues that may concern and/or interest you. The sharing of information forms an important component of the public participation process and provides the opportunity to become actively involved in the process from the onset. I&APs were given a 30 calendar day period to raise any issues or concerns regarding the project. Background Information documents (BID) were emailed, posted and delivered in English to stakeholders and organs of state.

## **8.5 I&AP correspondence**

All comments received from interested and affected parties were acknowledged and recorded in an Issues and Response Register and were addressed in the final Scoping Report accordingly. Please refer to Annexure E4 and E5 for the Issues and Concerns Register within Appendix E: Public participation process.

### **8.5.1 Issues raised and potential impacts identified during the Public participation process**

The Scoping Report aimed to scope, identify and list the environmental issues and potential impacts that are relevant to the project and determines where further information is required in the form of specialist studies and or investigations. The identification of such issues and potential impacts are solicited from stakeholders, interested and affected parties through a public consultation process as well and desktop investigations undertaken by the environmental consultant paired with initial site investigations.

The key identified issues and potential impacts pertaining to the proposed establishment of a mixed use development outlined the focus areas for the Impact Assessment phase and Specialist studies which were undertaken.

The following issues, determined through the public participation process with authorities and I&APs, were investigated in further detail during the EIA and informed by the final layout plan (Annexure C and D11) for the Minnebron x 1 mixed use development.

### **8.5.2 Biophysical environment**

The biophysical environment is the relation between the physical environment and the biological life forms within the environment.

- Impacts on biodiversity (fauna and flora).
- Impacts on aquatic ecosystems (wetlands).
- Impacts on soils and geology.
- Impacts on air quality, including radiation assessment.



### **8.5.3 Social environment**

The social environment refers to the environment developed by humans as contrasted with the natural environment.

- Impact on cultural and heritage resources.
- Impacts on land use and also surrounding land uses.
- Impact on existing services supply (municipal capability).
- Impact on traffic (local road network).
- Socio-economic impacts (positive and negative).
- Storm water management.
- Provision of water, sewage and electricity (infrastructure) to the residents of the residential area.
- The poor and insufficient municipal infrastructure in the area that will be exacerbated by the proposed development.
- Capacity of public amenities such as schools and clinics in the area.
- Mitigation measures and management procedures to reduce the potential impact of construction activities on the environment.
- Potential health problems associated with the substation and illegal waste disposal on site.

## **8.6 Comments on the draft scoping report**

During the correspondence with I&APs, stakeholders were advised that the Draft Scoping Report would be prepared and made available for public review. Electronic copies as well as hard copies of the Draft Scoping Report were made available to registered interested and affected parties and organs of state on the project database on 5 May 2018. One hard copy of the Draft Scoping Report was provided to the Ward Councillor for comment for a period of thirty (30) days, from 5 May 2018 to 5 June 2018 in the study area to allow for review and commenting.

Stakeholders were informed about the comment period for the Draft Scoping Report through emails and faxed letters and copies of the Draft Scoping Report emailed as requested from I&APs or provided with a link on the internet. State Departments also received the draft Scoping Report for their comments.

The concerns raised during the public participation process and the Draft Scoping Report comments period were included in the final Scoping Report and investigated in terms of the potential impacts associated with the proposed development in the Environmental Impact Assessment phase.

## **8.7 Public Consultation during Environmental Impact Phase**

Interested and Affected Parties will be notified of the commencement of the EIA Phase once all specialist investigations have been undertaken. As the specialist studies took long to complete GDARD has provided extension of timeframes for the submission of the Draft EIA (See Appendix E: Annexure E4 for the Email from GDARD). I&AP's will be given the opportunity to review the findings of the EIA which is presented in this Draft EIR and EMP. The draft EIR indicates the potential positive and negative impacts and measures to enhance positive impacts and reduce negative impacts.

As part of the assessment, an EMPr was compiled. The EMPr is a requirement as per the EIA Regulations. The EMPr recommends how to operate and implement the project. I&AP's will receive a notification letter announcing the availability of the Draft EIR. The report will be distributed for public review and comment on 19 June 2019 for a period of 30 calendar days.

All comments and issues received during the public review period of the Draft EIR and EMPr will be captured in a Final EIR and submitted to GDARD for review and ultimately approval. I&APs would receive notification of the submission and would as per the scoping phase have the opportunity to request copies of the final report.

## **8.8 Public Consultation during Decision making phase**

During this phase GDARD will review the Final EIR and consult with any other key organs of state e.g. the Department of Water and Sanitation (DWS) before granting or refusing an environmental authorisation.

The environmental authorisation will be made available for public review for a period of 20 consecutive calendar days. This provides I&AP's with an opportunity to verify that the decision taken have considered their comments and concerns raised. I&AP's are also then informed of the appeal procedure, should they have a reason to appeal.

## **8.9 Conclusion**

During the Environmental Impact Assessment phase the different design and technology alternatives were compared in terms of the potential environmental impacts associated with the preferred alternative of residential development. Specialist studies were undertaken during the EIA phase in order to determine the potential impacts on the social and biophysical environment.

# **9. IMPACT ASSESSMENT**

## **9.1 Introduction**

The following section categorises and identifies the single environmental aspects, which have informed the list of ***pertinent*** issues, which have been identified by specialist research, I&AP's and authority representation and the assessment evaluation. These listed issues have been determined through the environmental impact assessment, the scoping and EIA processes and the site visits with authorities, specialists and engineers.

## **9.2 Issues identified through public / authorities involvement**

The Scoping Report aimed to scope, identify and list the environmental issues and potential impacts that were relevant to the project and determined where further information is required in the form of specialist studies and or investigations. The identification of such issues and potential impacts were solicited from stakeholders, interested and affected parties through a public consultation process as well as desktop investigations undertaken by the environmental consultant in combination with initial site investigations.

The key identified issues and potential impacts pertaining to the proposed establishment of a mixed use development outlined the focus areas for the Impact Assessment phase and Specialist studies which were then undertaken.

The following issues, determined through the public participation process with authorities and I&APs, were investigated in detail during the EIA process and were informed by the final draft layout plan for the Minnebron x 1 mixed use development (See Annexure E6 for the Issues and Concerns register):

### **9.2.1 Biophysical environment**

The biophysical environment is the relation between the physical environment and the biological life forms within the environment.

- Impacts on Biodiversity (flora and fauna)
- Impacts on Aquatic Ecosystems (wetlands)
- Impacts on Soils and Geology
- Impacts on Air Quality
- Biodiversity concerns: march harrier and bullfrog
- Mitigation measures and management procedures to reduce the potential impact of construction activities on the environment.
- Reduction in groundwater recharge from impeded rainfall
- Air quality impacts from removing vegetation
- Agricultural land lost to residential use

### **9.2.2 Social environment**

The social environment refers to the environment developed by humans as contrasted with the natural environment.

- Impact on cultural and heritage resources.
- Impacts on land use and also surrounding land uses and property values.
- Impact on existing services supply: roads, sewage, water pressure (currently periodic reduction in pressure to no water at times) and waste management.
- Impact on traffic: road network capacity.
- Impacts on health of residents associated with the tailings facility.
- Safety concerns: precautions for increased density and crime
- Socio-economic impacts: employment or job creation for new residents
- Provision of water, sewage and electricity (infrastructure).
- The poor and insufficient municipal infrastructure in the area that will be exacerbated by the proposed development.
- Capacity of public amenities such as schools and clinics, hospitals, fire stations and schools in the area.
- Storm water management.
- Potential health concerns from substation and illegal waste disposal.
- Emergency Management Service to accommodate density increase.
- Use of local labour and businesses during construction, upgrade and maintenance of infrastructure.
- Public transport especially for schools

- Traffic control and road damage during construction
- Quality of life affected by increased pressure on services

### 9.3 Issues identified through the assessment process

The following list of issues has been determined through the assessment process based on the environmental baseline descriptions in section 3.

Environmental Features	Construction Activity	Description of potential impact
Air quality	<ul style="list-style-type: none"> <li>o Clearing and excavating</li> <li>o Construction vehicle movement</li> </ul>	<ul style="list-style-type: none"> <li>o Dust generation</li> <li>o Noise</li> <li>o Safety of road users</li> <li>o Health impacts</li> <li>o Radon levels</li> </ul>
Water <ul style="list-style-type: none"> <li>o Water quality (run-off)</li> <li>o Water quantity</li> <li>o Stormwater run-off</li> </ul>	<ul style="list-style-type: none"> <li>o Material storage</li> <li>o Mixing of concrete</li> <li>o Maintenance</li> <li>o Construction camp and vehicles</li> <li>o Dust suppression</li> </ul>	<ul style="list-style-type: none"> <li>o Pollution and siltation of water bodies/wetlands</li> <li>o Erosion gulley formation</li> <li>o Water from reliable sources</li> <li>o Damage to wetlands and stream</li> </ul>
Geology and soils	<ul style="list-style-type: none"> <li>o Trenching</li> <li>o Construction material storage</li> <li>o Vehicular movement</li> <li>o Rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>o Compaction of soils</li> <li>o Contamination of soil</li> <li>o Erosion</li> <li>o Dust</li> </ul>
Natural vegetation	<ul style="list-style-type: none"> <li>o Storage of construction materials</li> <li>o Clearing of topsoil and excavating</li> <li>o Vehicular movement and access</li> <li>o Road and platform construction</li> <li>o Trenching</li> <li>o Rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>o Destruction and loss of natural vegetation cover</li> <li>o Mixing of topsoil and subsoil</li> <li>o Loss of vegetative layer for rehabilitation</li> <li>o Erosion control</li> <li>o Pollution of or damage to wetlands.</li> </ul>
Fauna species	<ul style="list-style-type: none"> <li>o Vehicular movement</li> <li>o Clearing and excavating</li> <li>o Trenching</li> <li>o Construction of roads and platforms</li> <li>o Construction staff</li> </ul>	<ul style="list-style-type: none"> <li>o Noise</li> <li>o Safety</li> <li>o Potential displacement of birds and other fauna</li> <li>o Destruction and loss of natural habitat</li> </ul>

<b>Environmental Features</b>	<b>Construction Activity</b>	<b>Description of potential impact</b>
	activities	
Cultural / historical	<ul style="list-style-type: none"> <li>o Trenching</li> <li>o Vehicular movement</li> <li>o Clearing and excavating</li> <li>o Road and platform construction</li> </ul>	<ul style="list-style-type: none"> <li>o Destruction of cultural / archaeological material.</li> <li>o Loss of cultural / historical features</li> </ul>
<b>Socio-economic</b>		
Existing neighbouring communities	<ul style="list-style-type: none"> <li>o Trenching</li> <li>o Vehicular movement</li> <li>o Construction camp</li> </ul>	<ul style="list-style-type: none"> <li>o Noise pollution</li> <li>o Air pollution</li> <li>o Increased traffic</li> <li>o Safety of children and community members</li> <li>o Job creation</li> <li>o Increased flow of construction workers</li> </ul>
<b>Infrastructure:</b> <ul style="list-style-type: none"> <li>o Electricity supply</li> <li>o Water &amp; sewage supply</li> <li>o Removal of domestic waste</li> <li>o Roads</li> <li>o Upgrade of municipal infrastructure in the area</li> </ul>	<ul style="list-style-type: none"> <li>o Clearing and excavating</li> <li>o Construction Vehicle movement</li> <li>o Trenching</li> <li>o Construction camp</li> </ul>	<ul style="list-style-type: none"> <li>o Noise pollution</li> <li>o Air pollution</li> <li>o Supply of services from Ekurhuleni Metropolitan Municipality and Eskom</li> <li>o Disruption of services during upgrades</li> </ul>

#### **9.4 Pertinent issues addressed by the impact evaluation**

The above issues and comments were disseminated and categorised into issues of similar nature, to consolidate the assessment evaluation process. The assessments are environment focused with descriptions of the activity impacts included within each evaluation type.

### 9.4.1 Air quality - Dust generation

There will be a disturbance of soil properties with a loss of soil to wind (dust) and water erosion during the construction phase. This will be caused by construction activities such as clearing and excavating, topsoil and vegetation removal, trenching and storage as well as the movement of construction vehicles on site. The dust will influence the air quality in the immediate vicinity of the construction activities. If the air quality exceeds accepted standards, the neighbouring communities as well as construction workers could experience health problems.

Dust from the construction activities could impact on the flora and fauna on neighbouring natural areas if not mitigated (Annexure D2). During the operational phase of the project, dust will be minimal, since the internal roads will be paved, disturbed areas will be rehabilitated and communal areas will be vegetated.

Dust from the adjacent tailings facility will not impact on residents during the operational phase as it is partially rehabilitated however mitigation measures such as vegetation or development of the area can reduce the impacts. According to the Radiological Impact Study the prevailing wind direction, as well as associated PM<sub>10</sub> concentration and TSP deposition, is towards the northwest and north east, which means that the contribution of this (radon inhalation) pathway in the Minnebron x 1 residential development area would be minimal, since the contribution to the total effective dose is generally less than the radon inhalation pathway.

**Table 16: Impact table for dust generation**

Dust generation		
Impact Evaluation	Description	Summary
Nature and extent	The impact will be restricted to the site as well as the surrounding area.	Medium
Duration	The impact will be of short duration, limited to construction phase.	Short term
Status and intensity	The intensity of the impact will be medium, but it could be mitigated with proper planning and suitable mitigation measures.	Medium
Probability	The impact will be probable and all mitigation and construction requirements are to be instituted in improving and maintaining the status quo of the air quality.	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMP, be implemented.	Medium

<b>Dust generation</b>	
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Wet all construction areas with water from a water truck three times a day during the dry periods of the year to reduce dust and adjust the frequency as necessary for sufficient dust suppression.</li> <li>○ Disturb as little as possible of the natural vegetation on site and keep construction activities within demarcated areas only.</li> <li>○ Rehabilitate disturbed areas as soon as construction activities have been completed in that area.</li> <li>○ Construction workers to follow prescribed precautions when working in dusty conditions.</li> <li>○ Construction vehicles to reduce speed to 30km/h through the site to reduce dust.</li> <li>○ Transportation vehicles used for the construction materials to be covered with tarpaulins when travelling off site to reduce dust when travelling.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### **9.4.2 Noise**

Noise is generated during the construction and operation phase of the project. Excessive noise could have an impact on the neighbouring communities, construction workers as well as the animals in the area.

The following construction activities could potentially generate noise during the construction phase of the project:

- Construction of access roads (excavator / grader / bulldozer and dump trucks).
- Vehicular movement or large delivery trucks on access and internal roads. Construction traffic is expected to be generated during the entire construction period and the volume and type of traffic generated will be dependent on the type of construction activities being conducted. The use of onsite crushing and screening, as well as onsite concrete batching plants could significantly reduce heavy vehicle movement to and from the site.
- The establishment, operation and removal of concrete batching plants or the use of concrete trucks.
- Clearing, excavating and digging of trenches.
- Blasting may be required as part of the civil works to clear obstacles (rocks) to prepare foundations, but highly unlikely. Blasts will be infrequent occurrences with a loud but instantaneous character. Blasting is highly regulated and the control of blasting to protect human health will ensure that any blasts will use minimum explosives and occur in a controlled manner. The breaking of obstacles by explosives is a very specialised field and when correct techniques are used, it causes less noise than a rock breaker.

**Table 17: Impact table for noise**

<b>Noise during construction phase</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact will be restricted to the site as well as the surrounding area.	Medium
Duration	The impact will be of short duration, limited to construction phase.	Short term
Status and intensity	The intensity of the impact will be moderate, but it could be mitigated with proper planning and correct mitigation measures.	Low
Probability	The impact will be probable and all mitigation and construction requirements are to be instituted.	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMPr be implemented.	Medium
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Construction workers to wear earmuffs as prescribed by ISO 18000 standards.</li> <li>○ Working hours should be restricted to reduce impact on neighbouring residents, fauna on the neighbouring natural areas at night and weekends.</li> <li>○ Construction vehicle traffic to be reduced to the minimum.</li> <li>○ All machinery and plant to conform to SABS noise reduction standards.</li> <li>○ The adjacent property owners must be informed of the construction activities and blasting (if needed) schedule.</li> </ul>	
<b>Level of significance after mitigation</b>		<b>Low</b>

### 9.4.3 Soil disturbance and instability

No geotechnical conditions preventing township establishment are encountered on this site. The potential for collapse settlement and excessive normal settlement represents the most serious geotechnical conditions that need to be considered in any foundation design. Limited perched water tables may hamper construction in and just after a wet season. Excavation difficulties should be expected where quartzite crops out intermittently.

The topography on site is relatively flat, decreasing the potential for soil erosion and limiting cut and fill needed for construction that may cause dust and erosion. Construction activities such as vehicular movement or parking could potentially cause soil pollution should leaks of oil, petrol or diesel occurs and must be mitigated.

Specific mitigation measures have been recommended and it is imperative that they be implemented during the construction phase of the development.



**Table 18: Impact table for soil stability**

<b>Soil stability</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the site	Within site boundary
Duration	The impact could be reversible over time.	Medium term
Status and intensity	The intensity of the impact could be low if mitigated with proper planning and management.	Low
Probability	The impact will be have a low probability	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendations as stipulated in the EMP, be implemented.	Low
<i>Mitigation Measures</i>	<p>The following founding solutions are recommended for light structures erected on Class C2 land:</p> <ul style="list-style-type: none"> <li>• Normal construction methods may be considered on Class C land provided no other geotechnical constraints are present. Foundations should be placed on ferruginised soil below any silty/sandy layers.</li> </ul> <p>The following founding solutions are recommended for light structures erected on Class C1 land:</p> <ul style="list-style-type: none"> <li>• Modified Normal: Reinforced strip footings with articulation joints at some internal and external doors. The masonry should be lightly reinforced. Foundation pressures should not exceed 50kPa.</li> <li>• In Situ Soil Compaction below Footings: Remove in situ soil to a depth and width of 1,5 times the foundation width or a competent horizon. Replace with suitable material compacted to 93% MOD. AASHTO density at 11% and +2% of optimum moisture content (OMC)</li> <li>• Deep strip footing: Found on a competent horizon below the problem layer using normal construction but with the use of fabric reinforcement in floor slabs. Site should be adequately drained.</li> <li>• Soil Raft: Remove in situ material to 1m beyond the perimeter of the structure to a depth of 1.5 times widest foundation or to competent horizon and replace with inert backfill compacted at 93% MOD. AASHTO density at +2% to -1% of OMC. Normal construction methods with lightly reinforced strip footings and light reinforcement may then be utilised.</li> </ul> <p>The following founding solutions are recommended for light structures erected on Class C2 land.</p> <ul style="list-style-type: none"> <li>• <b>Stiffened Strip Footings:</b> Stiffened or Cellular Raft: Stiffened strip footings or cellular raft with articulation joints or lightly reinforced masonry. Bearing pressure should not</li> </ul>	

Soil stability		
Impact Evaluation	Description	Summary
	<p>exceed 50kPa. Mesh reinforcement in floor slabs. The site should be properly drained and adequate plumbing and services precautions should be taken to prevent leaks.</p> <ul style="list-style-type: none"> <li>• <b>In Situ Soil Compaction below Footings:</b> Remove in situ soil to a depth and width of 1.5 times the foundation width or a competent horizon. Replace with suitable material compacted to 93% MOD. AASHTO density at -1% and +2% of optimum moisture content (OMC). The removed material is often suitable for replacement. Normal construction with lightly reinforced strip foundations and masonry may then be utilised.</li> <li>• <b>Deep Strip Footings:</b> found on a competent horizon below the problem layer using normal construction but with the use of fabric reinforcement in floor slabs. The site should be adequately drained.</li> <li>• <b>Soil Raft:</b> Remove in situ material to 1.0m beyond the structure to a depth of 1.5 times widest foundation or to a competent horizon and replace with inert backfill compacted at 93% Mod. AASHTO density at +2% to -1% of OMC. Normal construction methods with lightly reinforced strip footings and light reinforcement in masonry may then be utilised.</li> </ul>	
<i>General mitigation measures:</i>	<ul style="list-style-type: none"> <li>○ When clearing and excavation or trenching activities takes place, topsoil must first be removed and stored separately from the subsoil for rehabilitation purposes.</li> <li>○ Ponds and silt traps to be constructed as soon as possible after construction begins.</li> <li>○ Precautions to be taken to limit sediment movement off the site.</li> <li>○ Fuel/oil spills on site must be managed so that no runoff contamination occurs. Contaminated soil must be removed to a registered landfill site.</li> <li>○ All Equipment working on the site to be in full working order – no leaks that could cause soil pollution.</li> <li>○ Daily spraying of exposed soil to minimise dust.</li> </ul>	
<b>Level of significance after mitigation</b>		<b>Low</b>

#### 9.4.4 Ground and surface water pollution (Stormwater)

There are pans and an unchannelled valley bottom and seepage wetland on the site and the floodline delineation will be affected by the development. Careful planning of stormwater is needed to reduce impacts on this system. Stormwater will accumulate at low points during construction phase. This water will carry silts that can damage the wetland areas when it concentrates on these areas.

A stormwater management plan has been developed and was closely linked to the planning of this development. It is generally good practice to avoid any accumulation of surface water near buildings by appropriate surface drainage design. Care must be taken to ensure that stormwater is settled and handled on site so that it does not impact on wetlands and pans on site.

**Table 19: Impact table for ground and surface water**

<b>Ground and surface water pollution</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the site and surrounding areas	Local
Duration	The impact could be of long duration, not only limited to the construction phase but also during the operational phase with Stormwater draining into the wetlands.	Long term
Status and intensity	The intensity of the impact could be minor if mitigated with proper planning and management.	Minor
Probability	The impact will be probable during the construction phase.	Probable
Significance	The impact <b>if not</b> mitigated will have high significance. It is imperative that the mitigation and recommendation as stipulated in the EMP, be implemented.	High
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Manage stormwater discharges, across the site, with consideration for both water quality and flow rates.</li> <li>○ Introduce a range of techniques at all levels of the development with this objective</li> <li>○ Reduce both the volumes and rate of runoff from the developments proposed on the site itself.</li> <li>○ Place excavation material on stream-up side of all trenches that will be excavated.</li> <li>○ Before stormwater trenches are excavated, the stormwater retention pond areas must first be prepared to accept stormwater during construction. This will then act as a stilling chamber in which any silts and waste will settle before the water can enter the wetland area.</li> </ul>	

<b>Ground and surface water pollution</b>	
	<ul style="list-style-type: none"> <li>○ Roads can also concentrate stormwater towards the water retention areas. Before road construction, channels that lead to low lying areas can be constructed, the riparian area must be protected by construction of the retention pond areas to settle stormwater during construction.</li> <li>○ The retention pond areas must be maintained and cleaned during construction and be kept in a working order. After construction the ponds will be cleaned and vegetated.</li> <li>○ Stormwater and sewerage lines must be constructed from the low point towards the high point to prevent accumulation of stormwater in the trenches.</li> <li>○ Particular care must be taken to prevent spillage of oils and fuel, especially around the onsite storage of diesel if needed. Preventative measures must be in place if spillages should occur to prevent the spillage to enter trenches or road construction areas. The top layer of soil around the storage tanks must be stabilized with cement to establish an impermeable layer of soil. This must be removed after construction.</li> <li>○ Adhere to all the recommendations as listed in the Civil Engineering Services report and EMPr.</li> <li>○ In order to minimize artificially generated surface storm water runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilized for these purposes.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### 9.4.5 Flora

The study site lies in the quarter degree square 2628AD (Springs) and Mucina & Rutherford (2006) classified the area as Tsakane Clay Grassland, a short, dense grassland on flat to slightly undulating plains and low hills.

The flora study found that the *Eragrostis – Cynodon* grassland and the *Imperata – Eragrostis* grassland study units are secondary grassland and not considered sensitive, no wetland were found in the *Imperata – Eragrostis* grassland. No vegetation study units are deemed sensitive.

No Red List or Orange List species occur on the study site, but a Red List species occurs within 200 meters of the northern boundary of the site. A protective buffer should be maintained around the population of Red List species. It was determined that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive..

**Table 20: Impact table for flora**

Flora		
Impact Evaluation	Description	Summary
Nature and extent	The impact could be restricted to the construction site.	Within site boundary
Duration	The impact could be of long duration, not only limited to the construction phase.	Long term
Status and intensity	The intensity of the impact could be low if mitigated with proper planning and management.	Low
Probability	The impact will be probable during the construction phase if development takes place.	Probable
Significance	The impact <b>if not</b> mitigated will have low significance. It is imperative that the mitigation and recommendation as stipulated in the EMP be implemented.	Low
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Only indigenous plant species, preferably species that are indigenous to the natural vegetation of the area, should be used for landscaping in communal areas. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be incorporated into landscaped areas. Forage and host plants required by pollinators should also be planted in landscaped areas.</li> <li>○ A protective buffer should be maintained around the population of Red List species found north of the site.</li> <li>○ An appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Programme (EMPr) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMPr and ROD.</li> <li>○ The sensitive open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing).</li> <li>○ Category 1, 2 and 3 Alien Vegetation must be removed from the study site.</li> </ul>	

<b>Flora</b>	
	<ul style="list-style-type: none"> <li>○ Dumping of builders' rubble and other waste in the areas earmarked for exclusion must be prevented, through fencing or other management measures. These areas must be properly managed throughout the lifespan of the project in terms of fire, eradication of exotics etc. to ensure continuous biodiversity.</li> <li>○ Avoid any disturbances within the wetland areas and their buffer zones.</li> <li>○ Avoid erosion at all times.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### 9.4.6 Fauna

Construction activities will cause disturbance (noise) and displacement of fauna on site, but not on a permanent basis, since the fauna would most probably move away from the area to the natural areas in the surroundings. The study site has several pans and wetlands which can be considered important topographical features and contains faunal habitat. The species richness is decidedly low, which is ascribed to limited habitats available, restricted site size and adjoining areas and a dismal quality of conservation resulting in species displacement.

The natural fauna of the site has deteriorated in species richness and environmental wellbeing as result of overgrazing, regular veld fires and disregard for conservation practices. The habitat on and in the study area will not favour any of the Red Data faunal species recorded for the area. Connectivity to other open spaces is moderate.

**Table 21: Impact table for fauna**

<b>Fauna</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the construction area and surroundings.	Local
Duration	The impact could be of long duration, not only limited to the construction phase.	Long term
Status and intensity	The intensity of the impact could be low if mitigated with proper planning and management.	Low
Probability	The impact will be Probable during the construction phase if managed.	Probable
Significance	The impact <b>if not</b> mitigated will have medium to low significance. It is imperative that the mitigation and recommendation as stipulated in the EMP be implemented.	Low
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ The contractor must ensure that no fauna on site and in the surroundings is disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.</li> <li>○ It is suggested that where work is to be done close to the</li> </ul>	

<b>Fauna</b>	
	<p>wetlands and buffer areas, these areas be fenced off during construction, to prevent heavy machines and trucks from trampling the plants, compacting the soil and dumping in the system.</p> <ul style="list-style-type: none"> <li>○ During the construction phase, noise must be kept to a minimum to reduce the impact of the development on the fauna residing in the wetlands and on the neighbouring sites.</li> <li>○ Dumping of builders' rubble and other waste in the areas earmarked for exclusion must be prevented, through fencing or other management measures. These areas must be properly managed throughout the lifespan of the project in terms of fire, eradication of exotics etc. to ensure continuous biodiversity.</li> <li>○ Avoid any disturbances within the wetland areas and their buffer zones.</li> <li>○ Avoid erosion at all times.</li> <li>○ The wetland and buffer zone area as determined by a wetland specialist should be kept free from any development or any other form of human disturbance.</li> <li>○ No off road activities should take place in the wetland or within the buffer zone of the pan.</li> <li>○ Proper veld management practises should be implemented with respect to grazing, burning and control of woody invasions in open space areas during the operation phase of the proposed development.</li> <li>○ Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to withstand the disturbance in an undisturbed zone close to their natural territories.</li> <li>○ No vehicles should be allowed to move in or across the wet areas or drainage lines and possibly get stuck. This leaves visible scars and destroys habitat, and it is important to conserve these areas.</li> <li>○ Alien and invasive plants must be removed.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### **9.4.7 Archaeological and cultural/historical sites destruction**

Although no sites of heritage significance were identified within the study area, care should be taken to ensure that the correct procedures are followed if anything of cultural/historic significance is found on site. No paleontological sites of high value could be identified. It is not anticipated that bedrock will be affected.

**Table 22: Impact table for archaeological/cultural**

<b>Archaeological and cultural/historical sites destruction</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the construction area.	Within site boundary
Duration	The impact could be likely during the construction phase	Short term
Status and intensity	The intensity of the impact could be minor if mitigated with proper planning and management.	Minor
Probability	The impact could be improbable during the construction phase if managed.	Improbable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMP, be implemented.	Medium
<i>Mitigation Measures</i>	<p>No sites of heritage significance were identified within the proposed study area.</p> <p>In the event that artefacts / graves / areas of cultural significance are discovered during the construction phase, the following recommendations are given:</p> <p>All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.</p> <ul style="list-style-type: none"> <li>○ All construction in the immediate vicinity (50m radius of the site should cease).</li> <li>○ The heritage practitioner should be informed as soon as possible.</li> <li>○ In the event of obvious human remains the SAPS should be notified.</li> <li>○ The area in a 50m radius of the find should be cordoned off with hazard tape.</li> <li>○ Public access should be limited.</li> <li>○ The area should be placed under guard.</li> <li>○ No media statements should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.</li> <li>○ If a grave is found, the identified grave should be fenced off or relocated (with the proper measures for relocation) before construction commence.</li> </ul>	
<b>Level of significance after mitigation</b>		<b>Low</b>



### 9.4.8 Job creation, capacity building and skills transfer

Jobs are anticipated to be created during the construction phase. Whilst the expected inflow of workers from outside the study area cannot be quantified at this stage, it is anticipated that the number of workers involved in a project of this nature, would have a marked impact on the local population figures.

The construction workforce would be present in the area and social conflict between “outsiders” and the local population could materialise in the form of anger and discontent aimed at outsiders. In worst cases, it could, potentially, lead to violence between the two groups. The possibility of conflict materialising would thus depend on the local communities’ perceptions of whether outsiders are favoured to locals for employment opportunities, as well as on the actual number of outsiders that would be employed. A critical mitigation measure in this regard is the employment of locals.

An extensive influx of job seekers to an area could result in negative social impacts such as illegal settlements with associated environmental pollution, social conflict between job seekers and locals over securing employment, conflict among informal vendors for “new” business, a lack of sufficient accommodation and other infrastructure to cater for their needs, and pressure on water- and sanitation-related facilities, etc.

**Table 23: Social impact table**

Population Change and Inflow of Workers & job seekers		
Impact Evaluation	Description	Summary
Nature and extent	The impact will be restricted to the site as well as the surrounding area.	Local
Duration	The impact could be of Medium duration, not only limited to the construction phase.	Medium
Status and intensity	The intensity of the impact could be medium if mitigated with proper planning and management.	Medium
Probability	The impact will be probable during the construction phase.	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMP be implemented.	Medium

<b>Population Change and Inflow of Workers &amp; job seekers</b>	
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Local labour (women included) should be used as far as possible during the construction phase of the development.</li> <li>○ Construction workers (especially those in the semi-skilled and unskilled categories) should be employed as much as possible.</li> <li>○ Care should be taken not to create unrealistic expectations among locals in terms of job creation, as is often the case where high unemployment levels prevail.</li> <li>○ The recruitment process and the use of contractors should be clearly communicated to the local communities, e.g. through community meetings arranged by the local councillors.</li> <li>○ Councillors in the adjacent towns should be consulted regarding the sourcing of labour.</li> <li>○ A designated area must be set out for vendors selling food to construction workers where they will not be a nuisance to the surrounding landowners. Used oil and domestic waste must be disposed of in a proper way. Care must be taken that these vendors do not cause veld fires that could impact on surrounding properties.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Medium</b>

#### 9.4.9 The upgrade and provision of Services and Roads

The proposed development is expected to increase the demand for proper services in the area. The Services report (Annexure D7) on civil services proposed that the average annual daily water demand (AADD) for the proposed development is approximately 222.55 Kl/d.

Water in this area comes from the existing 600mm Rand Water line that connects the Brakpan reservoir with the Klipriviersberg reservoir system. The Rand Water line does not have the capacity to accommodate the required 500mm connection and a reservoir and water tower will have to be constructed, which is currently at detail design stage.

Currently the northern section of the development falls under the Brakpan-RW0082 distribution zone. The southern section of the development will fall under the Brakpan-RW2811 distribution zone. Currently the site is bounded by a 150 dia water line on the northern and eastern section. The southern side of the development has a 125 dia line at relative close proximity, that is currently servicing the existing developments on the eastern boundary of the site.

The capacity of the existing outfall sewer is insufficient to accommodate the proposed development and the sewer will have to be upgraded. It is expected that the development will ultimately be served by the Waterfall WWTP, with a current capacity of 170 ML/d, which has to be upgraded by ERWAT.

Currently the entire development drains toward the Brakpan-Vlakplaats drainage system with a spare capacity of 97.94 l/s. The internal sewage network was analysed, and it was found that the system does have spare capacity for the proposed development.

There is no stormwater infrastructure on the site. Stormwater run-off from the site must be controlled in terms of the EMM requirements. A number of stormwater attenuation ponds will thus have to be constructed, which will overflow into the buffer areas. A stormwater management plan was developed during the EIA phase to properly manage stormwater on the site.

The proposed development may be supplied with electricity from the Van Eck substation on site. The existing maximum demand at Van Eck already exceeds safe capacity. Additional space capacity will have to be installed. Alternatively the site may be supplied from the planned Helderwyk/Leeuwpoort 88kV POD.

The proposed development may be supplied with electricity from the Van Eck substation situated on the site. The existing capacity of the substation is however inadequate and the planned upgrading of the existing transformers to 160MVA capacity will be required. The planned Helderwyk/Leeuwpoort 88kV substation will also become relevant for other developments in the vicinity.

A traffic impact study was done (see Annexure D10) and requires road network upgrades to accommodate the proposed development.

Domestic waste associated with the proposed development could have an impact on the environment if the waste stream is not properly managed. EMM is however the landowner and applicant and formal waste removal will be implemented in this development.

**Table 24: Civil Services and roads impact table**

<b>Upgrade and provision of Services and Roads</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact would not be restricted only to the site area.	Regional
Duration	The impact would be of long duration, not limited only to the construction phase.	Long term
Status and intensity	The intensity of the impact could be high if not mitigated with proper planning and management.	High
Probability	The impact will be probable and definite during the construction and operation phase.	Probable
Significance	The impact if not mitigated will have a high impact in terms of the upgrade of the outfall sewer and other infrastructure, accumulation of waste, provision of water.	High
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ A formal waste removal strategy for the proposed township must be developed and implemented by EMM to reduce the risk of environmental pollution from waste.</li> <li>○ EMM will have to ensure that the sewage system, WWTW, bulk water and stormwater systems are properly upgraded and other services take place before the proposed development is finalised</li> </ul>	

	<ul style="list-style-type: none"> <li>o Upgrade Roads and Services in the area.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Moderate positive impact</b>

#### 9.4.10 The provision of housing and amenities

Ekurhuleni’s current housing backlog is estimated to be in the region of 200 000 units and is still growing. The obvious need and huge demand for formal housing is an indisputable fact. Fast-tracking housing delivery is one of the top priorities of central, provincial and local government.

Minnebron x 1 will be a major development in the Central East Rand, comprising more than 10 000 housing units and a range of community facilities and amenities. The aim is to develop an integrated and sustainable township, catering for communities over the entire socio-economic spectrum and offering a wide range of lifestyle options within an environment which is conducive to social interaction, playing, learning and working.

A total of 40 “**Public Open Space**” erven are proposed throughout the township, including local play parks, stormwater detention dams, and the buffer areas around wetlands. The major part of the open space system consists of the buffers and wetlands.

The above structuring elements combine to demarcate **distinct residential cells/neighbourhoods** in the proposed development.

Providing housing on this site could reduce the need for informal settlement on site.

**Table 25: Provision of housing impact table**

<b>Provision of housing</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact would not be restricted only to the site area.	Regional
Duration	The impact would be of long duration, not limited only to the construction phase.	Long term
Status and intensity	The intensity of the impact could be medium positive.	Medium positive
Probability	The impact will be probable and definite during the operation phase.	Probable
Significance	The impact will have a highly positive impact.	High positive
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>o Upgrade Roads and Civil Services in the area before construction of the houses commence.</li> <li>o Provide a range of housing typologies</li> <li>o Provide a business area to decrease the need for communities to go far for shopping of essentials.</li> <li>o Encourage the Health Department to provide clinics in the area.</li> </ul>	
<b>Level of significance after mitigation</b>	<b>High positive impact</b>	

### 9.4.11 Health and Safety Impacts

During the construction phase, the safety of construction workers as well as the surrounding communities is of concern as is the case with any other construction activities. Further health and safety issues associated with the actual construction site include unauthorised entry to the site and construction activities, increased risk of accidents due to the increased movement of construction vehicles on the site and on the local roads, as well as the risks associated with the storage of chemicals or other hazardous substances on the site.

Another source of concern is the establishment of a construction camp on the construction site. Construction camps, where labourers are accommodated for the duration of the construction period are usually associated with a possible increase in criminal activities. Other concerns relate to littering, unwanted behaviour of construction workers, transmission of sexually transmitted diseases (STDs), environmental pollution, an increased risk of fires, etc. Although such perceptions cannot be substantiated or changed, they should be dealt with sensitively. The employment of locals would be a key mitigation measure in this regard, as the development of a construction camp would then be unnecessary and outsiders would not come to the area and intrude on the local social networks. If that is not possible then proper mitigation measures must be implemented to reduce the potential impacts associated with construction camps.

**Table 26: Health and safety impact table**

Health and Safety impacts		
Impact Evaluation	Description	Summary
Nature and extent	The impact could be Regional, not only limited to the site and surrounding neighbourhood.	Medium
Duration	The impact would be of short term, occurring mostly during the construction phase.	Short term
Status and intensity	The intensity of the impact could be medium if mitigated with proper planning and management.	Medium
Probability	The impact will be probable during the construction phase.	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance on the neighbouring community	Medium
	<ul style="list-style-type: none"> <li>o No construction workers may be housed on the site.</li> <li>o Ensure safe and healthy working practices.</li> <li>o Chemicals and materials stored at the storage sites on site should be held securely and in accordance with the relevant health and safety regulations.</li> <li>o Only qualified personnel should undertake tasks relevant to their duties.</li> <li>o Suitable protection (clothing, harnesses, etc.) should be provided for construction workers.</li> </ul>	

<b>Health and Safety impacts</b>	
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Local labourers should be used as far as possible during the construction phase as it would limit the influx of outsiders to the area and avoid a possible increase in criminal activities and eliminate the need for a residential camp.</li> <li>○ Signage along the local roads should be put up to indicate construction areas and to limit the risk of accidents.</li> <li>○ Construction and delivery vehicles must be limited to 30km/h.</li> <li>○ The construction site must be fenced and access controlled by security before construction commence to keep construction workers and vehicles on site and to reduce the chance of children falling in trenches or to get in conflict with construction vehicles.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### 9.4.12 Construction camp

The construction camp could have an impact on the environment if the placement or design is poorly situated. Domestic waste as well as construction waste generated at the construction camp could also impact on the fauna and flora in the area as well as the human health of construction workers if it is not removed to a landfill site.

No construction workers may be housed at the construction camp. Only construction materials and offices will be housed at the construction camp. These construction materials could consist of aggregate, cement, water, steel for foundations, electric cables, oils etc. The placement and design of the construction camp will therefore have to take the social constraints of the site into consideration. The site must also be designed to limit any impact that could potentially be caused by spillages.

**Table 27: Construction camp impact table**

<b>Construction camps</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the construction area and surroundings.	Local
Duration	The impact could be of short duration, only limited to the construction phase.	Short
Status and intensity	The intensity of the impact could be minor if mitigated with proper planning and management.	Minor
Probability	The impact will be probable during the construction phase.	Probable
Significance	The impact <b>if not</b> mitigated will have medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMP, be implemented.	Medium
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ The construction camp must be established in an area which is disturbed, the locality discussed with the ECO before establishment.</li> </ul>	

	<ul style="list-style-type: none"> <li>○ The contractor must supply the workers with firewood or preferably gas cooking appliances, to ensure that wood is not taken from the surrounding area.</li> <li>○ Water for construction activities must be trucked in from formal registered water sources.</li> <li>○ Domestic waste must be removed separated, recycled and taken to a registered landfill site where needed.</li> <li>○ Regular clean-up of the construction camp must ensure that no waste is windblown or otherwise distributed onto the surrounding natural areas.</li> <li>○ Chemical toilets must be provided at the construction camp and at regular intervals on the site.</li> <li>○ Bins must be provided for domestic waste and regular clean-ups to be done of the entire site.</li> <li>○ No animals may be killed or hunted for food.</li> <li>○ The construction camp area must be properly rehabilitated after construction to a natural state, should it fall outside the study area.</li> </ul>
<b>Level of significance after mitigation</b>	<b>Low</b>

#### 9.4.13 Visual Aspects

The main visual impact associated with the construction phase would be the actual construction site, possible storage of equipment and disruption of the soil and vegetation. These impacts are temporary and should respond to mitigation measures. The study area is degraded and disturbed due to the following impacts on the study site and adjacent areas:

- Alien vegetation establishment and expansion;
- Dumping and litter;
- Mining (mine tailings on neighboring properties); and
- Frequency of fire events.

The site is surrounded by existing townships, the tailings facility and roads and should not change the visual characteristics of the area dramatically should the neighbouring characteristics of the neighbourhoods be kept in mind. However the formalisation of the area will stop the dumping in the area which will improve the visual perception of the site.

**Table 28: Visual impact table**

<b>Visual aspects</b>		
<b>Impact Evaluation</b>	<b>Description</b>	<b>Summary</b>
Nature and extent	The impact could be restricted to the construction site and surrounding area.	Local
Duration	The impact could be of long duration since the proposed development is of a permanent nature	Long term
Status and intensity	The intensity of the impact could be low if mitigated with proper planning and management.	Low
Probability	The impact would be probable during the operation phase.	Probable
Significance	The impact <b>if not</b> mitigated will have a medium significance. It is imperative that the mitigation and recommendation as stipulated in the EMP be implemented.	Medium
<i>Mitigation Measures</i>	<ul style="list-style-type: none"> <li>○ Disturbed areas outside the proposed development site should be rehabilitated as soon as possible after construction.</li> <li>○ The construction site should be kept litter free.</li> <li>○ Planning must take into account the natural surroundings, sense of place and critical views.</li> <li>○ Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent /surrounding properties including road verges, roads or public places and open spaces during or after the construction period of the proposed developments but disposed of at an approved dumping site as approved by the Council.</li> <li>○ Dustbins must be provided at strategic places within the construction area.</li> <li>○ The construction site must be kept in a clean and orderly state at all times.</li> <li>○ Architectural styles and paint colours should take cognisance of the character, styles and sense of place of the neighbouring community.</li> <li>○ Maintain buildings and perimeter fencing etc. in order to ensure that they do not deteriorate and result in an aesthetically unpleasing development.</li> </ul>	
<b>Level of significance after mitigation</b>		<b>Low</b>



## 9.5 Cumulative impacts

Cumulative impacts result from actions which may not be significant on their own but which are significant when added to the impact of other similar actions. The anticipated impacts resulting from the construction and implementation of the proposed development could potentially result in cumulative negative effects when taking the following into consideration:

- The proposed development will add to existing road users in the area and will have an impact on traffic.
- The proposed development will add additional pressure to services in the area.
- The proposed development will add to shortages in health facilities, schools, retirement centres and churches if the necessary services are not provided/upgraded.
- Construction impacts may further lead to nuisance noise impacts, the transformation of the general ambience and quality of the site and surroundings and visual concerns.
- Construction impacts may increase dust in the area.

Therefore it is essential that the EMP for the construction phase be implemented to minimise the impact of construction activities on the environment.

- The construction and subsequent operational activities will be the source of various waste streams which must be managed appropriately.
- Dust should be monitored on site during construction and dust suppression applied on a regular basis.
- Mitigation during the operational phase of the development is:
  - The upgrade of Roads and Services in the area.
  - The upgrade and maintenance of the outfall sewer and WWTP.
  - Maintenance and management of domestic waste and removal of the waste on a regular basis to registered landfill sites by EMM.
  - Provision of health and education facilities by the Health and the Education departments.

## 10. CONCLUSION

There is a tremendous need for housing, better services and jobs within the Ekurhuleni Metropolitan Municipality area as well as the surrounding communities. The project team has worked with the different stakeholders, authorities and the local community to ensure that the proposed project address both the social concerns as well as the environmental concerns.

The proposed development will have a low negative and a high positive impact on the environment should all the mitigation measures proposed above be implemented. It is essential that the Environmental Management Programme be implemented during the construction and operational phases of the proposed development.

It is therefore recommended that the **preferred option be authorised by the Department of Agriculture and Rural Development**, in terms of the conditions and requirements of this report and that the township be managed in terms of the recommendations as given in this report.

A protective buffer should be maintained around the population of Red List vegetation species found within 200m of the site. It was determined through all the biodiversity specialist studies

that with the exception of the depression pans along the center and in the southern corner of the site, as well as the seepage and unchannelled valley bottom wetland in the northern corner of the site, the site is mostly transformed with alien vegetation and is therefore not deemed sensitive. The site is situated within the urban edge, surrounded by development and the vegetation of the site is transformed.

In terms of GN 509 of the National Water Act, 1998 any development within 500 meters of a wetland should follow a water use license application process for the release of stormwater from the site. A Water Use Licence Application (WULA) will therefore be submitted to the Department of Water and Sanitation (DWS) for approval.

There is a huge need for housing provision in the area and the negative social impacts associated with the proposed development can, in most cases, be mitigated successfully.

The proposed residential development is anticipated to have the following **positive social** impacts:

- The creation of employment (even limited) in an area where job opportunities are scarce and where the unemployment rates are growing, as well as the possible economic spin-offs is an important positive impact.
- The possibility of skills development for temporary and permanent employees exists.
- The provision of houses and mixed use development will reduce the housing need in the area and will provide essential services and socioeconomic opportunities.
- The upgrading of roads and services as well as the removal of waste from a formal township will reduce the environmental impacts in the area.

The proposed residential development could have the following **negative social** impacts:

- An influx of job seekers to the area cannot be excluded, with subsequent negative social impacts.
- A possible inflow of temporary workers to the area during the construction phase, as well as the intrusion impacts associated with the construction activities such as increased construction vehicle activity.
- Should the outfall sewer not be upgraded to accommodate increasing demands in the area, then there is a large risk of environmental pollution to the aquatic systems in the area as well as a health risk to neighbouring communities.
- Should roads and bulk water / sewage systems not be upgraded in the area before construction of the proposed development commence, then this could have a negative impact on the surrounding communities.

The study has shown that the proposed development has no fatal flaws in terms of the institutional, bio-physical or socio-economic environment. There would be no significant impact on the environment, which could not be mitigated by proper mitigation measures. The ensuing Environmental Management Programme (EMPr) as provided in Appendix F could mitigate most of these impacts.

## 11. RECOMMENDATIONS

It is recommended that the **preferred option** of a **Residential Development** be approved with the following conditions:

- All the requirements and mitigation measures as described in the Environmental Management Programme (EMPr) appended in Appendix F must be adhered to.
- All the recommendations and mitigation measures as per the specialist reports must be adhered to.
- The Water Use Licence (WUL) must be approved by the DWS before construction can commence near the wetland and aquatic systems.
- It is recommended that an independent Environmental Control Officer (ECO) be appointed to ensure that the ROD and the requirements of the Environmental Management Programme are adhered to.
- The use of local labour should be maximised to ensure that the locals stand to benefit from the proposed project, but also to limit most of the anticipated social impacts associated with the construction phase of the project (e.g. conflict between locals and outsiders about employment).
- The outfall sewer and other essential bulk services as well as the roads or intersections must be upgraded before the construction phase of the proposed development commence.

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