

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR A MIXED
LAND USE DEVELOPMENT, LOCATED ON THE REMAINDER OF THE FARM
ALLANDALE 10 IR, TO BE KNOWN AS RABIE RIDGE EXT 7, MIDRAND,
GAUTENG PROVINCE
GAUT REF: 002/22-23/E3421**

APPLICANT:
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EXECUTIVE SUMMARY

Project Description

Ninфу Allandale Dev PTY LTD has appointed Seedcracker Environmental Consulting CC, an independent, registered, Environmental Assessment Practitioner (EAP), to assist with undertaking the required application processes (including the Scoping and public participation processes), and to compile and submit the required documentation in support of an application for EA in accordance with the NEMA-Listed activity/ies, identified for the Rabie Ridge X 7 (RRX7) project.

Approximately 41 300m² of vacant land will be utilized for predominantly high-density residential development – mostly catering for entry level and middle income bonded housing. Mixed income and social integration across race and income levels will be made possible by this development. Bulk infrastructure in the form of water, sewerage and solar electricity are being investigated. Bulk needs to be upgraded to cater for the size of the new development. The development proposal will further offer a range of community facilities, educational services, open spaces and services to the surrounding community.

The site is zoned “Agricultural” at present. The project is located on the Remainder of the Farm Allandale 10 IR, to be known as Rabie Ridge Ext 7, Midrand, Johannesburg Metropolitan Municipality, Gauteng Province. The site is divided into two portions by Modderfontein Road. It is adjacent to, and on the southern side of Republic Road. Dane Road traverses the southern portion of the site.

Property Ownership

The property is in the name of the Gauteng Province: Department of Human Settlements.

Site description

The site is presently vacant, and is utilised by the surrounding informal community for livestock grazing, illegal dumping, informal clay and brick making areas, informal township church services; foot paths across the site, and subsistence agriculture in the wetland areas. The study area is located within an area characterised by transformed open veld, current and historic agriculture and rural urbanisation. With the extent of vegetation transformation taking place in the area due to the above mentioned activities, significant local and regional loss of biodiversity has taken place. The site has been vacant for many years and is constantly under threat of being informally and illegally occupied / land grabbed.

Compatibility of township with the Surrounding Area

The Rabie Ridge X 7 township is located between the low density Agricultural small holdings of Austin View (rural residential according to the City of Joburg) in the West, the low density Agricultural small holdings of President Park in the North, and the high density formal and informal areas of Ivory Park, Rabie Ridge and Commercialia, in the east and south. It is the largest remaining piece of land “bridging” the two opposing land uses. The Rabie Ridge X 7 township would essentially bring the high-density land use of Rabie Ridge and Ivory Park, closer to the rural residential areas. Whereas the proposed Rabie Ridge X 7 township would be complimentary to the east and south land uses, it would not be the same, to the land uses in the north and west.



Given the City of Joburg's Spatial Planning Frameworks, and the applicants intention to address the housing backlog in the area, the Rabie Ridge X 7 township would fulfil the authorities needs in a formally planned land use application. However, the township would need to be acceptable and sustainable in terms of bulk service provision and wetland preservation.

Infrastructure and Services

Water Supply

The proposed development falls within the President Park and Rabie Ridge Reservoir water district. The Rabie Ridge Reservoir is located east of the K56 (adjacent to the proposed development), feeding the various townships around and including Rabie Ridge. A 200mmØ pipe runs on the eastern side of the K56 (Modderfontein Road) in a southern direction. Two 300mmØ connection points is proposed for the western portion of the proposed development. A 160mmØ water pipe runs on the northern side along the K111 (Republic Road) and a 225mmØ water connection could be obtained from this pipe for the eastern portion of the proposed development. Johannesburg Water might require upgrades for the existing water system due to the added demand from the proposed development. The upgrades can only be confirmed by Johannesburg Water upon approval of this report. The estimated water demand for the proposed development is calculated as: 434.0 ℓ/s. The internal services will be taken over by City of Johannesburg Municipality they will be responsible for the maintenance of the services.

Sewer

The proposed development falls within two drainage basins, namely the Northern sub-basin and the Olifantsfontein sewer basin. The western portion of the proposed development falls in the Northern Sub-basin area, ultimately draining to the Northern Waste Water Treatment Works. To connect to this drainage basin, a new 250mmØ sewer pipe will have to be constructed from the western boundary of the proposed development along the small watercourse and connect to an existing sewer pipe to the south west of the proposed development. Data obtained from Johannesburg Water suggest that a section of the existing sewer system will have to be upgraded to accommodate the additional flow from the proposed development. This new 250mmØ pipe will have to be approximately 1.26km long. The eastern portion falls within the Olifantsfontein sewer basin, draining to the Olifantsfontein Waste Water Treatment Works. An existing 160mmØ sewer pipe is located east of the proposed development, on the eastern side of the K56 (Modderfontein Road). From data obtained by Johannesburg Water, it is seen that this pipe has a full flow velocity of 2.5m/s and has a spare capacity of 45%, thus resulting in an estimated 22.5ℓ/s spare capacity. The data suggest that this existing 160mmØ sewer pipe will also have to be upgraded to accommodate the additional flow generated by the proposed development. The suburbs adjacent to the proposed development site (Rabie Ridge and Commercia) have an established sewerage system. The estimated sewerage flow for the proposed development is:= 200.22ℓ/s

- The Water and Sewer Services Reports have been submitted to council for comment. No comments or approvals are in place yet.



Electrical Power

WSP has estimated a high level load of the maximum demand for the site, in accordance with the SANS 10142-1: 2006 and the electrical load allowance. The total estimated load for the development is calculated to be **10.2 MVA**. The electrical supply authority in the area is City Power.

City Power has indicated that no capacity is currently available on the network and will only be available once the supply in the area is upgraded, and the upgrade is completed. The applicant is subsequently exploring alternative energy solutions such as solar and gas. Solar Farm implementation principles, such as a small-scale embedded generation (SSEG) is presently being investigated by the applicant. [Any power generating facility located at a residential, commercial or industrial site, where electricity is generally also consumed, is considered a small-scale embedded generation (SSEG)]. These are mainly solar photovoltaic (PV systems) but also include other technologies such as wind and biogas. Further information/reports being explored by the applicant at this stage, is not available, and will be included in the Final EIAR.

Storm water Management and Design

A topographical survey was conducted of the site and the existing stormwater systems. As a result, the proposed development is divided into three major drainage areas; East, North West and South, as discussed below:

Eastern Drainage Area: Currently, an existing earth channel is located on the southern side of the K111 (Republic Road) on the northern boundary of the proposed development. Five culvert crossings along the property boundary are located from the channel draining underneath the K111 in a northern direction into the road reserve.

Northern and southern Drainage Areas: A small watercourse is located in the middle of the western portion of the proposed development. The western portion of the proposed development will drain towards this small watercourse.

A total volume of 24 355m³ of the run-off generated by the proposed development will have to be attenuated before releasing the stormwater into the existing systems or the existing watercourse. WSP propose that the stormwater should be managed on site by means of Sustainable Drainage Systems (SuDS) principles. The stormwater drainage system will consist of various post-development catchment areas and pipe networks discharging into four attenuation dams before discharging into the existing watercourse (North Western and Southern areas) and the existing pipe network (Eastern area).

Proposed Stormwater Design

The discharge generated by the stands and internal roads is captured by field and kerb inlets at low points, and is subsequently piped to the proposed attenuation dams. Concrete pipes of class 50D and 100D will be used ranging from 450mmØ to 1650mmØ. The pipes will be designed to accommodate the 1:5 year storm event. For larger storms the run-off will be conveyed to the proposed dams by kerbed road channels and outlet channels in conjunction with the underground piped networks. Stormwater should be managed on site by means of Sustainable Drainage Systems (SuDS) principles

Attenuation: In order to minimize and control the stormwater run-offs from the post-developed stage, WSP propose that one attenuation dam for the Northwestern area and one attenuation dam for the



Southern area is constructed. For the Eastern Area, we propose that 2 local attenuation dams are constructed. The attenuation dams will be designed to accommodate the post-development flows for the 1:5 and 1:25 year storm events and discharge the pre-development flows. Overflow weirs situated at the top of the dam walls will accommodate the flow generated by storm events of 1:50 year or larger. The 1:2 year run-off will be attenuated and will be used to recharge the ground water table. Through the use of attenuation measures as described in the WSP report, the post-development run-off from the development will have similar drainage characteristics as in a permeable, undeveloped state. The pre- and post-development run-off will remain virtually unchanged in this regard and therefore the downstream flood lines will not be affected. The SuDS principles will be applicable to the 1:2 year storm event. The run-off generated by 1:5 year storms will be captured by kerb inlets and grid inlets and be conveyed towards the attenuation dams by concrete pipes. For 1:25 year storms the run-off will be conveyed to the dams by kerbed road channels and open channels in conjunction with the underground piped networks. Stormwater flows from a 1:5 year and a 1:25 year event will be released into the existing watercourse and stormwater systems at a rate not exceeding the floods generated by similar events by the site in its pre-development stage.

- The SWM Report has been submitted to council for comment. No comments or approvals are in place yet.
- The SWM will be updated for the final EIA report to reflect the preferred town planning and wetland layouts.

Flood line

The 1:100 year flood line was determined by WSP and was taken into account with the finalization of the layout for the proposed development. See Figure 3.

Solid waste disposal

During the *construction* phase, waste should be managed as described in the Waste Disposal Management Plan included in the EMP. During the *operational* phase, municipal or private waste services must be utilised, as well as the services of recycling companies.

Access and Roads

The following intersections have been included in the scope of the TIA:

- Main Road (future K111)/ Boshoff Road (Intersection 1)
- Main Road (future K111)/ Modderfontein Road (future K56) (Intersection 2)
- Modderfontein Road (future K56)/ Falcon Street (Intersection 3)
- Modderfontein Road (future K56)/ Dane Road (Intersection 4)
- Modderfontein Road (future K56)/ Unnamed Gravel Road (Intersection 5)
- Dane Road/ West Road (Intersection 6)
- West Road/ Republic Road (Intersection 7)
- Boshoff Road/ Tlangelani Road (Intersection 8)

Access: The following accesses to the subject development are proposed:

- **K56 accesses:** Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.



- **K111 access:** A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.
- **Boshoff Road access:** Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.

Numerous road upgrades are suggested for the development.

Development Phasing: The roads and intersection upgrades are phased in conjunction with the construction programme received from the developer. The following phases have been considered:

- **Phase 1:** Shopping centre and hospital
- **Phase 2:** Residential 1 and Residential 3 (120 units/ha) units
- **Phase 3:** Residential 3 (200 units/ha) and primary school

It is possible for the order of the phases to change, or even overlap. The proposed road upgrades for each of the development phases is provided in the Traffic Impact Report.

Non-Motorised and Public transport

Public transport in the study area is mainly provided by minibus taxis and busses which operates along Main Road, Modderfontein Road and Dane Road. The proposed development is expected to generate a significant demand for public transport and it is therefore proposed that public transport lay-bys be provided at the following intersections:

- Main Road/Development Access (Intersection A)
- Modderfontein Road/Falcon Street (Intersection 3)
- Modderfontein Road/Dane Road (Intersection 4)

No non-motorised transport infrastructure currently exists in and around the subject site. In order to aid pedestrian movement to and from the proposed development, it is suggested that paved pedestrian walkways be provided along at least one side of all Class 3 roads within the development. It is further recommended that paved sidewalks be provided along Main Road and Modderfontein Road between the new public transport lay-bys and the access to the development

- The proposed development is supported from a traffic engineering perspective provided that the recommendations made in this study are implemented.

The Institutional Environment

- The Rabie Ridge X 7 development is subject to numerous national, provincial and local statutory polies and regulations. This application abides by the listed statutory requirements.

The listed activities associated with the project that require environmental authorisation, prior to construction works commencing on site include the following:



Indicate the number of the relevant Government Notice:	Activity No (s) (relevant notice): e.g. Listing notices 1, 2 or 3	Describe each listed activity as per the wording in the listing notices:	Describe the portion of the development as per the project description that relates to the applicable listed activity
GN. R 983, 8 December 2014 as amended by GN R 327, 7 April 2017 Listing Notice 1	Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater; (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;	The development will include bulk transportation of water and stormwater.
	Activity 10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more (ii) with a peak throughput of 120 litres per second or more	The development will require the upgrading of bulk infrastructure.
	Activity No. 12 (ii) (a) and (c)	The development of infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— within a watercourse; and if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The development of infrastructure exceeding 100 square metres within 32 metres of a wetland, and within the wetland, will be required for the construction and upgrading of bulk infrastructure.
	Activity 13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more	The development will have 4 storm water attenuation dams constructed on site as per the stormwater management plan.
	Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Development of infrastructure exceeding 10 cubic metres within a wetland will be required for the construction and upgrading of bulk infrastructure.
GN. R 984, 8 December 2014 as amended by GN R 325, 7 April 2017	Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation	Clearance of vegetation of more than 20 hectares will be required for the proposed development.



GN. R 985, 8 December 2014 as amended by GN R 325, 7 April 2017	Activity 4 (c) iv	The development of a road wider than 4 metres with a reserve less than 13,5 metres, in Gauteng, in Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;	The proposed intersection upgrades in the Traffic Impact Report will be required in areas identified as CBA and ESA in the screening tool.
	Activity 12 (c) ii	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan, in Gauteng, Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans	Clearance of vegetation of more than 300 square metres or more of indigenous vegetation will be required for the proposed development, in areas identified as CBA and ESA in the screening tool.
	Activity 14 (ii) a (c) iv	The development of— infrastructure or structures with a physical footprint of 10 square metres or more; where such Development occurs— (a) within a watercourse; in Gauteng, in Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans	The Rabie Ridge X 7 development will require a clearance of vegetation of more than 10 square metres or more, within a watercourse of an identified CBA and ESA, will be required for the installation of bulk services

A Scoping and Environmental Impact Assessment (EIA) process is required for above listed activities which have the potential to result in significant impacts which are complex to assess. Scoping and EIA studies accordingly provide a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts.

- An amended EIA Application Form will accompany the submission of the Final EIA report, to include the listed activities as detailed in table 5, previously not identified at the onset of the Scoping Phase.
- The proposed activities associated with the Rabie Ridge X 7 project, trigger the need for a WULA in terms of Section 21 water uses of the NWA. The regulatory Competent Authority for the WULA is the Department of Water and Sanitation (DWS).

Need and Desirability

The desirability of the Rabie Ridge X 7 development, has been discussed concerning the following aspects:

- Physical characteristics
- The character of the area
- Accessibility



- Spatial Planning
 - Provision of services
 - The need and desirability of the development from a *locational* perspective
 - Need and Desirability of the development from an *Environmental Perspective*
- The need and desirability of the development has been clearly motivated.

Alternatives

The alternatives considered for the proposed Rabie Ridge Extension 7 mixed Land use Township include location alternatives, land use alternatives (including the No-go option), and layout alternatives.

A summary of the alternatives assessed is provided in the following Table:

Alternative level	Alternative	Description
Property or location	1 alternative) (Preferred)	Current proposed site
	2	None identified.
Layout alternatives	1 alternative) (Preferred)	Current proposed layout accommodating the 2013 SEF wetland delineation, as approved by the COJ
	2	Township layout accommodating the 2022 SAS wetland delineation, including all wetland features on the site
Land use alternatives	1 (Preferred alternative)	Mixed Land Use Township
	2	Single Land Use: Housing only
Technology alternatives	1 (Preferred alternative)	Alternative technologies for methods of construction, energy provision, water management and waste management
	2	Conventional methods of construction, energy provision, water management and waste management are
No-go option	1	Current land use of the proposed sites is mainly subsistence agricultural land.

The property was selected as the applicant seeks to rezone and subdivide the property to establish a mixed use development. The selection of the development footprint within the property followed a precautionary approach, to ensure that any unacceptable environmental impacts related to the proposed development are avoided as far as possible. This avoidance approach reduces the degree of mitigation required to ensure that potential environmental impacts are within acceptable levels. This approach was achieved by appointing specialists to undertake constraints and sensitivity analysis for the entire study area to inform the scoping process. These constraints identified were used to determine the areas acceptable for development from an ecological, freshwater resource, archaeological, groundwater, agricultural, heritage, and socio-economic perspective, ensuring potential



impacts are kept to an absolute minimum. A mixed-use development allows for a variety of amenities and conveniences to the residents and is the preferred option. The development must implement alternative technologies as a standard practise.

Description of the receiving environment

Geology

In 2006, D J Olivier Engineers conducted a soil investigation for future township development on the Remainder of the Farm Allandale 10 IR. The founding conditions of the site were evaluated for normal brick buildings. D J Olivier Engineers found that the residual underlying the transported soils is a granite of the Witwatersrand sequence. It is stable with high bearing values when unweathered. The soils above the granite are alluvial sands, silt and clays with gravel and dispersed small boulders. The site may be divided into zones of shallow and deep rock levels, as well as an area of marshland, and a portion with outcrops of hard granite. D J Olivier Engineers provide founding conditions and recommendations for township infrastructure in the report. Excavation for services will not encounter any problems, as no ground water was encountered during the survey, and the fact that the material in the upper 1.m soil layers is fairly permeable. Therefore, D J Olivier Engineers confirm that the soil conditions on site are suitable for development, and normal brick construction may be employed without excessive additional foundation costs. Comments from the Council for Geoscience were received in 2010. These comments were based on D J Olivier Engineers 2006 report. The council confirmed that the site is not underlain by dolomitic rocks and soils, and therefore the risk of karstic sinkhole formation is not possible.

Topography and drainage

D J Olivier Engineers confirmed the site to slope from East to West, at approximately 3%. According to the NFEPA database the proposed development area falls within the Highveld Ecoregion, the Limpopo Catchment, the Crocodile West and Marico Water Management Area (WMA), the Upper Crocodile subWMA and is located on the A21B and A21C quarternary catchment divide. The topography and elevation profile correspond with the catchment divide identified by the NFEPA (2011) database. It also indicates that the proposed development area is the proximal point from which surface runoff might be generated and drain from into the surrounding areas.

Hydrological features on the site

A non-perennial river intersects the study boundary in the western portion of the study site while the most south-western corner also includes a non-perennial drainage line (Chief Directorate: Surveys & Mapping, 1996).

Wetlands

Three (3) separate and independent freshwater ecosystem assessments have been conducted for the Rabie Ridge X 7 study area. The first wetland delineation study was undertaken by Strategic Environmental Focus (SEF) in September 2013, for the very first S&EIR application for the RRX7 township project. When the new applicant re-initiated the mixed land use township application in 2021/2022, the 2013 SEF wetland report had to be updated (including new site inspections), to conform to the auspices of an Appendix 6 level specialist assessment (NEMA, as amended on 7 April 2017), where the most current ecological and aquatic characteristics of the site, potential and current impacts from the



development, were re- evaluated. To this end, Scientific Aquatic Services (SAS) were appointed to compile the required updated freshwater ecosystem assessment report.

The results of the SAS report were substantially different to the 2013 SEF report. The Un-channelled Valley Bottom Wetland (UCVB) on site, had increased dramatically in size since the 2013 SEF delineation exercise. To determine the correct and accurate wetland delineation to adopt for the site, a third, independent wetland specialist was appointed. Terra Soil Science was appointed to provide a specialist opinion on the presence and context of the wetlands identified on the proposed Rabie Ridge X7 development area. The Terrasoil report also provides a high-level hydrogeology of the site.

The intention of the Terra Soil report is not to function as one of several attempts by the applicant to obtain favourable delineation outcomes. Rather, the report is aimed at addressing specific site conditions in the context of current legislation, guidelines and best practice with the ultimate aim of ensuring the conservation and adequate management of the water resource on the specific site.

See table 10 of this report for the summary of the findings of the three separate wetland reports.

Cit of Johannesburg's Comments on the Wetland Reports

Following receipt of the independent specialist wetland studies, SEC submitted all the reports to the COJ, Environmental Impact Management Department, in Sept 2022, as separate addendums to the Draft Scoping Report. SEC requested the commenting authorities' input, to inform the project team which wetland delineation results to proceed with / adopt for the site. The COJ's comments are as follows:.....*"After a thorough review of the above findings, the Department has come to the following conclusions:*

1. The Department accepts the Wetland Delineation by SEF (HGM 1 & 2) and would concede on the remaining HGM's based on the findings, and the fact that the systems are isolated and have been severely degraded.
 2. As per the City's Catchment Management Policy, no development would be permitted within the wetland or riparian zone, or within a buffer of 30 metre from the outer edge of such wetland or riparian zone or riverbank where this is clearly identifiable, or within the 1:100-year floodlines, whichever is the greatest. In this case (HGM 1 & 2).
 3. Due to the presence of an existing road (Dane Road) which would have potentially isolated the wetland system, this road could serve as southern buffer of HGM 1 & HGM 2 wetland units, in a case where the 30m buffer extend beyond the road.
- Based on the recommendations of the Terrasoil report, and the COJ Environmental Impact comments, the 2013 SEF delineation has been adopted for the RRX7 township.

Wetlands affected by the township development

The proposed development will result in the total loss of wetland features HGM 4 and 5, and therefore the impact is of serious severity. However due to the highly modified state, and low ecological importance of these features, the sensitivity of the features is of low significance. HGM 4 was considered to provide few ecosystem services, therefore the loss of this feature will not result in a



significant sociocultural impact. The proposed activities will result in the permanent loss of portions of two wetland features (HGM 1 and HGM 3) prior to the implementation of mitigation measures due to the development of residential structures. Additionally, portions of HGM 1, and HGM 3 – 5 will be lost due to the development of roadways and the installation of bulk services. The severity of the impact of these activities can be considered to be significant, but not particularly severe. Furthermore the ecological scores of all of the wetland features indicated a highly modified system of limited ecological importance and sensitivity.

The Wetland Ecologist (SEF 2013) recommended that no structures be developed within HGM 1 -3, and that a 30m minimum buffer zone be implemented around these wetlands. This was based on the premise that serious rising damp, and water problems might compromise the structural stability of buildings placed there, as exemplified by water damage in the existing residential buildings encroaching upon wetland features. However, the Geotechnical report disputed this stating that no special problems with damp proofing were predicted (WSP 2015).

- Water Use License Associates (PTY) LTD has been appointed to submit a Water Use License application to the Department of Water and Sanitation, to facilitate the Water Use Authorisation process as described in the National Water Act (Act No. 36 of 1998) for water uses as defined in Section 21 relating to the RRX7 application. This application is presently underway.

Wetland Rehabilitation

SAS compiled a detailed Wetland rehabilitation and Management Plan for the activities proposed within the identified wetland systems. The above mentioned rehabilitation plan and the engineering storm water management plan were both informed by the mitigation measures provided by SEF in the 2013 Wetland Assessment Report. In order to mitigate potential negative affects to the watercourse, large scale attenuation and associated diffuse release infrastructure would have to be designed and implemented to mimic the hydrology of a predevelopment Halfway House granite landscape. This would require integration of the development layout, inclusion of green spaces, stormwater design to include several attenuation facilities as well as diffuse release infrastructure fringing the hillslope seepage wetlands. SEF further recommended that both soft and hard engineering principles be utilised to ensure that the most cost effective and aesthetically pleasing mitigation options are implemented.

Hydro-Geology

Nineteen boreholes are located within 1 km of the proposed development area. An additional four boreholes located on the edge of the designated 1 km assessment radius were identified by chance. The majority of groundwater users occur to the west of the proposed development area, within President Park. Nineteen of the 23 boreholes, or 82.6%, of the boreholes were in working order. Of those boreholes that were in use 100% were used for irrigation, 37% were used for drinking and domestic use, and 5% of boreholes were used for recreational purposes (full physical contact).

At the time of the assessment the groundwater at all four boreholes was considered to be suitable for drinking water. However, the compliance of various metals with the standards for domestic use, irrigation, and livestock watering could not be determined. Therefore, it is recommended that a precautionary approach be taken and that the water not be used for these purposes. Furthermore,



the water was not deemed suitable for aquaculture purposes, which was not an identified groundwater use in the area.

Terrestrial Ecology

The study area is located within an extensively urbanised landscape. As such, the study area has already been subjected to a number of impacts relating to anthropogenic activities, including the disposal of household refuse and construction material and the transformation of areas from grasslands and wetland to agricultural fields. The study area is currently encompassed by urban areas and has resulted in the loss of habitat connectivity to larger natural areas in the region, whilst internal habitat transformation and roads has led to habitat fragmentation. The proposed development within the study area will result in further loss of habitat and loss/displacement of the remaining species which inhabit the study area. Although this habitat and species diversity loss is unavoidable, the overall impact is unlikely to lead to significant alterations / impact to species populations in the greater region, as the study area is not considered to be a core home range for fauna. No faunal SCC were observed or are expected to occur within the study area.

Three broad Habitat Units were distinguished for the Study Area:

- Mixed Grasslands;
- Freshwater Habitat: Seep Wetland; Unchanneled Valley Bottom; and
- Transformed Areas.

The data gathered during the specialist site visit indicated that the Mixed Grassland Habitat Unit is of Moderately Low Sensitivity, the Freshwater Habitat Unit is of Intermediate Sensitivity, and the Transformed Areas Habitat Unit is of Low Sensitivity. The proposed development will impact on these Habitat Units to varying degrees. The floral, faunal and herpetofaunal sensitive areas were all located within the conserved HGM 1 and 2 Unchanneled Valley Bottom wetlands located in the southern central portion of the site. HGM wetland units 4 and 5 have not been accommodated in the final township layout plan, due to their fragmented nature, and their low Ecological Importance and Sensitivity Scores.

Agricultural Assessment

Scientific Aquatic Services (SAS) CC was appointed in 2015, to conduct an Agricultural Potential assessment for the proposed Rabie Ridge X 7 mixed township development. The desktop assessment indicated that the subject property comprises of moderate Land Capability (class IV), with marginal potential for arable agriculture. This suggests that the entire subject property is considered suitable to arable agriculture, however with considerable soil depth limitations. However, the 2014 Gauteng Conservation Plan version 3.3 (C-Plan v.3.3) indicated that the subject property was dominated by low agricultural potential soils of moderate (class IV) land capability. This was most likely due to urbanisation in the area, and relatively small proportion of arable land for sustainable agricultural production. The majority of the identified soils were classified as Land Capability class III, comprising of Cv and Hu soils, collectively constituting approximately 48.4% (56.7 ha) of the subject property. These soils are considered to be of high agricultural potential. Whereas the identified Av, Pn, and Lo soils were classified as class VI land capability class, collectively constituting approximately 9.4% (11.1 ha) of the subject property. The Av Pn, and Lo were therefore considered to be of moderate-high



agricultural potential, as their imperfectly drained nature is known to be considerably beneficial for some deep rooted crops under drought conditions where irrigation water is scarce; hence the common exploitation of these soils for maize production in the Highveld region.

The remainder of the subject property comprises of low agricultural potential soils. It is the specialist's opinion that the relative extent of the soils with arable agricultural potential identified within the property is unlikely to justify the acquisition and maintenance of essential farm implements, and the extent of these soils is therefore considered unlikely to sustain viable crop production at a commercial scale. With the currently extensively urbanised surrounding area, the likelihood of larger tracts of land being combined into a viable agricultural land use unit is unlikely, and it is deemed more likely that the erven in the surrounding area will undergo further and increasing levels of subdivision in the future. These soils are therefore at best well suited to subsistence farming. It is therefore of the specialist's opinion that the proposed mixed land use can be considered favourably from an agricultural potential aspect, provided the recommended mitigation measures are implemented during the execution of this project to prevent impact on adjacent soils.

Social Environment

Social Amenities

The proposed Rabie Ridge Ext. 7 development is divided into an eastern and western section. The eastern section is situated to the east of Modderfontein Road and to the south of Republic Road. Both the eastern and western sections of the proposed development (west of Modderfontein Road) fall within Ward 110. Rabie Ridge township, however is divided between Ward 110 and Ward 80. The main socio-economic challenges faced in Ward 110 relate to unemployment and the provision of affordable housing. Aspects such as basic Service Delivery, Transport, Recreational Facilities, Educational Facilities, and the present Subsistence Agricultural Practises on site have been addressed in the assessment.

Air Pollution

The study site is located adjacent to the existing high density Rabie Ridge and Ivory Park Townships. The air quality in the area is polluted from pollutant sources such as dust, smoke and ash outfall from burning waste dumps, wood and coal for cooking and heating, etc. No formal study of the air quality in the study area will be undertaken, due to the non-noxious land uses of the Rabie ridge X 7 project. The upgraded living conditions of the residents will mean that the residents are provided with power, thereby eliminating their dependence on burning fossil fuels. Other detrimental practices which cause air pollution in the study area currently, includes the burning of waste and tyres.

Noise

Currently, no noise is generated on the site. Potential Noise sources created by the new development will be: Construction Noise: During construction activities, people are often exposed to different levels of pounding, roaring, beeping and other loud noises from construction work. Construction noise abatement measures have been provided in the EMP, to ensure that the construction activities are not a source of excessive noise to the adjacent residents. Operational Noise: Noise generated from



the new development includes accepted urban sources of noise including traffic, school sirens, etc. These noise sources will not be a nuisance noise source.

Visual Impact

The proposed Rabie Ridge X 7 development will change the character of the site from an unbuilt, vacant area to a high-density residential area, including all affiliated township amenities. The disturbance of the environment during the *construction phase* will lead to temporary negative visual impacts. Properties closest to the development would be mostly affected, as well as commuters making use of Modderfontein, Republic, and Dane Roads. The construction site will be visible from some of the residents' dwellings located adjacent to the site. These impacts will be temporary in nature. The construction of the township will be phased over a long term. The area surrounding the site is already marred by other visual elements such as existing infrastructure (power lines, water tower, roads, illegal dumping, informal settlement), traffic movement, littering and human traffic across the site, as well as other townships, such as the existing Rabie Ridge, Ivory Park, Commercialia, and Chloorkop/Phomolong. Although the formalised township buildings will be clearly visible, it is anticipated that the development will be accepted over time, as the inevitable extension of the above-mentioned existing townships. Vacant land owned by the province is either formally developed, or informally invaded. Formally planned development is the preferable option. The constructed development (*operational phase*) will have a permanent visual impact. The most marked impact would be for the residents of the agricultural holdings to the north and west of the development. Such a high-density development with all the related infrastructure would disturb their viewpoints and change the character of their surrounding area significantly. It is fair to say that the proposed Rabie Ridge x 7 Mixed Land use development would not be aesthetically pleasing to the residents of the agricultural holdings. It would influence their sense of place (rural type of environment). However, considering that the site is earmarked for urbanisation, the development of the site in line with councils' high density housing strategies is inevitable. Where the high-density erven of the residential erven will incur the maximum level of visual change, building line setbacks from adjacent rural – residential land owners, and the orientation of buildings on the property must be such that the impact on the amenity and privacy of adjacent landowners is kept to a minimum.

The City of Joburg's development planning and urban management assert that the department is actively promoting higher densities across the city, and especially in areas that are well connected to existing and new public transportation networks. Higher densities mean greater efficiency in the use of land and bulk infrastructure, more viable public transport systems, and better levels of servicing for communities to support facilities such as schools, hospitals and libraries. Significant constraints in terms of bulk infrastructure and road capacity are being addressed. To this end, no specialist visual impact assessment is deemed necessary for the development.

Socio Economic Environment

Demographics of a study area are important to ensure that new developments will complement/fit into the existing land uses. See Appendix 21 for the comprehensive Social Impact Assessment conducted for the development. Social profiles and the local economic contribution of the RRX7 development have been addressed in detail in said report.



Heritage and Palaeontological resources

The site visit undertaken by the Specialist confirms that the largest extent of the proposed project site is found to be of very low heritage sensitivity. This does not mean that no heritage resources will be present in these very low sensitive areas, but the probability of resources of high cultural significance being found there are highly unlikely. From a heritage point of view it is recommended that the proposed development be allowed to continue, on condition of acceptance of the proposed mitigation measures. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. No Palaeontological assessment was recommended by the specialist.

Environmental Composite Map

The preferred township layout plan, Figure 2 of this report, has been configured to incorporate the various environmental characteristics and areas of significance that must be taken into consideration. The preferred township layout plan, indicates the following in relation to the proposed development site:

- 1:100-year flood line delineation;
- Storm water attenuation ponds;
- Adequate open space; and
- Wetlands with buffer areas to be conserved in the development.

Figures 13 of this report indicates all the wetland areas in relation to the schematic layout plan.

Risks and Key Issues

Potential risks and impacts addressed to date, include, but are not limited to, the following:

- Biophysical impacts including alteration of fauna and flora habitats, as well as the loss of wetlands on site.
- Socio-economic impacts including visual, noise, increased traffic and the provision of adequate water and sewer services, and the lack of electrical services in the area

Key issues assessed include:

- Adequate provision of services to the development
- Loss of areas of aquatic significance (wetlands)
- Social impacts

Impacts and Mitigation Measures

Relevant issues were evaluated in terms of the most important parameters applicable to the environmental management. Numerous mitigation measures have been provided that will manage the impacts or mitigate them successfully.

Conclusion

After considering and assessing the potential environmental impacts associated with the proposed development, it can be concluded that **the present lack of capacity of municipal electrical power supply to the site, and the absence of confirmed municipal water and sewer services to the**



township, is a critical, and potentially fatal flaw for the project. These issues are to be resolved for the Final EIA report.

There are no biophysical constraints / significant negative impacts on the biophysical environment, that could result in fatal flaws for the project. The UCVB wetland system has been largely modified throughout its extent but is still deemed important for hydrological functioning (such as flood attenuation and nutrient/toxicant assimilation). In accordance with the wetland and hydro pedological specialist reports, and the COJ comments, the majority of the HGM wetland units 1 & 2, including the 30m buffer, have been conserved on site.

The preferred alternative assessed in this report is feasible and reasonable, *provided municipal services, bulk infrastructure upgrades and alternative energy resources can be secured for the long term*. The mixed land use proposal is in line with the planning policies and guidelines for the area. All the mitigation, management and monitoring measures provided under Section J of this report must be implemented, should the proposed development be approved.

Due to the size of the development, the current unavailability of power to the site, the required bulk infrastructure upgrades and confirmation of available municipal sewer and water, and the availability of government project funding, the construction phase is anticipated to continue for at least 5 – 10 years, probably longer. The applicant intends to develop the shopping centre immediately, with the remaining land uses being built in phases, as services and funding become available.

Only once the service provision flaws have been addressed in the Final EIA report, can the project be supported for authorisation. On such basis, SEC could recommend that the application be authorised, subject to the recommendations of the municipal service providers, Final Environmental Impact Assessment Report, The Environmental Management Program (EMPr), and all specialist studies. Applicable legislation must be followed, and applicable licences obtained prior to any construction occurring on site.



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SECTION A: 1. NEMA REQUIREMENTS FOR AN EIA REPORT

The table below lists the minimal contents of an EIA report in terms of Appendix 3 of the EIA Regulations, 2014 (as amended) and provides a reference on where to find the required information in this report. This Draft EIA report has been compiled in accordance with the NEMA EIA Regulations, 2014, as amended. A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

Contents of an EIA report	Where it is found in this report
1a. 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 Details of – <ul style="list-style-type: none"> • the EAP who prepared the report; and • the expertise of the EAP, including a curriculum vitae; 	Section A.4 Appendix 1
1b. The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including: <ul style="list-style-type: none"> • The 21-digit Surveyor General code of each cadastral land parcel; • Where available, the physical address and farm name; • Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; 	Section B
1c. 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 – <ul style="list-style-type: none"> • a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or • on land where the property has not been defined, the coordinates within which the activity is to be undertaken; 	Figure 2
1d. A description of the scope of the proposed activity, including <ul style="list-style-type: none"> • all listed and specified activities triggered and being applied for; and • a description of the associated structures and infrastructure related to the development; 	Section D Section C
1e. 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;	Section D



Contents of an EIA report	Where it is found in this report
1f. 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 development footprint within the approved site as contemplated in the accepted scoping report;	Section E
1g. A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Section E & Section F
1h. A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including	Section F
i. details of the development footprint alternatives considered;	Section F
ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section H
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;	Appendix 23
iv. the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section G
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;	Section J
vi. the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section J
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;	Section J
viii. the possible mitigation measures that could be applied and level of residual risk;	Section J



Contents of an EIA report	Where it is found in this report
ix. if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Section F
x. a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Section F
(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 development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including —	Section J
i. a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section J
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;	Section J
j. an assessment of each identified potentially significant impact and risk, including— <ul style="list-style-type: none"> 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; 	Section J
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;	Section I



Contents of an EIA report	Where it is found in this 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 development footprint on the approved site as contemplated in the accepted scoping report 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;	Section L
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Section J
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Sections F & J
(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;	Section I & K
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section K
(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;	Section L
(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;	N/A
(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;	Appendix 1



Contents of an EIA report	Where it is found in this report
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(u) an indication of any deviation from the approved scoping report, including the plan of study, including (v) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (w) a motivation for the deviation;	N/A
(x) any specific information that may be required by the competent authority; and	Appendix 23
(y) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report, the requirements as indicated in such notice will apply.	Noted

2. OBJECTIVE OF THE EIA PROCESS

The objective of the environmental impact assessment process is to, through a consultative process:

- i. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- ii. describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
- iii. identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- iv. determine the—
 - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated;
- v. identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
- vi. identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;



- vii. identify suitable measures to avoid, manage or mitigate identified impacts; and
- viii. identify residual risks that need to be managed and monitored.

3. INTRODUCTION

Ninфу Allandale Dev PTY LTD has appointed Seedcracker Environmental Consulting CC, an independent, registered, Environmental Assessment Practitioner (EAP), to assist with conducting the required application processes (including the Scoping and public participation processes), and to compile and submit the required documentation in support of an application for EA in accordance with the NEMA-Listed activity/ies, namely:

GNR 984: Activity 15; The clearance of an area of 20 hectares or more of indigenous vegetation
GNR 984: Activity 12 c 11; The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan, in Gauteng, Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; and
GNR 984: Activity 14 ii a (c) iv; The development of— infrastructure or structures with a physical footprint of 10 square metres or more; where such Development occurs— (a) within a watercourse; in Gauteng, in Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans

See Section D2 for the full list of activities identified for the project.

Approximately 41 300m² of vacant land will be utilized for predominantly high-density residential development – mostly catering for entry level and middle income bonded housing. Mixed income and social integration across race and income levels will be made possible by this development. Bulk infrastructure in the form of water, sewerage and electricity are being investigated. Bulk needs to be upgraded to cater for the size of the new development. The development proposal will further offer a range of community facilities, educational services, open spaces and services to the surrounding community.

The site is zoned “Agricultural” at present. The project is located on the Remainder of the Farm Allandale 10 IR, to be known as Rabie Ridge Ext 7, Midrand, Johannesburg Metropolitan Municipality, Gauteng Province. The site is divided into two portions by Modderfontein Road. It is adjacent to, and on the southern side of Republic Road. Dane Road traverses the southern portion of the site.

The proposed township will consist of the following erven: 432 “Res 1” erven, 17 “Res 3” erven at 40du/ha, 20 “Res 3” erven at 60du/ha, 1 Institutional erf, 1 Business 1 erf, 1 Educational erf, 7 public open spaces, 2 municipal stands, and roads.



4. DETAILS OF THE EAP

Company of Environmental Assessment Practitioner (EAP):	SEEDCRACKER ENVIRONMENTAL CONSULTING CC	
Name of the EAP:	STEPHANIE CLIFF	
EAP Qualifications	BSC Hons Animal Science BSC Hons Wildlife Management	
Professional affiliation or registration:	Registered Environmental Assessment Practitioner: Number 2019/487 Member of IAIA SA	
Physical address:	228 Ashwood Drive, Centurion	
Telephone:	082 626 4117	
E-mail:	Stephweb@mweb.co.za	

See Appendix 1 for Steph Cliff's Curriculum Vitae. Stephanie Cliff holds a BSc Honours Degree in Animal Science, and a BSc Honours Degree in Wildlife Management. Mrs Cliff started her career in Environmental Management in 2003. Her subsequent involvement in all fields of environmental and social management have been in leadership positions. Mrs Cliff has considerable experience in the governance, environmental ethics, legislation, risk management and technical aspects of environmental management systems and Environmental Impact Assessment Processes. She has gained advanced knowledge of Integrated Environmental management (IEM) tools and principles, the principles, and fundamental criteria of the National Environmental Management Act (NEMA), provincial policies and regulations. Mrs Cliff has worked throughout South Africa, conducting Basic Assessments, Scoping & EIAs, and has monitored construction activities (Environmental Control Officer) for the built environment. She has project managed all projects assigned to her, conducted the full spectrum of public participation for strategic, linear, and large-scale projects, peer reviewed specialist studies, and authored the consolidated impact reports. SEC was established in 2008. Mrs Cliff is a Registered Environmental Assessment Practitioner: Number 2019/487. As a Registered EAP, Mrs Cliff is required to uphold the EAPASA Code of Ethical Conduct and Practice in all professional endeavours, towards the goal of quality assurance in environmental assessment practice.

5. SPECIALIST CONSULTANTS

In terms of regulation 16(1)(b)(v) of the EIA Regulations, 2014, as amended, the National Web based Environmental Screening Tool Report is included in Appendix 2. Specialist studies that were identified through use of the National Web based Environmental Screening Tool were:

- Landscape/visual Impact Assessment;
- Archaeological and Cultural Heritage Impact Assessment;
- Palaeontology Impact Assessment;
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Socio-Economic Impact Assessment;
- Plant Species Assessment; and



- Animal Species Assessment.

Two (2) of the above specialist studies as identified through the screening tool were deemed unnecessary by the EAP, whilst the remainder of the studies were deemed essential, based on the nature of the proposed development, the receiving environment and the Scoping Phase assessment (including plan of study for impact assessment). Additional Wetland and Ground Water Hydrocensus studies were conducted to address authority and IAP comments. Specialist studies conducted during the Scoping Phase, which included site investigations, confirmed the redundancy of the Palaeontology Impact Assessment and Landscape/visual Impact Assessment, as identified by the tool.

The specialist studies included thorough site visits, and the gathering of data relevant to identifying and assessing environmental impacts that may occur because of the proposed mixed land use development proposal. The impacts were assessed according to the impact significance rating methodology (Section J). The specialists have also included recommendations preliminary mitigation/management measures to minimise potential negative impacts or enhance potential benefits, respectively. The specialist's declaration of independence is included in the respective specialist reports.

The following team of qualified and experienced specialist's, form part of the project team:

Professional Discipline	Company and Contact Person
Agricultural Assessment	Scientific Aquatic Services Stephen Van Staden
Ground water and Hydrocensus	Scientific Aquatic Services Stephen Van Staden
Freshwater Delineation and assessment	Scientific Aquatic Services, Nelanie Cloete Terrasoil, Dr Johan van der Waals
Terrestrial assessment	Scientific Aquatic Services Stephen Van Staden, Chris Hooton
Heritage Impact Assessment	Dr J Van Schalkwyk
Social Impact Assessment	Batho Earth Ingrid Snyman
Town Planning	The Town Planning Hub Bea Fletcher
Traffic Impact	WSP Nico Roets
Civil services and Stormwater Management	WSP Nico Roets
Project and Development Management	Ricci Davidoff



SECTION B. PROPERTY DESCRIPTION

B1. Project Locality and Extent

The mixed land use development is located on the Remainder of the Farm Allandale 10 IR, Midrand, City of Johannesburg Metropolitan Municipality, Gauteng Province. The site is divided into two portions by Modderfontein Road. It is adjacent to, and on the southern side of Republic Road. Dane Road traverses the southern portion of the site. The site measures 129, 6391 hectares in extent and is currently vacant. Please see Figure 1 for the locality map. The corner coordinates of the application area are provided in Table 2 below:

28 173	26 010
28 172	26 008
28 163	26 013
28 164	26 014
28 165	26 014
28 162	26 013
28 160	26 014
28 164	26 025
28 168	26 023
28 164	26 025
28 168	26 023
28 166	26 029
28 171	26 028

SG 21 Digit Code for the property: TOIR0000000001000000

B2. Property Ownership

The property is in the name of the Gauteng Province: Department of Human Settlements.

B3. Site description

The site is presently vacant, and is utilised by the surrounding informal community for livestock grazing, illegal dumping, informal clay and brick making areas, informal township church services; foot paths across the site, and subsistence agriculture in the wetland areas. The study area is located within an area characterised by transformed open veld, current and historic agriculture and rural urbanisation. With the extent of vegetation transformation taking place in the area due to the above mentioned activities, significant local and regional loss of biodiversity has taken place. The site has been vacant for many years and is constantly under threat of being informally and illegally occupied / land grabbed.

B4. Surrounding Land Uses

The Remainder of the Farm Allandale 10 IR is currently vacant. Surrounding land uses to the application site / study area are presented in Table 3:

Cardinal Direction	Land Use
North	President Park Agricultural Holdings Kaalfontein X 4



	Ebony Park Republic Road
East	Existing Rabie Ridge formalised township. Ivory Park Extensions Modderfontein Road
South	Commercia Dane Road
West	Austin view A.H

B5. Compatibility of township with the Surrounding Area

The Rabie Ridge X 7 township is located between the low density Agricultural small holdings of Austin View (rural residential according to the City of Joburg) in the West, the low density Agricultural small holdings of President Park in the North, and the high density formal and informal areas of Ivory Park, Rabie Ridge and Commercia, in the east and south. It is the largest remaining piece of land “bridging” the two opposing land uses. The Rabie Ridge X 7 township would essentially bring the high-density land use of Rabie Ridge and Ivory Park, closer to the rural residential areas. Whereas the proposed Rabie Ridge X 7 township would be complimentary to the east and south land uses, it would not be the same for the land uses in the north and west.

Given the City of Joburg’s Spatial Planning Frameworks, and the applicants intention to address the housing backlog in the area, the Rabie Ridge X 7 township would fulfil the authorities needs in a formally planned land use application. However, the township would need to be acceptable and sustainable in terms of bulk service provision, electrical supply, and wetland preservation.



SECTION C. PROJECT DESCRIPTION

C1. Project Description

Approximately 41 300m² of vacant land will be utilized for predominantly high-density residential development – mostly catering for entry level and middle income bonded housing. Mixed income and social integration across race and income levels will be made possible by this development. Bulk infrastructure in the form of water, sewerage and electricity are still being investigated. Bulk services need to be upgraded to cater for the size of the new development. The development proposal will further offer a range of community facilities, educational services, adequate open spaces and community services to the surrounding communities.

The mixed land use township development is proposed to comprise the following land uses:

Table 4:

LAND USE TABLE				
USE	AREA	OF TOWNSHIP	AMOUNT OF ERVEN	ERF NUMBERS
RESIDENTIAL 1	12.9098ha	13%	432	
RESIDENTIAL 3 - 40du/ha	8.4347ha	8.3%	17	
RESIDENTIAL 3 - 60du/ha	21.3511ha	21%	22	
BUSINESS 1	14.4985ha	14.3%	1	
INSTITUTIONAL	2.5053ha	2.5%	1	
EDUCATIONAL	2.7621ha	2.7%	1	
PUBLIC OPEN SPACE	21.7195ha	21.4%	7	
MUNICIPAL	2.2525ha	2.2%	2	
ROADS	14.9246ha	14.6%		
TOTAL	101.3581ha	100%	483	

The site is zoned “Agricultural” at present. The Town Planning Hub (TPH) have been appointed by the applicant, to apply for Township Establishment Rights. See Figure 2 for the proposed township layout plan.

C2. Infrastructure and Services

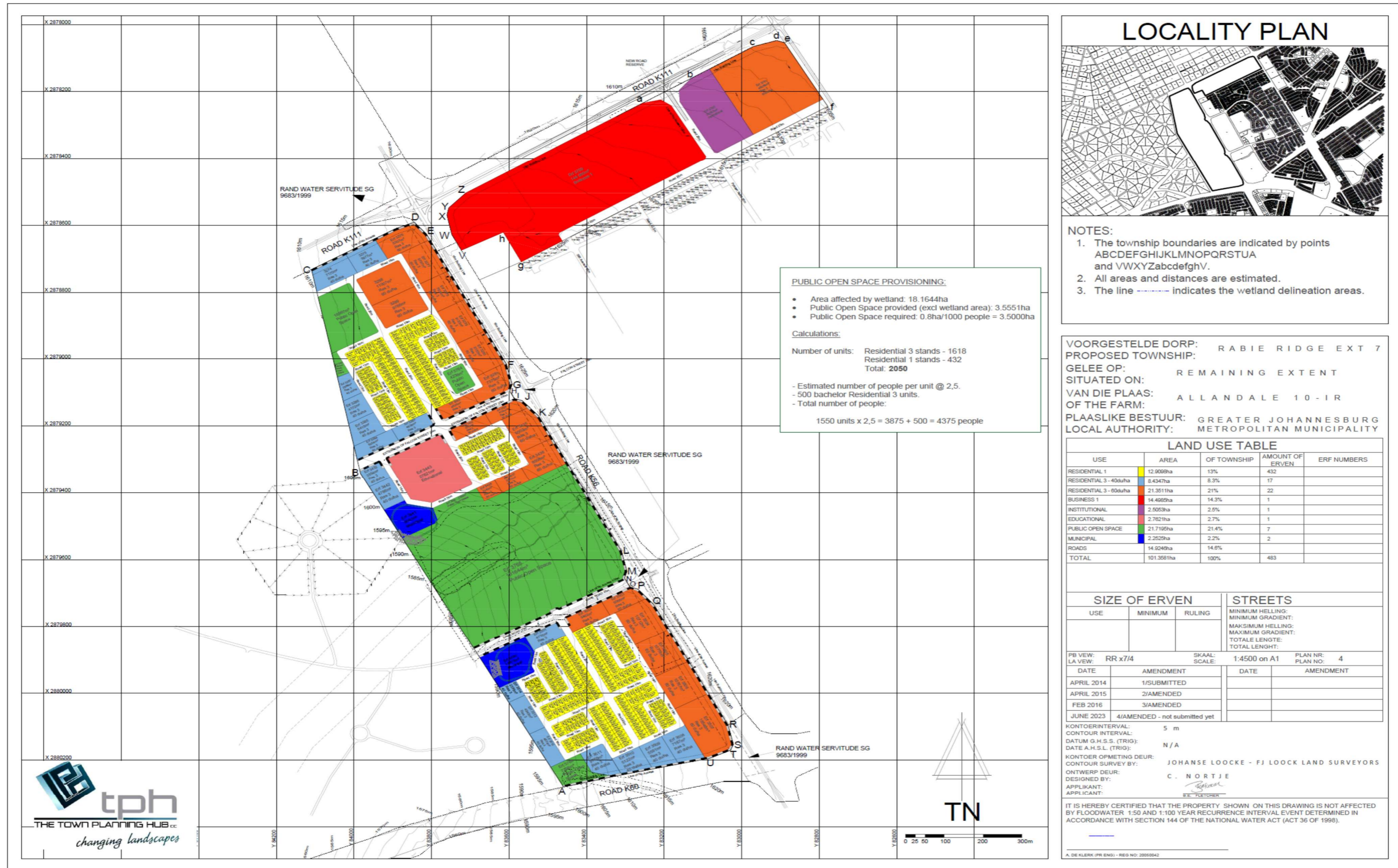
C2.1 Water Supply

WSP Group Africa (Pty) Ltd have investigated and compiled the Water and Sewer Report for the project, see Appendix 3.

The proposed development falls within the President Park and Rabie Ridge Reservoir water district. The Rabie Ridge Reservoir is located east of the K56 (adjacent to the proposed development), feeding the various townships around and including Rabie Ridge. A 200mmØ pipe runs on the eastern side of the K56 (Modderfontein Road) in a southern direction. Two 300mmØ connection points is proposed for the western portion of the proposed development.



Figure 2: Present proposed Township Layout Plan



A 160mmØ water pipe runs on the northern side along the K111 (Republic Road) and a 225mmØ water connection could be obtained from this pipe for the eastern portion of the proposed development.

Johannesburg Water might require upgrades for the existing water system due to the added demand from the proposed development. The upgrades can only be confirmed by Johannesburg Water upon approval of this report.

The estimated water demand for the proposed development is calculated as:

$$\begin{aligned}\text{Peak Hourly Consumption (PHC)} &= \text{Water demand} \times \text{Peak Factor} \\ &= (8\,295.2 / 24) \times 4 \\ &= 1\,382.5 \text{ k}\ell/\text{h}\end{aligned}$$

$$\begin{aligned}\text{Total water consumption} &= \text{PHC} + \text{Total Fire Flow (TFFfh)} \\ &= (1\,382.5 / 3\,600) * 1000 \ell/\text{s} + 50 \ell/\text{s} \\ &= \mathbf{434.0 \ell/\text{s}}\end{aligned}$$

The internal services will be taken over by City of Johannesburg Municipality they will be responsible for the maintenance of the services.

C 2.2 Sewer

The proposed development falls within two drainage basins, namely the Northern sub-basin and the Olifantsfontein sewer basin. The western portion of the proposed development falls in the Northern Sub-basin area, ultimately draining to the Northern Waste Water Treatment Works. To connect to this drainage basin, a new 250mmØ sewer pipe will have to be constructed from the western boundary of the proposed development along the small watercourse and connect to an existing sewer pipe to the south west of the proposed development. Data obtained from Johannesburg Water suggest that a section of the existing sewer system will have to be upgraded to accommodate the additional flow from the proposed development. This new 250mmØ pipe will have to be approximately 1.26km long. The eastern portion falls within the Olifantsfontein sewer basin, draining to the Olifantsfontein Waste Water Treatment Works. An existing 160mmØ sewer pipe is located east of the proposed development, on the eastern side of the K56 (Modderfontein Road). From data obtained by Johannesburg Water, it is seen that this pipe has a full flow velocity of 2.5m/s and has a spare capacity of 45%, thus resulting in an estimated 22.5ℓ/s spare capacity. The data suggest that this existing 160mmØ sewer pipe will also have to be upgraded to accommodate the additional flow generated by the proposed development.

The suburbs adjacent to the proposed development site (Rabie Ridge and Commercia) have an established sewerage system.

The estimated sewerage flow for the proposed development is:

$$\begin{aligned}\text{Peak Flow} &= \text{Peak Factor} \times \text{Sewerage Flow} \\ &= 2.5 \times (6\,919.7 / 86400) * 1000 \\ &= 200.22\ell/\text{s}\end{aligned}$$



- The Water and Sewer Services Reports have been submitted to council for comment. No comments or approvals are in place yet.

C 2.3 Electrical Power

WSP has been appointed by the applicant to investigate the available electrical services for the proposed development. See Appendix 4.

A high level load estimate of the maximum demand for the site was done in accordance with the SANS 10142-1: 2006 and the electrical load allowance. The total estimated load for the development is calculated to be **10.2 MVA**.

The electrical supply authority in the area is City Power. City Power has indicated that *no capacity is currently available* on the network and will only be available once the supply in the area is upgraded, and the upgrade is completed. The applicant is subsequently exploring alternative energy solutions such as solar and gas. Solar Farm implementation principles, such as a small-scale embedded generation (SSEG) is presently being investigated by the applicant. Any power generating facility located at a residential, commercial or industrial site, where electricity is generally also consumed, is considered a small-scale embedded generation (SSEG). These are mainly solar photovoltaic (PV systems) but also include other technologies such as wind and biogas. Further information/reports being explored by the applicant at this stage, is not available, and will be included in the Final EIAR.

C 2.4 Storm water Management and Design

WSP Group Africa (Pty) Ltd have compiled the Storm water Management Report for the project, see Appendix 5.

A topographical survey was conducted of the site and the existing stormwater systems. As a result, the proposed development is divided into three major drainage areas; East, North West and South, as discussed below:

Eastern Drainage Area

Currently, an existing earth channel is located on the southern side of the K111 (Republic Road) on the northern boundary of the proposed development. Five culvert crossings along the property boundary are located from the channel draining underneath the K111 in a northern direction into the road reserve.

Northern and southern Drainage Areas

A small watercourse is located in the middle of the western portion of the proposed development. The western portion of the proposed development will drain towards this small watercourse.

The aim of the stormwater management report is to satisfy the JRA requirements by means of attenuation of the peak stormwater flow generated by the development. A volume of 290m³/ha was used for the purpose of this report. This value will be justified in Chapter 7 of



this report. Thus, a total volume of 24 355m³ of the run-off generated by the proposed development will have to be attenuated before releasing the stormwater into the existing systems or the existing watercourse.

WSP propose that the stormwater should be managed on site by means of Sustainable Drainage Systems (SuDS) principles. The report will thus further discuss and explain the SuDS proposed. The run-offs were determined with the aid of SSA. The stormwater drainage system will consist of various post-development catchment areas and pipe networks discharging into four attenuation dams before discharging into the existing watercourse (North Western and Southern areas) and the existing pipe network (Eastern area). The attenuation is discussed in detail in the following chapter.

Proposed Stormwater Design

See Appendix 5 for the Civil Report detailing the present proposed stormwater management for the township. The discharge generated by the stands and internal roads is captured by field and kerb inlets at low points, and is subsequently piped to the proposed attenuation dams. Concrete pipes of class 50D and 100D will be used ranging from 450mmØ to 1650mmØ. The pipes will be designed to accommodate the 1:5 year storm event. For larger storms the run-off will be conveyed to the proposed dams by kerbed road channels and outlet channels in conjunction with the underground piped networks.

Sustainable Drainage Systems (SUDS)

Stormwater should be managed on site by means of Sustainable Drainage Systems (SuDS) principles. The purpose of the SuDS principles is to try to replicate natural systems that use cost effective solutions with low environmental impact to drain away surface water run-off through collection, storage, and cleaning before allowing it to be released slowly back into the environment, such as into existing water courses. Examples of this type of system are:

- Basins: shallow landscape depressions that is dry most of the time when it's not raining.
- Rain-gardens: shallow landscape depressions with shrub or herbaceous planting.
- Swales: shallow normally-dry, wide-based ditches.
- Filter drains: gravel filled trench drain.
- Permeable interlocking pavers: Stormwater run-off infiltrates the permeable interlocking paved surface through the cells filled with stone into a stone bedding layer.

The exact positions of these systems will be addressed in the detail design stage of this development. The SuDS principles are only applicable to the 1:2 year storm event, any run-off from larger storm events will be captured by the underground pipe networks and attenuation dams.

Attenuation

In order to minimize and control the stormwater run-offs from the post-developed stage, we propose that one attenuation dam for the Northwestern area and one attenuation dam for



the Southern area is constructed. For the Eastern Area, we propose that 2 local attenuation dams are constructed, as seen in Figure 3 of this EIA report, and Appendix 5.

The attenuation dams will be designed to accommodate the post-development flows for the 1:5 and 1:25 year storm events and discharge the pre-development flows. Overflow weirs situated at the top of the dam walls will accommodate the flow generated by storm events of 1:50 year or larger. The 1:2 year run-off will be attenuated and will be used to recharge the ground water table.

Using attenuation measures as described in the WSP report, the post-development run-off from the development will have similar drainage characteristics as in a permeable, undeveloped state. The pre- and post-development run-off will remain virtually unchanged in this regard and therefore the downstream flood lines will not be affected. The SuDS principles will be applicable to the 1:2 year storm event.

The run-off generated by 1:5 year storms will be captured by kerb inlets and grid inlets and be conveyed towards the attenuation dams by concrete pipes. For 1:25 year storms the run-off will be conveyed to the dams by kerbed road channels and open channels in conjunction with the underground piped networks. Stormwater flows from a 1:5 year and a 1:25 year event will be released into the existing watercourse and stormwater systems at a rate not exceeding the floods generated by similar events by the site in its pre-development stage.

- The SWM Report has been submitted to council for comment. No comments or approvals are in place yet.
- The SWM will be updated for the final EIA report to reflect the preferred town planning and wetland layouts.

C 2.5 Flood line

The 1:100 year flood line was determined by WSP and was taken into account with the finalization of the layout for the proposed development. See Figure 3. *This figure is a composite illustration showing all the wetland features on site. Only the central UCVB Wetland will be conserved on site as shown in Figure 2.*

C 2.6 Solid waste disposal

During the *construction* phase, waste should be managed as described in the Waste Disposal Management Plan included in the EMPr. During the *operational* phase, municipal or private waste services must be utilised, as well as the services of recycling companies.

C 2.7 Access and Roads

WSP was appointed to amend the Traffic Impact Assessment (TIA) for Rabie Ridge Extension 7. See Appendix 6 for this report. A previous study was conducted by WSP in June 2016, but has since lapsed.

The site is currently undeveloped. The purpose of the study is to determine the traffic impact the proposed development is expected to have on the existing road network and, if required,



recommend possible road upgrades to mitigate such an impact. This report also comments on the position of the proposed development accesses, as well as on non-motorised and public transport facilities.

This report will be subject to approval from the following relevant roads authorities:

- Johannesburg Roads Agency (JRA);
- City of Ekurhuleni, and
- The Gauteng Department of Roads and Transport (Gautrans)

Study Area investigated:

The following intersections have been included in the scope of this study:

- Main Road (future K111)/ Boshoff Road (Intersection 1)
- Main Road (future K111)/ Modderfontein Road (future K56) (Intersection 2)
- Modderfontein Road (future K56)/ Falcon Street (Intersection 3)
- Modderfontein Road (future K56)/ Dane Road (Intersection 4)
- Modderfontein Road (future K56)/ Unnamed Gravel Road (Intersection 5)
- Dane Road/ West Road (Intersection 6)



- West Road/ Republic Road (Intersection 7)
- Boshoff Road/ Tlangelani Road (Intersection 8)

Traffic Counts:

New traffic surveys were commissioned by WSP on Monday 5 September 2022 at all study intersections identified. The 2022 survey indicated a 14.6% growth in AM peak hour traffic volumes, and a 16.9% growth in PM peak hour traffic volumes since 2016. This equates to an average annual traffic growth rate of between 2.3% and 2.6%.

Access

The following accesses to the subject development are proposed:

- **K56 accesses:** Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.
- **K111 access:** A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.
- **Boshoff Road access:** Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.

Road upgrades

WSP suggest the following road upgrades:



Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
1. Main Rd/ Boshoff Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 30 m long)	Developer
	East	— New right-turn lane (min. 30 m long) — New left-turn slip lane with auxiliary lane (min. 120 m long)	— Developer — Roads Authority
	South	— New right-turn lane (min. 80 m long) — New left-turn slip lane with auxiliary lane (min. 80 m long)	Developer
	West	— Additional through lane — New right-turn lane (min. 30 m long)	— Developer — Roads Authority
2. Main Rd/ Modderfontein Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 30 m long) — Additional through lane (min. 30 m long)	— Roads Authority — Developer
	East	— Two new right-turn lanes (min. 60 m and 90 m long) — Additional through lane — New left-turn slip lane with auxiliary lane (min. 120 m long)	— Roads Authority — Roads Authority — Developer
	South	— Two new right-turn lanes (each min. 90 m long) — Additional through lane	— Roads Authority — Developer
	West	— Two new right-turn lanes (min. 60 m and 90 m long) — New shared-left and through lane (min. 60 m long)	Roads Authority
Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
3. Modderfontein Rd/ Falcon St	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 100 m long) — Additional through lane	Developer
	East	— New right-turn lane (min. 60 m long) — New left-turn slip lane with auxiliary lane (min. 60 m long)	— Roads Authority — Developer
	South	— New right-turn lane (min. 100 m long) — New left-turn slip lane with auxiliary lane (min. 100 m long) — Additional through lane	Developer
	West	— New right-turn lane (min. 60 m long) — New left-turn lane — New through lane	Developer



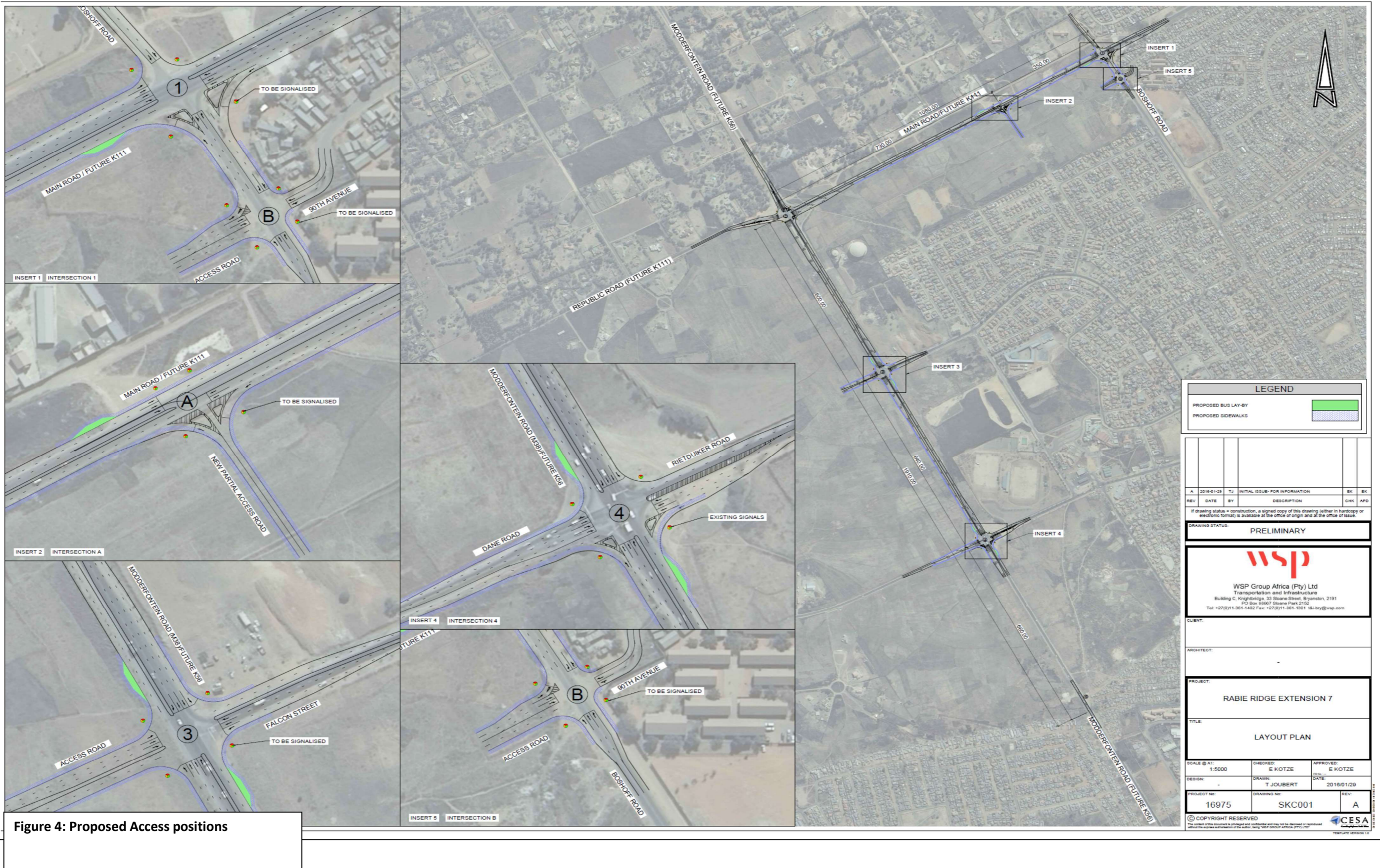


Figure 4: Proposed Access positions



4. Modderfontein Rd/ Dane Rd	Control	— Upgrade existing traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 60 m long) — Additional through lane	— Roads Authority — Developer
	East	— New right-turn lane (min. 30 m long) — New left-turn slip lane with auxiliary lane (min. 30 m long) — Additional through lane (min. 30 m long)	— Roads Authority — Developer — Roads Authority
	South	— New right-turn lane (min. 60 m long) — New left-turn slip lane with auxiliary lane (min. 60 m long) — Additional through lane (min. 120 m long)	Roads Authority
	West	— Extend existing right-turn lane to min. 30 m long — Additional right-turn lane (min. 60 m long) — New shared-left-and through lane (min. 100 m long)	— Developer — Developer — Roads Authority
5. Modderfontein Rd/ Gravel Rd	No upgrades		

Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
6. Dane Rd/ West Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 20 m long)	Developer
	East	— New right-turn lane (min. 50 m long) — New shared-left and through lane (min. 20 m long)	Roads Authority
	South	— New right-turn lane (min. 20 m long)	Developer
	West	— New right-turn lane (min. 20 m long)	Roads Authority
7. West Rd/ Dane Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 15 m long)	Developer
	East	— New shared-left and through lane (min. 60 m long)	Roads Authority
	South	— New right-turn lane (min. 15 m long) — New shared-left and through lane (min. 30 m long)	Developer
	West	— New right-turn lane — New left-turn lane (min. 15 m long)	— Developer — Roads Authority
8. Boshoff Rd/ Tlangelani Rd	Control	— Convert to traffic signal control	— Developer
	North	— New right-turn lane (min. 80 m long)	— Developer
	East	— New right-turn lane (min. 15 m long)	— Developer
	South	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 20 m long)	— Developer
	West	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 30 m long) — New through lane	— Developer



Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
A. Main Rd/ Development Access	Control	— Convert to traffic signal control	— Developer
	East	— New left-turn slip lane with auxiliary lane (min. 120 m long) — Additional through lane	— Developer
	South	— New left-turn slip lane	— Developer
	West	— New right-turn lane (min. 20 m long) — Additional through lane	— Developer
Main Road	Both directions	— Additional through lane (both directions) between Intersection 1 and 2	— Developer
Modderfontein Road	Both directions	— Additional through lane (both directions) between Intersection 2 and 4	— Developer

Development Phasing

The roads and intersection upgrades are phased in conjunction with the construction programme received from the developer. The following phases have been considered:

- **Phase 1:** Shopping centre and hospital
- **Phase 2:** Residential 1 and Residential 3 (120 units/ha) units
- **Phase 3:** Residential 3 (200 units/ha) and primary school

It is possible for the order of the phases to change, or even overlap. The proposed road upgrades for each of the above phases is provided in the Traffic Impact Report.

Non-Motorised and Public transport

Public transport in the study area is mainly provided by minibus taxis and busses which operates along Main Road, Modderfontein Road and Dane Road. The proposed development is expected to generate a significant demand for public transport and it is therefore proposed that public transport lay-bys be provided at the following intersections:

- Main Road/Development Access (Intersection A)
- Modderfontein Road/Falcon Street (Intersection 3)
- Modderfontein Road/Dane Road (Intersection 4)

No non-motorised transport infrastructure currently exists in and around the subject site. In order to aid pedestrian movement to and from the proposed development, it is suggested that paved pedestrian walkways be provided along at least one side of all Class 3 roads within the development. It is further recommended that paved sidewalks be provided along Main Road and Modderfontein Road between the new public transport lay-bys and the access to the development

- The proposed development is supported from a traffic engineering perspective provided that the recommendations made in this study are implemented.



SECTION D: DESCRIPTION OF THE INSTITUTIONAL ENVIRONMENT

The legislation, policies and guidelines relevant to this application as contemplated in the EIA regulations, have been used to inform the contents of this report. The legislative framework has been used to ensure that all important environmental, cultural, and social aspects have been taken into consideration, and are addressed during the EIA process. The legislation that is relevant to this study is outlined below.

D1. The Constitution of the Republic of South Africa (Act 108 of 1996)

The environment, health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development.

The current environmental laws in South Africa concentrate on protecting, promoting, and fulfilling the Nation's social, economic, and environmental rights; while encouraging public participation, implementing cultural and traditional knowledge, and benefiting previously disadvantaged communities. Under South African environmental legislation, the applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The applicant will be responsible for the development and implementation of the conditions of any Environmental Authorisation received, in terms of rehabilitation, and the implementation of the Environmental Management Programme [EMPr].

D2. National Environmental Management Act (Act 107 of 1998), as amended (NEMA)

The main aim of the NEMA is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. The EIA Regulations, 2014, as amended are applicable to this project.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that have been identified as applicable to the proposed development. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised, are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in Gauteng, to the Department of Agriculture and Rural Development (GDARD).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette



No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

Table 5 provides the listed activities associated with the project that require environmental authorisation, prior to construction works commencing on site.

Table 5: Listed activities associated with the project

Indicate the number of the relevant Government Notice:	Activity No (s) (relevant notice): e.g. Listing notices 1, 2 or 3	Describe each listed activity as per the wording in the listing notices:	Describe the portion of the development as per the project description that relates to the applicable listed activity
GN. R 983, 8 December 2014 as amended by GN R 327, 7 April 2017 Listing Notice 1	Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater; (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;	The development will include bulk transportation of water and stormwater.
	Activity 10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more (ii) with a peak throughput of 120 litres per second or more	The development will require the upgrading of bulk infrastructure.
	Activity No. 12 (ii) (a) and (c)	The development of infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— within a watercourse; and if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The development of infrastructure exceeding 100 square metres within 32 metres of a wetland, and within the wetland, will be required for the construction and upgrading of bulk infrastructure.
	Activity 13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more	The development will have 4 storm water attenuation dams constructed on site as per the stormwater management plan.
	Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Development of infrastructure exceeding 10 cubic metres within a wetland will be required for the construction and upgrading of bulk infrastructure.
GN. R 984, 8 December 2014 as amended by GN R 325, 7 April 2017	Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation	Clearance of vegetation of more than 20 hectares will be required for the proposed development.



GN. R 985, 8 December 2014 as amended by GN R 325, 7 April 2017	Activity 4 (c) iv	The development of a road wider than 4 metres with a reserve less than 13,5 metres, in Gauteng, in Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;	The proposed intersection upgrades in the Traffic Impact Report will be required in areas identified as CBA and ESA in the screening tool.
	Activity 12 (c) ii	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan, in Gauteng, Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans	Clearance of vegetation of more than 300 square metres or more of indigenous vegetation will be required for the proposed development, in areas identified as CBA and ESA in the screening tool.
	Activity 14 (ii) a (c) iv	The development of— infrastructure or structures with a physical footprint of 10 square metres or more; where such Development occurs— (a) within a watercourse; in Gauteng, in Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans	The Rabie Ridge X 7 development will require a clearance of vegetation of more than 10 square metres or more, within a watercourse of an identified CBA and ESA, will be required for the installation of bulk services

A Scoping and Environmental Impact Assessment (EIA) process is required for above listed activities which have the potential to result in significant impacts which are complex to assess. Scoping and EIA studies accordingly provide a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts. Figure 5 below provides a graphic representation of all the components of a Scoping and EIA process.

- An amended EIA Application Form will accompany the submission of the Final EIA report, to include the listed activities as detailed in table 5, previously not identified at the onset of the Scoping Phase.

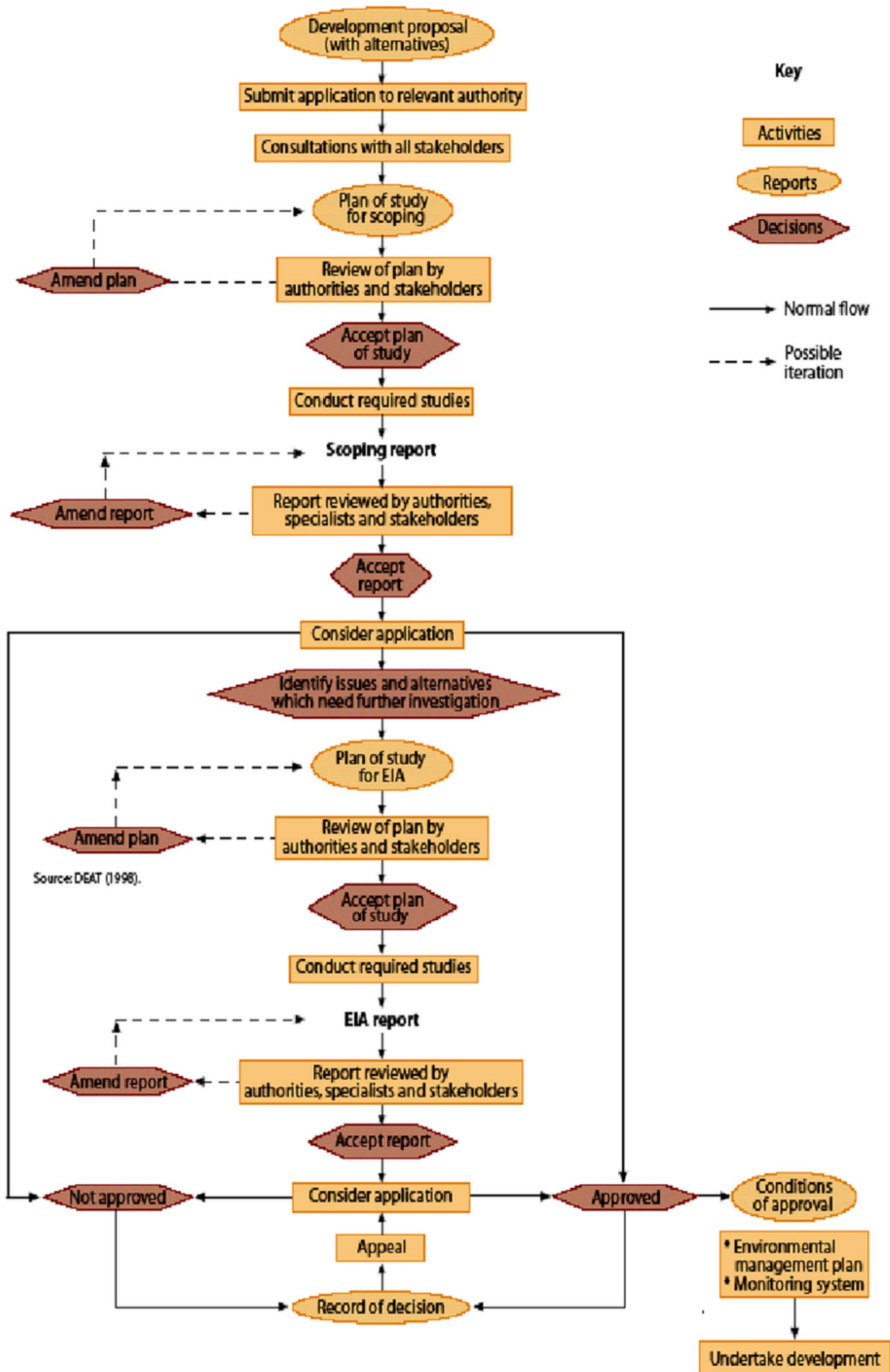
D3. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The objectives of this act are (within the framework of NEMA) to provide for:

- The management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.



Figure 5: Graphic representation of all the components of a Scoping and EIA process



This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of the surrounding areas is not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of the benefits arising from indigenous biological resources.

Furthermore, a person may not carry out a restricted activity involving either:

- a) A specimen of a listed threatened or protected species;
- b) Specimens of an alien species; or
- c) A specimen of a listed invasive species without a permit.

Two (2) Terrestrial Ecological specialist studies have been completed for the site, with specific attention to Red Data Listed species, habitats and biodiversity. The 2022 specialist study is aligned to requirements of this act.

D4. Government Notice 598 Alien and Invasive Species Regulations (2014), including the Government Notice 864 Alien Invasive Species List as published in the Government Gazette 40166 of 2016, as it relates to the National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004)

NEMBA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. In terms of alien and invasive species. This act in terms of alien and invasive species aims to:

- Prevent the unauthorized introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur,
- Manage and control alien and invasive species, to prevent or minimize harm to the environment and biodiversity; and
- Eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien species are defined, in terms of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004) as:

- (a) A species that is not an indigenous species; or
- (b) An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Categories according to NEMBA (Alien and Invasive Species Regulations, 2017):

- Category 1a: Invasive species that require compulsory control;
- Category 1b: Invasive species that require control by means of an invasive species management programme;
- Category 2: Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- Category 3: Ornaments used plants that may no longer be planted.

All Category 1 Declared Weeds and other alien invaders must be removed from the site.

D5. The National Water Act, 1998, Act 36

The National Water Act, 1998 (Act 36 of 1998 – NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence



on the resource quality, and that such assessment be subject to the NEMA EIA Regulations. A person may use water if the use is:

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

The NWA defines 11 water uses. A water use may only be undertaken if authorised by the Department of Water and Sanitation. Water users are required to register certain water uses that took place on the date of registration, irrespective of whether the use was lawful or not. The water uses for which an authorisation or licence can be issued include:

- Taking water from a water resource;
- Storing water;
- Impeding or diverting the flow of water in a watercourse;
- Engaging in a stream flow reduction activity contemplated in section 36;
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;
- Disposing of waste in a manner which may detrimentally impact on a water resource;
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course or characteristics of a watercourse;
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- Using water for recreational purposes.

The proposed activities associated with the Rabie Ridge X 7 project, trigger the need for a WULA in terms of Section 21 water uses of the NWA. The regulatory Competent Authority for the WULA is the Department of Water and Sanitation (DWS).

The following water uses require licensing.

- Section 21 (c) - impeding or diverting of flow of water in a watercourse.
- Section 21 (i) – altering the beds, banks, course or characteristics of a watercourse.

The WULA process involves five (5) steps as indicated in Figure 6 below.



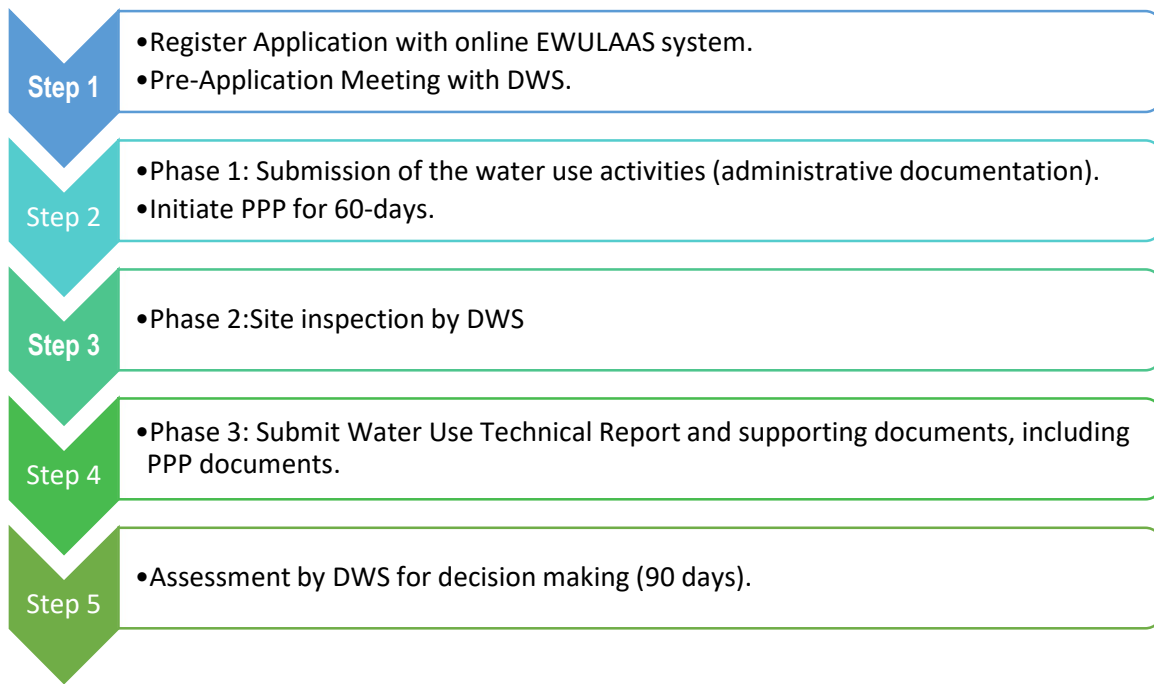


Figure 6: Steps associated with the Water Use License process.

D.5.1 Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998)

In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as:

- the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- in the absence of a determined 1 in 100 year flood line or riparian area, the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
- a 500m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

Any development on the study site has the potential to impact the aquatic ecosystems and must be authorised in terms of Section 21 of the National Water Act (1998). Scientific Aquatic Services have been appointed to conduct the WULA for this application.

D6. National Environmental Management Act: Protected Areas Amendment Act 21 of 2014

The National Environmental Management: Protected Areas Amendment Act 21 of 2014 aims to amend the National Environmental Management: Protected Areas Act, 2003, so as to amend or insert certain definitions; to authorise the declaration of marine protected areas; to provide for the management of marine protected areas; to provide for transitional measures; to effect certain textual alterations; and to provide for matters connected therewith.

The **National Environmental Management: Protected Areas Act 57 of 2003** intends to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards;



for intergovernmental co-operation and public consultation in matters concerning protected areas; and for matters in connection therewith.

Although the study area does not occur in a Protected Area, portions of the site are characterised by Ecological Support and Critical biodiversity Areas. The study area is defined by the Egoli Granite Grassland vegetation. This vegetation unit is considered endangered. Its conservation target is 24%. Only about 3% of this vegetation unit is conserved in statutory reserves and a few private conservation areas. More than two-thirds of the unit has already undergone transformation, mostly by urbanization, cultivation and by building of roads. Current rates of transformation threaten most of the remaining un-conserved areas.

D7. National Environment Management Waste Act, 2008 (Act No. 59 of 2008)

The NEM: Waste Act (NEMWA) was enacted on 10 March 2009 and came into effect on 01 July 2009. This Act repeals the sections in the Environment Conservation Act, Act 73 of 1989 that previously dealt with the licensing of general and hazardous waste storage facilities. The Act was established to regulate waste management for the protection of human health and the environment.

Section 19 of the NEMWA authorises the Minister to publish a list of waste management activities which would require an environmental assessment and waste management licence. On 3 July 2009 the Minister published a schedule of waste management activities in respect of which a waste management licence is required in accordance with section 20(b) of NEMWA (GN R718, GG 32368). Activities listed under Category A of GN R 718 for which a waste management licence is required, are equivalent to those that require a Basic Assessment process as stipulated in GN R 544 of June 2010. Category B activities are equivalent to those that require a full EIA process as stipulated GN R 545 of June 2010.

None of the activities relating to the construction and operation of the proposed Rabie Ridge X 7 Mixed Land Use development, will require a waste management license.

D8. Conservation of Agriculture Resources Act, 1983 (Act No. of 1983)

The purpose of this act is to provide for control over the utilization of the natural agricultural resources of the Republic to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

An Agricultural Assessment was conducted for the property in 2015 – as part of the previous S&EIR application. See Appendix 7. It was the specialist's finding that the relative extent of the soils with arable agricultural potential identified within the investigated subject property is unlikely to justify the acquisition and maintenance of essential farm implements, and the extent of these soil is therefore considered unlikely to sustain viable crop production at a commercial scale. With the currently extensively urbanised surrounding area, the likelihood of larger tracts of land being combined into a viable agricultural land use unit is unlikely, and it is deemed more likely that the erven in the surrounding area will undergo further and increasing levels of subdivision in the future. These soils are therefore at best well suited to subsistence farming. It is therefore the specialist's opinion that the proposed mixed land use can be considered favourably from an agricultural potential aspect, provided the recommended mitigation measures are implemented during the execution of this project to prevent impact on adjacent soils.



D9. National Heritage Resource Act 25 of 1999

The National Heritage Resource Act 25 of 1999 introduce an integrated and interactive system for the management of the national heritage resources; 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 and Chapter 2 section 35 subsection 3 states that any person who discovers archaeological or paleontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources and subsection 4 says that no person may, without a permit issued by the responsible heritage resources authority—

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite; and section 36 subsection 3 states that no person may, without a permit issued by SAHRA or a provincial heritage resources authority—
 - 1. destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
 - 2. destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or to use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals

As part of the previous S&EIR, an independent heritage consultant was appointed to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where the development is planned. None were found. See Appendix 8. From a heritage point of view, the specialist recommended that the proposed development be allowed to continue, on condition that if any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

D10. The Gauteng Provincial Environmental Management Framework, 2015

The Gauteng Provincial Environmental Management Framework is a legal instrument in terms of the Environmental Management Framework Regulations. The regulations are designed to assist environmental impact management including EIA processes, spatial planning and sustainable development.

According to the EMF, most of the site is located within the Urban Development Zone (Zone 1) of the EMF, while a small middle portion of the site falls within Zone 2. See Appendix 9. The intention of Zone 1, the Urban Development Zone, is to streamline urban development activities and promote development infill, densification and concentration of urban development to establish a more effective and efficient city region that will minimise urban sprawl. Zone 2 is sensitive to development activities. Only conservation is allowed in this zone.

D11. Gauteng C-Plan v3 2011

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province based on its contribution to reach the conservation targets within the province. These areas are grouped as Critical Biodiversity Areas (CBAs) or Ecological Support Corridors (ESAs). The CBAs comprise 'Irreplaceable' areas that must be conserved and areas classified as 'Important' to reach the conservation targets of the Province. ESAs



are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration to ensure sustainability in the long term.

According to the Gauteng Conservation Plan (version 3.3), a small area of the southernmost section of the site, is in a CBA2: Important area. see Figure 6. The CBA (Important) areas on site potentially include primary vegetation and habitat to plant species of conservation concern. Ecological Support Areas (ESAs) dominate the central to southern areas of the site. ESAs are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration.

Please refer to Section G, Section I, and the Appendices for the full ambit of specialist terrestrial and freshwater studies conducted for the study area.

D12. City of Johannesburg Metropolitan Regional Spatial Development Framework 2010/2011

The development impact spans over two of the COJ regions:

a. Region A Sub Area 10

Region A is located on the northern periphery of the City of Johannesburg Metropolitan area, bordered by Region C and Region E to the south, Mogale City Local Municipality to the west, City of Tshwane Municipality to the north and City of Ekurhuleni Municipality to the east. This region is still largely undeveloped with large tracts of land still being agricultural holdings and farm portions. The predominant land uses include, but are not limited to, industries, conference and hospitality facilities, low to high-density residential areas and environmental conservation areas. There is potential for eco-tourism related activities and urban agriculture in the western part of the region, due to this area's environmental quality and its association with other regional tourism destinations, such as the Hartbeespoort Dam (in Mogale City Local Municipality).

Sub Area 10 comprises of the marginalized areas Ebony Park, Ivory Park, Rabie Ridge and Kaalfontein. The sub area falls within the high priority areas of the Growth Management Strategy which will receive short term service upgrading and capital investment priority. Several key challenges have been identified in the sub area which includes poverty associated with high levels of unemployment, housing backlogs, the lack of social and economic opportunities and limited public transport. The haphazard proliferation of unregulated small businesses points to a need for business development in the sub area. The economic opportunities in these areas are still very limited and stronger linkages with other areas of opportunity are necessary.

The RSDF interventions for this Sub Area are to support development that encourages and supports community facilities, high residential densities between 70 – 90 du/ha along identified Mobility Spines (Republic Road), and mixed business uses.

b. Region E

The region forms one of Johannesburg's eastern borders, situated towards the north-eastern end of the metro. To its north is Region A (Midrand), with Region B (comprising of Northcliff, Craighall Park and Randburg, among others) to the west and Region F (the inner city and Johannesburg South) to its south. To the east are the



neighbouring towns of Kempton Park and Germiston, which are part of the Ekurhuleni Metropolitan Municipality. President Park Agricultural Holdings, Austin View, Commercias, and Commercias Extensions, which is situated directly to the north, west and south of the proposed development, fall within Sub-Region 3 and 4 of Region E and is situated on the border with Region A.

The main challenges facing the region relate to the following:

- An uncontrolled influx of people into the area, specifically Alexandra;
- Informal settlers;
- Perceived high-risk areas;
- A housing backlog;
- A rise in illegal occupation of land;
- Decay in some areas; and
- Traffic congestion in specific areas.

A project of this nature would result in a significant increase in the requirements for basic infrastructure and services such as roads, schools, medical services, emergency services, safety and security services, electricity, water, waste removal, sewage and so forth. The applicant and CoJ Municipality would have to fulfill the infrastructure requirements such as the bulk services (water and sewerage services), construction of internal roads, and the installation of other infrastructural requirements. Careful planning is required to enable the applicant and CoJ to meet the operational requirements, and to avoid any budget constraints. Pro-active planning and budgeting would thus be required prior to the construction phase to adequately address the increase in the infrastructure requirements. In this regard, although the province would be responsible for the bulk of the services provision, they will work jointly with the Municipality to plan for the infrastructure upgrades.

D13. City of Joburg Biodiversity Strategy and Action Plan

The CoJ Biodiversity Strategy and Action Plan (BSAP) sets out a framework and a plan of action for the conservation and sustainable use of biological diversity, and the equitable sharing of benefits derived from this use. The City of Joburg envisages an environmentally sustainable city, that anticipates, manages, and reduces its vulnerability to potential global and local environmental shocks, and works consistently to reduce the impact of its own built environment and urban processes on the broader envelope of natural resources.

Guiding principles of the BSAP require that the remaining natural ecological spaces should be kept in their natural condition, remain intact and functioning optimally. These spaces provide valuable ecological goods and services to the CoJ, and intervention can reduce their value. Biodiversity is a common, shared good (or public asset) and the CoJ take collective responsibility for the ecological goods and services provided by biodiversity in their jurisdiction. These principles will be important to remember, consider and implement by the CoJ, for the conserved wetlands to be zoned as *public open spaces* on site. Partnerships are essential to successfully implement conservation goals. The applicant and CoJ must engage all departments and entities that can play a role in enhancing and maintaining the conserved biodiversity on site, and develop partnerships with society (community structures, CBOs and NGOs) to protect the natural ecological spaces located within government projects. Accountability, budget and funding, and governance action plans for state owned open spaces are key.



D14. City of Johannesburg Metropolitan Municipality Spatial Development Framework 2040

Spatial inequality remains a defining characteristic of the settlement pattern of Johannesburg. The location and concentration of jobs does not match that of where people live. The Spatial Development Framework seeks to address the five major issues in Johannesburg's spatial and social landscape. The spatial transformation vision of the SDF 2040 seeks to create a spatially just, world class African city based on a compact polycentric growth model, with a strong core, connected to economic sub centers by efficient public transit, with high housing densities surrounding cores and gradually lower densities further from cores. The City of Johannesburg presently displays the inverse of this urban model with separated land uses and people living far from work opportunities. This pattern of development results in high social, economic and environmental costs.

The primary concern of the SDF is the urban inequality that exists in Johannesburg. Although Johannesburg enjoys higher average incomes than other parts of the country, it ranks as one of the most unequal cities in the world. Significant African cities such as Johannesburg therefore have the vast challenge of improving the lives of those living in informal dwellings and closing the gap between rich and poor. If Johannesburg is to become an inclusionary city, it needs to make space for the urban poor majority through planning initiatives such as densification, diversification and integration. In looking at housing delivery, it is important to consider the housing backlog, and the distribution of household income in the city. According to the City's studies, in 2012 there were an estimated 164,939 informal structures located within informal settlements in the City, with the largest concentration in the Ivory Park area. Education and public facilities are equally dispersed. Open spaces are also scattered, and many are currently unsafe and neglected. The separation of land uses contributes to increasing average distances travelled. It also impacts on energy intensity; by increasing energy needs for transportation; social inclusion; by making jobs and social infrastructure less accessible to low-income households; and economic productivity; by separating economic activity from labour pools and jeopardizing agglomeration economies.

The Rabie ridge X 7 township is a mixed-use development with a mixture of housing tenure. Residential opportunities will be created close to work opportunities, educational facilities, retail facilities and public transport. The development proposal is for a mixed typology of housing, providing the proposed residence with the opportunity of single residential houses and 3-storey walk up apartments. Within the various housing typologies, there are options of RDP houses, semi-bonded units, bonded units and rental stock, facilitating property ownership in the city. The application makes provision for approximately 2050 affordable dwelling units. The Rabie ridge X 7 township complies with the principles of the SDF.

- The Rabie Ridge X 7 development is subject to numerous national, provincial and local statutory polices and regulations. This application abides by the listed statutory requirements.

SECTION E: NEED AND DESIRABILITY ANALYSIS

Mixed land use development in South Africa has become an important concept due to its potential to promote sustainable development and address a range of urban issues such as spatial inequality and urban sprawl. However, before embarking on such a development, it is important to conduct an environmental need and desirability analysis to determine the potential impact of the development on the environment and whether it is necessary and desirable. Conducting an environmental need and desirability analysis is critical for any proposed mixed land use development in South Africa. This analysis will provide valuable information to



stakeholders and help to ensure that the development is sustainable and aligned with the broader goals of environmental protection, social equity, and economic growth.

The consideration of 'need and desirability' requires the consideration of the context of the proposal along with the broader societal needs and the public interest. According to the DFFE's Guidelines on Need and Desirability, the concept of need and desirability can be explained as; "need refers to *time*", and "desirability refers to *place*" – i.e., Is this the right time and the right place for locating the type of land use being proposed? Need and desirability can be equated to the wise use of land – i.e., the question of what the most sustainable use of land is. It is believed that the adequate consideration of need and desirability throughout the environmental process, will ensure that the "best practicable environmental option" is pursued. The need and desirability from an environmental and planning perspective is discussed in this section.

E 1. Desirability from a Planning Perspective

The proposed utilisation of the land must be considered *desirable* in relation to the spatial planning frameworks for the area. The concept of "desirability" in a land-use planning context can be described as follows:

"Degree of acceptability" of the specific land use(s) on a said property within an existing natural or manmade environment and the guideline proposals included in the relevant spatial development framework plans and policies, and municipal engineering services in so far as it relates to the desirability or based on its effect on existing rights and the biophysical environment concerned".

The desirability of the Rabie Ridge X 7 development, will be discussed concerning the following aspects:

- Physical characteristics
- The character of the area
- Accessibility
- Spatial Planning
- Provision of services

E 1.1 Physical Characteristics

The topography of the proposed development site is ideal for mixed land use development, with no major earthworks required to facilitate the development proposal (ie. Platforms, infill, etc). There are no physical features or any topographical constraints (Ridges, sinkholes, etc) which may restrict or prevent the land from being developed.

E.1.2 Character of the area

The Rabie Ridge X 7 township is located between the low density Agricultural small holdings of Austin View (rural residential according to the City of Joburg) in the West, the low density Agricultural small holdings of President Park in the North, and the high density formal and informal areas of Ivory Park, Rabie Ridge and Commercia, in the east and south. It is the largest remaining piece of land "bridging" the two opposing land uses. The Rabie Ridge X 7 township would essentially bring the high-density land use of Rabie Ridge and Ivory Park, closer to the rural residential areas. Whereas the proposed Rabie Ridge X 7 township would be complimentary to the east and south land uses, it would not be the same for the land uses in the north and west.



Given the City of Joburg's Spatial Planning Frameworks, and the applicants intention to address the housing backlog in the area, the Rabie Ridge X 7 township would fulfil the authorities needs in a formally planned land use application.

- The township will need to be acceptable and sustainable in terms of bulk service provision, electrical power supply, and wetland preservation.

Considering that the development area is within the approved urban edge, and is earmarked for urban development purposes, its strategic location constitutes a natural urban infill development.

E.1.3 Accessibility

The study area is located within existing developed areas. The traffic impact assessment has proposed three (3) access points to the development from the K56, K111 and Boshoff Road (subject to Gautrans approval. See Figure 4 of this report for the proposed access positions.

E.1.4 Spatial Planning

The application site is situated within the urban framework. Development within the urban edge is encouraged to promote integrated and infill development at appropriate locations to prevent urban sprawl and development outside the urban edge. The application is supported in the Spatial planning frameworks for the area, as discussed in Section D of this report.

E.1.5 Provision of services

Water and Sewer: Both these services will be provided by the City of Johannesburg Metropolitan Municipality. Johannesburg Water will require upgrades for the existing water and sewer systems, due to the added demand from the proposed Rabie Ridge X 7 development. The upgrades can only be confirmed by Johannesburg Water upon approval of the engineer's services report. The report has been submitted, and comments are pending. The developer will enter into service agreements with the Municipality at proclamation stage.

The internal services will be taken over by City of Johannesburg Municipality they will be responsible for the maintenance of the services.

The electrical supply authority in the area is City Power. City Power has indicated that ***no capacity is currently available*** on the network and will only be available once the supply in the area is upgraded, and the upgrade is completed. The applicant is subsequently exploring alternative energy solutions such as solar and gas. Solar Farm implementation principles, such as a small-scale embedded generation (SSEG) is presently being investigated by the applicant. Any power generating facility located at a residential, commercial or industrial site, where electricity is generally also consumed, is considered a small-scale embedded generation (SSEG). These are mainly solar photovoltaic (PV systems) but also include other technologies such as wind and biogas. Further information/reports being explored by the applicant at this stage, is not available, and will be included in the Final EIAR.

- Only once bulk municipal services and feasible renewable energy solutions have been confirmed by the local authority, for this township, may development proceed.



E2. Need and Desirability of the development from a Socio-Economic Perspective

Table 6 outlines the need and desirability of the development from a *locational* perspective. It informs the justification of the development to build in the proposed time and location from a socio- economic perspective.

NEED:

Aspect	Statement
Is the land use (associated with activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework agreed to by the relevant environmental authority?	Yes
Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	Yes. The applicant has had discussions and meetings with the Housing Department, and the indication from them is that there is a desperate need for housing in various municipalities. The Department is putting pressure on the developer to get the zoning sorted out as soon as possible to enable them to relocate people who have illegally settled in Eskom power line servitudes, to a more suitable and formal township establishment area. Furthermore, the department is in serious need of sites earmarked for schools in the following areas: Rabie Ridge, Ivory Park, and. Ebony Park. The majority of schools within these areas are operating at maximum capacity. The inclusion of an education site within this township is thus crucial, as the availability of sites for the provision of schools is limited. The project layout plan makes provision for an educational erf of approximately 2,8ha in size, which adheres to the Sustainable Human Settlement Guidelines.
Does the community/area need the activity and the associated land use concerned? (is it a societal priority)	Yes. The social and economic segregation of South African cities requires developments that are inclusionary and able to create socio economic benefits for local residents. The proposed Rabie Ridge X 7 development will encompass inclusionary and bonded housing, commercial development, retail, educational and convenience shopping centres to create a functional economic node. The proposed development will cater for various income groups and the mixed commercial, retail and residential space will ensure a 24-hour operational economy, with various activities operational throughout the day. The advantage of a mixed-use development creates opportunities for new businesses to thrive as



Aspect	Statement
	residential activities are incorporated into the development, providing a wider catchment. The impact of retail and office development goes beyond economic production as it also contributes to social well-being, convenience for local residents and is a key driver for recreational and “sense of place”, which residents can identify with. Mixed use developments are in general considered more sustainable as they provide abundant land uses that support and complement each other, thus making them more self-reliant. The activities in the proposed development will be integrated into the bigger regional context and not operate in isolation, increasing competitiveness for the area and integration of existing activities.
Is this project part of a national programme to address an issue of national concern or importance?	Yes. Rabie Ridge falls under Sub-Area 10 within Region A of the Region A, Regional Spatial Development Framework 2010/2011. The area is identified as one of the priority areas of the Growth Management Strategy.

DESIRABILITY:

Aspect	Statement
Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?	No. It is submitted that the development proposal supports and aligns with the existing municipal planning policies and framework for the area.
Do location factors favour this land use (associated with the activity applied for) at this place? (relates to the contextualization of the proposed land use on this site within its broader context)	<p>Yes. Rabie Ridge is situated close to several major transportation routes, including the N1 highway and the Gautrain station, making it easily accessible for businesses and commuters.</p> <p>The advantage of the proposed development integrates a mixture of activities and land uses, which leads to the utilization of networks to significantly reduce socio-economic disparities (i.e job-housing mismatch). In addition, continuing to accelerate human resources development and skills development, the development allows communities to manage and develop their local economies, become self-sufficient, create livelihoods and add to the economy.</p>



Aspect	Statement
<p>Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?</p>	<p>No. Rabie Ridge is a cost-effective alternative to other more expensive locations in Johannesburg, making it a favorable location for businesses and residents looking for affordable options. There is an increasing need for the provision of adequate housing located close to transport, employment and other urban opportunities. The social and economic segregation of South African cities requires developments that are inclusionary and able to create socio economic benefits for local residents.</p>
<p>Will the proposed land use result in unacceptable cumulative impacts?</p>	<p>From a socio-economic perspective, the proposed development will <i>not</i> result in unacceptable cumulative impacts.</p> <p>The proposed Rabie Ridge x 7 development will offer various employment opportunities in close proximity to residential activities as the development will be one that has integrated land uses (residential, business, institutional, educational, and municipal). The road network surrounding the site 9to be upgraded by the developer), linked with larger public transport routes, ensures an efficient public transport system benefiting local and surrounding residents. The Rabie Ridge x 7 development will also address the issue of providing densification along major routes in a growing region as well as meeting the ever-increasing housing gap market. Also See appendix 10 for the detailed Social Impact Assessment.</p>

E3 Need and Desirability of the development: *An Environmental Perspective*

The environmental need analysis is the process of evaluating the environmental impact of the proposed mixed land use development. This analysis will help to determine the necessity of the development in the area and identify potential environmental risks. The environmental desirability analysis evaluates the overall benefits and drawbacks of the proposed mixed land use development. This analysis considers the social, economic, and environmental impacts of the development to determine whether it is desirable.

The needs and desirability analysis component of the “*Guideline on need and desirability in terms of the Environmental Impact EIA Regulations (Notice 819 of 2014)*” includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development’s ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage sites, opportunity costs, etc.). Table 7 below presents the needs and desirability analysis undertaken for the proposed Rabie Ridge X 7 development.



Table 7: Motivation for Need and Desirability

Guideline	Statements
<p>How will this development (and its separate elements/aspects) impact the ecological integrity of the area?</p> <p>How were the following ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”), Conservation targets, Ecological drivers of the ecosystem, Environmental Management Framework Spatial Development Framework, and Global and international responsibilities relating to the environment (e.g., RAMSAR sites, Climate Change, etc.).</p>	<p>The vegetation of the study site is degraded by informal agriculture. Patches of natural grassland occurred between old and new cultivated fields. Connectivity with natural grassland does not exist. The study site has been ecologically disturbed by years of small-scale cultivation of maize fields, over-grazing, veld fires, building rubble, encroaching urbanisation and neglect. These factors have had a detrimental effect on mammal numbers and diversity. The study areas ecology will enter the final stages of a downward spiral towards local extinction, particularly on the terrestrial habitat. Considering the scale of the intended development, the loss/displacement of some mammals is a foregone conclusion, particularly that of terrestrial species, but in the overall picture of the affected species, it will be minimal.</p> <p>Hillslope seepage wetlands and an unchannelled valley bottom wetland occur on site. The project activities will result in the permanent loss of two of the small wetland features on site, and portions of the unchanneled valley bottom wetland will be lost. The severity of the impact of these activities is considered significant, but not severe since the ecological scores of all the wetland features indicated a highly modified system of limited ecological importance and sensitivity.</p> <p>Although the proposed activity would result in the complete loss of vegetation and other biota, any ecologically sensitive or important species identified can be rescued and relocated prior to construction upon the wetland features.</p> <p>The proposed development is in line with the EMF and SDF since the proposed development provides new residential opportunities within the</p>



Guideline	Statements
	<p>approved urban edge of on land earmarked by the RSDF for urban development purposes.</p> <p>The development proposal promotes land development that is spatially compact and resource-frugal since it is situated within the urban edge and abuts existing residential development to the north, east and west.</p>
<p>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>According to the GDARDE C-Plan, the site contains CBAs, ESAs and Wetlands.</p> <p>STS was appointed to conduct updated biodiversity assessments for the site. See Sections G 2.4, G 2.6, Section I 1 – I 5. The identified impacts/disturbance to the sensitive environmental features on site that will be conserved as open space, will be zoned as no-go areas.</p>
<p>How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>All potential positive and negative ecological impacts were assessed in the STS Terrestrial Biodiversity and Freshwater Assessment reports - refer to Section G and I of this report. The mitigation hierarchical approach was followed to manage the impacts and risks identified by specialists. Refer to baseline ecological information in Section G, and the impact assessment and mitigation measures in Section J of this EIA Report.</p>
<p>What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?</p>	<p>The proposed development will generate waste during both the construction and operational phases.</p> <p>In the case of the proposed development, an integrated waste management system which includes waste minimisation, waste recycling and the proper storage and disposal of waste, which does not impact the health of the environment and human health, must be adopted where possible.</p>



Guideline	Statements
<p>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The proposed development will change the character of the site. The site will be transformed from being undeveloped to a construction site and built environment.</p> <p>A comprehensive Heritage Impact Assessment (Appendix 22) was conducted to consider the impact of the proposed development on any cultural and heritage resources. Measures have been provided to avoid or minimise any potential negative impacts associated with the proposed development. No culturally significant sites will be destroyed for this project.</p>
<p>How will this development use and/or impact non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The proposed land use project will use non-renewable natural resources such as oil, coal, and natural gas for energy and transportation needs. The construction materials, including cement, steel, and bricks, would also require non-renewable resources for their production. Water resources will be impacted by such developments through increased demand from commercial and residential activities.</p> <p>Another potential impact on natural resources will be from waste generation and pollution. Mixed land use developments increase the amount of waste generated, including both solid waste and wastewater. This waste may need to be treated or disposed of, which could require additional resources.</p> <p>Overall, a mixed land use development could have significant impacts on non-renewable natural resources if not designed and executed with sustainability principles in mind. To minimize these impacts, sustainable construction practices, efficient use of resources, and renewable energy sources will be employed wherever possible. Additionally, waste management and pollution prevention strategies should be implemented to reduce the impact on natural resources.</p>



Guideline	Statements
<p>How will this development use and/or impact renewable natural resources and the ecosystem of which they are part?</p> <p>Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds?</p>	<p>The Rabie Ridge X 7 (RRX7) development will have both positive and negative impacts on renewable natural resources and the ecosystem in terms of the following aspects:</p> <ul style="list-style-type: none"> • Energy Use and Impact: The large-scale mixed land use development can impact renewable natural resources such as wind, solar, and geothermal energy. The development will utilize renewable energy sources such as solar panels, thereby reducing its dependence on non-renewable sources, and help to mitigate climate change. • Water Use and Impact: The RRX7 built development will impact water resources by increasing demand for fresh water and altering the natural hydrological regimes of the wetlands on site. The development will also require large amounts of water for construction, operation, and maintenance. This can lead to overuse of water resources and have significant impacts on groundwater reserves. Additionally, the development may increase stormwater runoff, which can cause erosion, sedimentation, and pollution of nearby water bodies. • Land Use and Impact: The RRX7 built development will impact the land by altering the present terrestrial and freshwater ecosystems, and reducing biodiversity. The development will require the destruction of small wetlands, which will destroy habitats and displace the remaining fauna. Additionally, the development may contribute to soil erosion, fragmentation of habitats, and loss of biodiversity. • Waste Management and Impact: The RRX7 built development will impact the environment through waste generation and management. The development will produce significant amounts of waste during construction and operation. If not managed properly,



Guideline	Statements
<p>What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources?</p>	<p>this waste can contribute to pollution, soil degradation, and water contamination.</p> <p>The following measures will be explored to avoid or minimize the use of resources in the RRX7 buildings:</p> <ul style="list-style-type: none"> • Passive design strategies: Passive design strategies such as building orientation, shading, natural ventilation, high-performance insulation, and daylighting can reduce the dependence on artificial lighting, heating, and cooling systems. • Energy-efficient appliances: Installation of energy-efficient electrical appliances such as LED lighting, energy-efficient air conditioners, fans, and refrigeration can drastically reduce energy consumption. • Renewable energy sources: Integration of renewable energy sources such as solar panels, wind turbines, or geothermal systems can minimize the use of fossil fuels for energy production. • Water-efficient fixtures: Installation of water-efficient fixtures such as taps, showers, and dual flush toilets can significantly reduce the consumption of water. • Use of sustainable building materials: Use of sustainable building materials such as bamboo, recycled steel, and reclaimed wood can reduce the demand for new materials, conserve natural resources, and minimize waste. • Recycling and waste reduction: Incorporation of recycling and waste reduction systems can divert waste from landfills and save resources. • Green roofs and walls: Installation of green roofs and walls can reduce heating and cooling loads and improve air quality while promoting biodiversity.



Guideline	Statements
<p>What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</p>	<ul style="list-style-type: none"> • Commissioning: Regular commissioning of building systems can identify and rectify inefficiencies, ensuring optimal performance and resource use. • Greywater systems: Installation of greywater systems can recycle wastewater for non-potable uses, such as irrigation. • Education and awareness: Raising awareness among building users about resource conservation and sustainable practices can instill responsible behavior and promote a culture of sustainability. • Energy-efficient lighting technology and energy saving measures will be used as far as possible to reduce the energy requirements of the development. <p>The applicant proposes the following measures to ensure the responsible and socially equitable use of resources for the RRX7 development: The development will promote social equity by providing affordable housing, accessible transportation, educational facilities, and green open space in low-income and deprived areas. Consult with local communities and engage them in the planning and design process to ensure that their needs and preferences are considered.</p> <p>The applicant understands that the responsible and equitable use of resources is essential for promoting sustainable development and minimizing negative impacts on the environment and society, because of the RRX7 development. As such, the development will be phased, and each phase will be subject to the implementing the measures described herein.</p> <p>By adopting sustainable practices, utilizing renewable resources, and engaging with local communities, built developments can minimize their environmental footprint while promoting social equity and economic growth. Responsible and equitable use of resources is essential for</p>



Guideline	Statements
	<p>promoting sustainable development and minimizing negative impacts on the environment and society.</p>
<p>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)? (Note sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)</p> <p>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e., what are the opportunity costs of using these resources this the proposed development alternative?)</p> <p>Do the proposed location, type and scale of development promote a reduced dependency on resources?</p>	<p>The proposed RRX7 development could have significant impacts on non-renewable natural resources if not designed and executed with sustainability principles in mind. In addition to the measures described above, which are understood and accepted by the applicant, the EMPr (Appendix 26) provides measures for the implementation of the activities during the planning, construction and operational phases of the proposed RRX7 development. The EMPr considers the following principles, amongst others:</p> <ul style="list-style-type: none"> • To minimize the developments dependency on resources, sustainable construction practices, efficient use of resources, and renewable energy sources should be employed wherever possible. • Pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied. • Waste is minimized and re-used or recycled where possible and otherwise disposed of in a responsible manner. • Negative impacts on the environment and people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied. • Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means. • The EMPr provides monitoring measures to evaluate the various stages and phases of development, and to identify potential negative impacts and take corrective measures as necessary.



Guideline	Statements
	<p>Implement regular reporting and communication to stakeholders on the development's performance, including environmental, social, and economic indicators.</p>
<p>How was a risk-averse and cautious approach applied in terms of ecological impacts? What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? What is the level of risk associated with the limits of current knowledge? Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>A risk-averse and cautious approach has been adopted by the Ecological specialists for their respective assessments. This approach has included identifying measures to minimize potential harm to the environment as a result of the impacts identified for a built development. A detailed description of assumptions, uncertainties and gaps in knowledge that relate to the assessment and mitigation measures proposed are included in the relevant sections of the terrestrial and freshwater reports. The specialist reports include mitigation measures to reduce potential environmental harm, and monitoring actions before, during, and after the proposed activity, to assess any impacts that occur to the environment, and adjust mitigation measures as needed.</p> <p>By adopting a risk-averse and cautious approach in terms of ecological impacts, the environment will be better protected, and will ensure that the building activities have minimal negative impacts in the long-term.</p>
<p>How will the ecological impacts resulting from this development impact people's environmental rights in terms of the following: Negative impacts: e.g., access to resources, opportunity costs, loss of amenity (e.g., open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p>	<p>In many cases, negative ecological impacts resulting from a built development, disproportionately affect marginalized communities, such as those at Rabie Ridge. These impacts affect people's ability to access clean air, water, and food, and can also impact their ability to enjoy a healthy and safe environment. In many cases, these impacts and can violate their right to a healthy and sustainable environment. Such impacts can lead to the displacement of communities.</p>



Guideline	Statements
<p>Positive impacts: e.g., improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</p> <p>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage sites, opportunity costs, etc.)?</p> <p>Based on all of the above, how will this development positively or negatively impact the ecological integrity objectives/targets/considerations of the area?</p> <p>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?</p>	<p>The ecological impacts of the RRX7 development have been carefully considered, and mitigation measures provided to protect people's environmental and human rights.</p> <p>A detailed impact assessment is provided in Section J of this report. Measures to avoid, mitigate and manage negative impacts and promote positive impacts are included in the EMPr (Appendix 27).</p> <p>The EMPr aims to identify and prevent the potential negative impacts on the environment and people's environmental rights, and where they cannot be altogether prevented, are minimised and remedied. The EMPr (Appendix 27) encourages and promotes community wellbeing and empowerment through environmental education of workers during construction. The outcome of this EIA Report and the EMPr is to ensure that the proposed development is sustainable, inclusive, and respectful of human rights and the environment, and that the provisions of all the environmental reports compiled for the development are enforced and monitored during the lifecycle of the project.</p>
<p>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?</p>	<p>Cumulative impacts were identified and assessed in Section J of this report.</p>
<p>"Promoting justifiable economic and social development"</p> <p>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?</p> <p>The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies</p>	<p>The City of Johannesburg Metropolitan Municipality. 2021. Draft Spatial Development Framework 2040 (2021/22 update) refers to Rabie Ridge (amongst others), as a <i>marginalised area</i>. Marginalised areas are classified as high priority investment areas, with clear envisaged outcomes and spatial opportunities as expressed in the SDF, as well as detailed frameworks and development strategies for the individual areas.</p>



Guideline	Statements
<p>applicable to the area, Spatial priorities and desired spatial patterns (e.g., need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.), Spatial characteristics (e.g., existing land uses, planned land uses, cultural landscapes, etc.), and, Municipal Economic Development Strategy (“LED Strategy”)</p>	<p>The proposed development site has been identified in the RSDf for community facilities, high residential densities between 70 – 90 du/ha along identified Mobility Spines (Republic Road), and mixed business uses. The proposed development is in line with the applicable planning policies and guidelines for the region. The development area is within the approved urban edge, earmarked for urban development purposes and its strategic location constitutes a natural urban infill development.</p>
<p>Considering the socio-economic context, what will the socio- economic impacts be on the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</p> <ul style="list-style-type: none"> Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs? 	<p>The socio-economic benefits and impacts are discussed in Section G and Section J of this report.</p> <p>The Rabie Ridge mixed land use project will contribute to: <i>Infrastructure Development</i>; Improving infrastructure in a community can attract businesses, investors, and tourists. This may involve investing in transportation networks, utilities, broadband connectivity, and other physical infrastructure to create a business-friendly environment, <i>Workforce Development</i>: Enhancing the skills and employability of the local workforce is crucial for economic growth. Initiatives may include vocational training programs, job placement services, partnerships with educational institutions, and promoting entrepreneurship and innovation, <i>Local Enterprise Zones</i>: Establishing designated areas with tax incentives, streamlined regulations, and other benefits can attract businesses to invest and create jobs in a specific locality. These enterprise zones are often aimed at revitalizing underdeveloped areas and stimulating economic growth, and <i>Collaborative Networks</i>: Collaboration and partnerships among local businesses, government entities, educational institutions, and community organizations can foster economic development. This can involve creating business associations, industry clusters, or innovation hubs to promote knowledge sharing and cooperation.</p>



Guideline	Statements
	The specific LED initiatives implemented in Rabie Ridge will depend on the priorities and resources available to the local government, community organizations, and other stakeholders.
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	This EIA has addressed the physical (proposed built environment, land uses and consideration of the biophysical environment), cultural (heritage impact assessment) and social needs (Social impact assessment) of the study area and surrounding communities.
Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	Yes. A project of this nature would result in long term positive social and economic gains in terms of providing infrastructure and services such as housing, roads, schools, medical services, emergency services, safety and security services, electricity, water, waste removal, sewage to the area. The applicant and CoJ Municipality would have to fulfill the infrastructure requirements such as the bulk services (water and sewerage services), construction of internal roads, and the installation of other infrastructural requirements.
<p>In terms of location, describe how the placement of the proposed development will:</p> <ul style="list-style-type: none"> • result in the creation of residential and employment opportunities in close proximity to or integrated with each other, • reduce the need for transport of people and goods, • result in access to public transport or enable non-motorised and pedestrian transport (e.g., will the development result in densification and the achievement of thresholds in terms of public transport) • compliment other uses in the area 	See Sections D12, D13,D14, G5, J2.12 and Appendices 10 & 21 of this report.



Guideline	Statements
<ul style="list-style-type: none"> • be in line with the planning for the area, • for urban-related development, make use of underutilised land available on the urban edge • optimise the use of existing resources and infrastructure • opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g., not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement) • discourage "urban sprawl" and contribute to compaction/densification, • contribute to the correction of the historically distorted spatial patterns of settlements and the optimum use of existing infrastructure in excess of current needs • encourage environmentally sustainable land development practices and processes • take into account special locational factors that might favour the specific location (e.g., the location of a strategic mineral resource, access to the port, access to rail, etc.), • the investment in the settlement or area in question will generate the highest socio-economic returns (i.e., an area with high economic potential), • impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and • in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement? 	



Guideline	Statements
<ul style="list-style-type: none"> • How was a risk-averse and cautious approach applied in terms of <i>socio-economic</i> impacts? • What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? • What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge? • Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development? 	<p>A risk-averse and cautious approach in terms of socio-economic impacts, involves carefully considering and mitigating potential risks and negative consequences, before implementing project initiatives. A risk-averse and cautious approach aims to minimize potential negative socio-economic impacts and ensure that the benefits of the development initiative outweigh the risks. It emphasizes careful consideration, stakeholder engagement, evidence-based analysis, and ongoing monitoring to foster sustainable and inclusive development.</p> <p>To this end, a thorough Impact Social Impact Assessment (SIA) which accompanies this detailed environmental impact assessment (EIA), has identified the potential risks and impacts associated with the proposed Rabie Ridge X 7 Project, see Section J. The SIA and EIA have addressed the economic, social, cultural, and environmental aspects pertaining to the development proposal, to ensure that the potential negative consequences of the development are minimized or mitigated.</p> <p>The SIA and EIA PPP included thorough Stakeholder Engagement Processes. Stakeholders who the SIA and EIA PPP engaged with included community members and councillors, which allowed for a better understanding of the communities concerns and perspectives. The potential socio-economic risks and impacts have been identified and addressed, see Sections D12, D13,D14, G5, J2.12 and Appendices 10 & 21 of this report</p>



Guideline	Statements
<p>How will the socio-economic impacts resulting from this development impact people's <i>environmental</i> rights in terms following: Negative impacts: e.g., health (e.g., HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>See Sections D12, D13,D14, G5, J2.12 and Appendices 10 & 21 of this report, and Appendix 27 for the EMPr. Measures are provided in the EMPr to avoid any impacts on people's environmental rights during the construction phase.</p> <p>Registered I&APs will be provided with the opportunity to comment on this draft EIA report, thereby ensuring that all people's needs, rights and concerns will be addressed through this process.</p>
<p>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g., over utilisation of natural resources, etc.)?</p>	<p>The proposed development will result in the total and permanent loss of portions of the wetland features on site. The activity will result in the complete loss of vegetation, fauna, herpetofauna, avifauna, ecologically sensitive or important species. The severity of the impact of these activities is not severe. Furthermore, the ecological scores of all of the wetland features indicated a highly modified system of limited ecological importance and sensitivity. Due to the highly modified state, and low ecological importance of the smaller wetland features, the sensitivity of the wetland features to be developed, is of low ecosystem significance.</p> <p>The subsistence agricultural practices on site are from individuals illegally using the open space to cultivate maize for subsistence purposes. Construction activities will impact on this resource use. The proposed mixed land use development would thus impact on the ecological resources being utilised on site (water) and result in the end of the provisioning services (mealies).</p>



Guideline	Statements
<p>What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?</p>	<p>The “best practicable environmental option (BPEO)” has been selected in this EIA report based on a comprehensive understanding of the project. This detailed draft EIAR includes all the possible environmental issues as well as the socio-economic factors applicable to a mixed land use, built environment project. A large team of specialists have provided detailed inputs in their respective fields, pursuant in selecting the BPEO.</p> <p>The SIA has thoroughly identified and addressed the socio-economic factors that need to be considered for the authority’s decision-making process. Data was gathered by the SIA specialist, and the relevant stakeholders were engaged with during the PPP, to understand and address the socio economic factors such as employment opportunities, economic growth, social equity, community well-being, cultural heritage, public health, and the overall impact on local livelihoods.</p> <p>A Comparative Analysis of the different alternatives, considering both environmental and socio-economic factors has been included in section F of this report. This analysis has evaluated how the identified alternatives perform in terms of their environmental effectiveness and socio-economic impacts.</p> <p>The Stakeholder Engagement process conducted for the SIA and EIA has assisted with the decision making regarding the BPEO. The Stakeholder Engagement process has been transparent, inclusive, and has involved engagement with the relevant identified stakeholders.</p>



Guideline	Statements
<p>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?</p> <p>Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?</p>	<p>To pursue environmental justice and ensure that adverse environmental impacts are not unfairly distributed, particularly among vulnerable and disadvantaged persons, the following measures have been taken as part of this EIA:</p> <p>The EIA and SIA PPP has provided access to information and has raised public awareness of the project through inclusive and participatory processes. These processes have provided the platform and multiple avenues for affected communities, including the vulnerable and disadvantaged persons, to voice their comments/concerns/objections, and to be part of meaningful participation and decision making for the proposed project. Information related to environmental risks, impacts, and decision-making processes has been made accessible and transparent to all.</p> <p>This Environmental Impact Assessment has not identified any disproportionate impacts on the vulnerable and disadvantaged groups in the area, in fact, quite the opposite. The RRX7 development is proposed to <i>serve</i> the region and its communities. This DEIAR has included an assessment of cumulative impacts (see section J of this report) and has addressed the social implications of the project (see the SIA, Appendix 10 & 21).</p> <p>There is no need for other alternatives to be considered. The proposed RRX7 development is in close proximity to existing high density townships such as Ivory Park, Rabie Ridge, Chlookop/Phomolong, and Commercia, and can serve as an integration link between these different land use nodes. The RRX7 proposal does not contribute to urban sprawl or</p>



Guideline	Statements
<p>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</p>	<p>inefficient types of land use. The development is situated next to major routes in the area (Modderfontein and Republic Roads) which links various urban nodes. From a social perspective, it is anticipated that the proposed development will make a significant positive contribution towards the <i>dire</i> housing needs in the local community, without negatively compromising the day-to-day activities of the different community groups surrounding the site. A well-managed housing and various other uses built project, will result in an improvement to the region, and remove the negative environmental impacts associated with the with the illegal, subsistence, and ad-hoc activities presently occurring on the undeveloped and unmaintained land.</p> <p>The RRX7 project <i>is</i> a targeted investment in the study area. The applicant and landowner intend to direct resources and investments towards addressing disparities in access to environmental resources, benefits and services. Municipal funding and resources will be allocated to the RRX7 initiative, which specifically targets disadvantaged categories of persons, ensuring they have access to clean water, sanitation, energy services, green spaces, and other essential environmental resources.</p>
<p>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</p>	<p>Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and are responsible for managing these impacts throughout the development's life cycle. The Applicant, therefore, has overall and total environmental responsibility to ensure that the EMPr is implemented on site, and that both the EMPr and the Environmental Authorisation are complied with at all times. The Applicant is also responsible for ensuring that all other environmental and water-related legislation is complied with.</p>



Guideline	Statements
<p>What measures were taken to:</p> <ul style="list-style-type: none"> • ensure the participation of all interested and affected parties, • provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, • ensure participation by vulnerable and disadvantaged persons • promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means, • ensure openness and transparency, and access to information in terms of the process, • ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition was given to all forms of knowledge, including traditional and ordinary knowledge, and • ensure that the vital role of women and youth in environmental management and development was recognised and their full participation therein was be promoted? 	<p>Refer to Appendices 10 & 21 of this report for the SIA, and section H of this report for the PPP conducted for the project.</p>
<p>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?</p>	<p>The RRX7 project is a targeted, mixed land use, investment project in the study area. The applicant and landowner intend to direct resources and investments towards addressing disparities in access to environmental resources, benefits and services. Municipal funding and resources will be allocated to the RRX7 initiative, which specifically targets disadvantaged categories of persons, ensuring they have access to clean water, sanitation, energy services, green spaces, and other essential environmental resources.</p>



Guideline	Statements
<p>What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?</p>	<p>Health and safety concerns will be addressed in the EMPr to be compiled as part of the EIR. The Contractor shall at all times observe the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and ensure adequate safety precautions on the site throughout the development phase.</p> <p>An Environmental Control Officer (ECO) must be appointed to monitor compliance with the EMPr during the development phase. This will be a condition of the environmental authorisation.</p>
<p>Describe how the development will impact job creation in terms of, amongst other aspects:</p> <ul style="list-style-type: none"> • the number of temporary versus permanent jobs that will be created, • whether the labour available in the area will be able to take up the job opportunities (i.e., do the required skills match the skills available in the area), • the distance from where labourers will have to travel, • the location of jobs opportunities versus the location of impacts (i.e., equitable distribution of costs and benefits), and • the opportunity costs in terms of job creation (e.g., a mine might create 100 jobs, but the impact on 1000 agricultural jobs, etc.). 	<p>The proposed development is expected to create new employment opportunities during the development phase. The majority, if not all, of the employment opportunities, are likely to benefit previously disadvantaged individuals from the local community. Given the high unemployment levels in the surrounding areas, coupled with the low income and education levels, this would represent a positive social impact. At this stage estimations are that the maximum number of job opportunities during any phase would total 1 950 prospects. The majority of these jobs would fall within the unskilled category (approximately 1800). The total cumulative number of jobs could amount to 6 600.</p>
<p>What measures were taken to ensure:</p> <ul style="list-style-type: none"> • that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and • that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures? 	<p>National, municipal and local departments that administer a law relating to a matter affecting the environment relevant to this application for Environmental Authorisation, as well as those identified by IAPS's and the competent authority, have been consulted during the PPP undertaken as part of the Scoping and EIA process.</p> <p>Consultation with the state departments and organs of state will assist in the coordination of policies and legislation relating to the environment. This consultation process has been undertaken during the PPP.</p>



Guideline	Statements
<p>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</p>	<p>The overarching purpose of the EIA process is to determine, assess and evaluate the consequences (positive and negative) of a proposed development. An iterative approach has been followed as part of this Scoping and EIA process, to achieve the key purpose of EIA, which is to identify solutions, approaches or options for development that best meets sustainability objectives. Throughout the Scoping and EIA process, there have been opportunities to constantly refine and adapt the development proposal to respond to these issues or concerns, about the environmental factors.</p> <p>The PPP undertaken as part of the Scoping and EIA processes, have provide members of the public (or I&APs) with the opportunity to raise any environmental concerns related to the proposed development. All issues and concerns raised have been addressed in the CRR, see Appendix 25 of this report.</p>
<p>Are the mitigation measures proposed realistic and what long-term environmental legacy and the managed burden will be left?</p> <p>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</p>	<p>Yes. Refer to Section J of this report for the practical, achievable, and realistic mitigation measures recommended for the impacts identified for this project. These measures have been incorporated into the EMP, and they will also become conditions of the environmental authorisation, should it be granted.</p> <p>The Applicant will be responsible for the implementation of, and for compliance with the conditions of all environmental-related approvals. Compulsory monthly monitoring and compliance actions to be carried out by an independent ECO, will hold the relevant parties accountable to the correct environmental compliance.</p>



Guideline	Statements
<p>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</p>	<p>The “best practicable environmental option (BPEO)” has been selected in this EIA report based on a comprehensive understanding of the project. This detailed draft EIAR includes all the possible environmental issues as well as the socio-economic factors applicable to a mixed land use, built environment project. A large team of specialists have provided detailed inputs in their respective fields, pursuant in selecting the BPEO.</p> <p>A Comparative Analysis of the different alternatives, considering both environmental and socio-economic factors has been included in section F of this report. This analysis has evaluated how the identified alternatives perform in terms of their environmental effectiveness and socio-economic impacts. A description of the development alternatives are provided in Section F of this report. The assessment of the impacts associated with the alternatives are provided in this section as well.</p>
<p>Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</p>	<p>See Appendices 10 & 21 of this report for the detailed SIA which has addressed these aspects.</p>



SECTION F DESCRIPTION OF THE RECEIVING ENVIRONMENT

F 1 The Biophysical Environment

F 1.1 General Climatic conditions

The project area falls within the Highveld Climatic Zone. The average annual precipitation ranges from 500mm to 700mm (WRC, 1994). Rainfall is generally in the form of thunderstorms. These can be of high intensity with lightening and strong gusty south-westerly winds. Hail frequency is high, tending to occur 4-7 times per season. Over the last seven year period, 1989 recorded the highest rainfall in a year with 630mm while the lowest of 429mm was recorded in 1985. The majority of the rainfall is during the summer months of October to March at which time approximately 90% of the annual rainfall occurs.

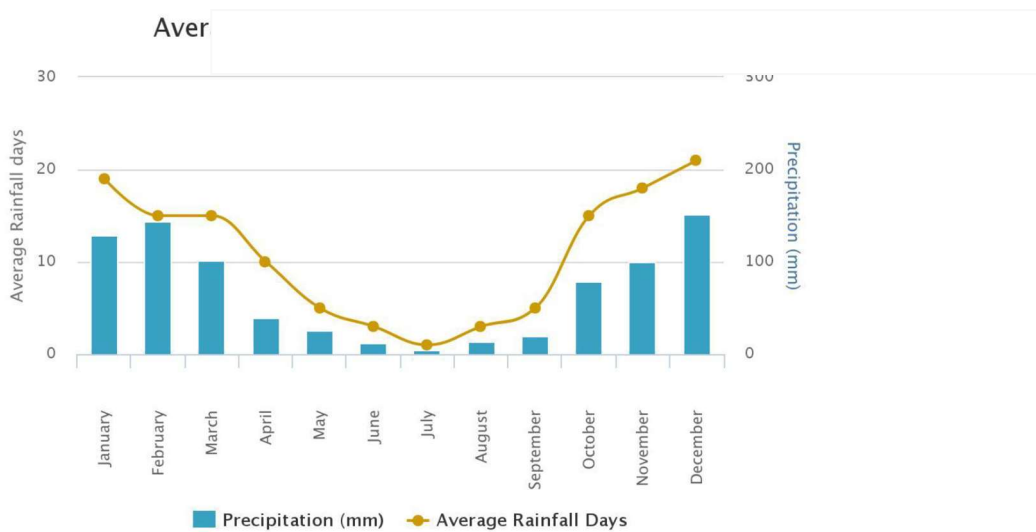


Figure 8: Average Rainfall (mm Graph for Midrand)

Temperatures in this climatic zone are generally mild, but low minima can be experienced in winter due to clear night skies. Temperatures in the region tend to be warm to mild, with average maximum temperature of 27.90 C and an average minimum temperature of 11.80C. Frost characteristically occurs in the winter months. Generally winds are light, but south-westerly winds associated with thunderstorms are typically strong and gusty.

G 1.1.1 Climate Change

²Climate projections indicate that the outcome for Gauteng is likely to be a drier climate overall, with higher temperatures and longer dry spells dominating weather patterns. Intense rainfall events will aggravate the situation by increasing run-off rather than infiltration. These occurrences increase the risk for flash floods and erosion, placing pressure on stormwater infrastructure and affecting agricultural practices.

Climate change is a serious threat to Gauteng. Gauteng’s current socio-economic situation will deteriorate if it fails to adequately respond to climate change. Gauteng is particularly vulnerable at a household level where poverty reduces people’s adaptive capacity, but also at a macroeconomic level because of the region’s heavy dependence on carbon-intensive energy. The Gauteng City Region’s Overarching Climate Change Response Strategy and Action Plan states that the pressure on economic performance will also mount if the energy footprint

² [www. Climate change is a serious threat to Gauteng \(iol.co.za\)](http://www.iol.co.za)

of the province remains tightly bound to coal-fired electricity and coal/oil-based liquid fuels. The strategic financial sense of a switch to renewable energy is undisputed.

Efficient urban design, linked to modernised mass transportation and safeguarded green infrastructure, is a key ingredient to making cities (and the people living in them) resilient and reducing disaster risks.

F 2.2 Site Geology

In 2006, D J Olivier Engineers conducted a soil investigation for future township development on the Remainder of the Farm Allandale 10 IR. The founding conditions of the site were evaluated for normal brick buildings. See Appendix 11 for this Geotech Report. D J Olivier Engineers found that the residual underlying the transported soils is a granite of the Witwatersrand sequence. It is stable with high bearing values when unweathered. The soils above the granite are alluvial sands, silt and clays with gravel and dispersed small boulders. The site may be divided into zones of shallow and deep rock levels, as well as an area of marshland, and a portion with outcrops of hard granite.

D J Olivier Engineers provide founding conditions and recommendations for township infrastructure in the report. Excavation for services will not encounter any problems, as no ground water was encountered during the survey, and the fact that the material in the upper 1.m soil layers is fairly permeable. Therefore, D J Olivier Engineers confirm that the soil conditions on site are suitable for development, and normal brick construction may be employed without excessive additional foundation costs.

Comments from the Council for Geoscience were received in 2010. These comments were based on D J Olivier Engineers 2006 report. The council confirmed that the site is not underlain by dolomitic rocks and soils, and therefore the risk of karstic sinkhole formation is not possible.

F 2.3 Topography and drainage

D J Olivier Engineers confirmed the site to slope from East to West, at approximately 3%. According to the NFEPA database the proposed development area falls within the Highveld Ecoregion, the Limpopo Catchment, the Crocodile West and Marico Water Management Area (WMA), the Upper Crocodile subWMA and is located on the A21B and A21C quarternary catchment divide. The topography and elevation profile correspond with the catchment divide identified by the NFEPA (2011) database. It also indicates that the proposed development area is the proximal point from which surface runoff might be generated and drain from into the surrounding areas.

F 2.4 Hydrological features on the site

The study area falls within the quaternary catchment A21C which is part of the Crocodile (West) and Marico Water Management Area and the Upper Crocodile Sub-Water Management Area. A non-perennial river intersects the study boundary in the western portion of the study site while the most south-western corner also includes a non-perennial drainage line (Chief Directorate: Surveys & Mapping, 1996).

F 2.4.1 Wetlands

Three (3) separate and independent freshwater ecosystem assessments have been conducted for the Rabie Ridge X 7 study area. The first wetland delineation study was undertaken by Strategic Environmental Focus (SEF) in September 2013, for the very first S&EIR application for the RRX7 township project. See Appendix 12. When the new applicant re-initiated the mixed land use township application in 2021/2022, the 2013 SEF wetland report had to be updated (including new site inspections), to conform to the auspices of an Appendix 6 level specialist



assessment (NEMA, as amended on 7 April 2017), where the most current ecological and aquatic characteristics of the site, potential and current impacts from the development, were re-evaluated. To this end, Scientific Aquatic Services (SAS) was appointed to compile the required updated freshwater ecosystem assessment report, see Appendix 13.

The results of the SAS report were substantially different to the 2013 SEF report. The Un-channelled Valley Bottom Wetland (UCVB) on site, had increased dramatically in size since the 2013 SEF delineation exercise.

To determine the correct and accurate wetland delineation to adopt for the site, a third, independent wetland specialist was appointed. Terra Soil Science was appointed to provide a specialist opinion on the presence and context of the wetlands identified on the proposed Rabie Ridge X7 development area. See Appendix 14 for the Terra Soil report. The Terrasoil report also provides a high-level hydrogeology of the site.

The intention of the Terra Soil report is not to function as one of several attempts by applicants to obtain favourable delineation outcomes. Rather, the report is aimed at addressing specific site conditions in the context of current legislation, guidelines, and best practice, with the ultimate aim of ensuring the conservation and adequate management of the water resource on the specific site.

See table 10 for the summary of the findings of the three separate wetland reports.

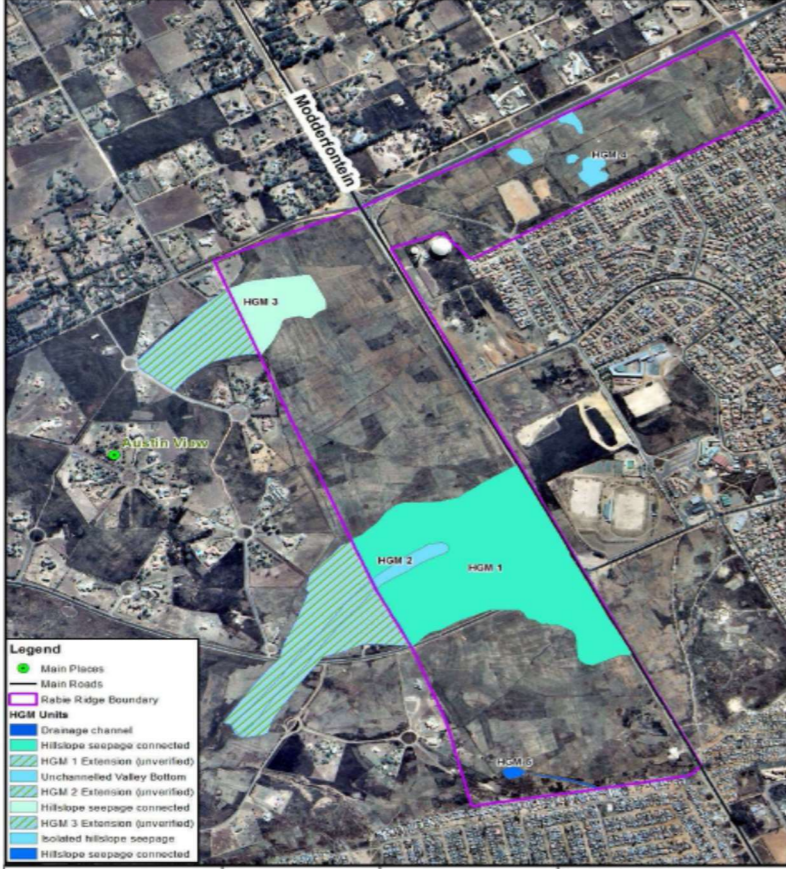

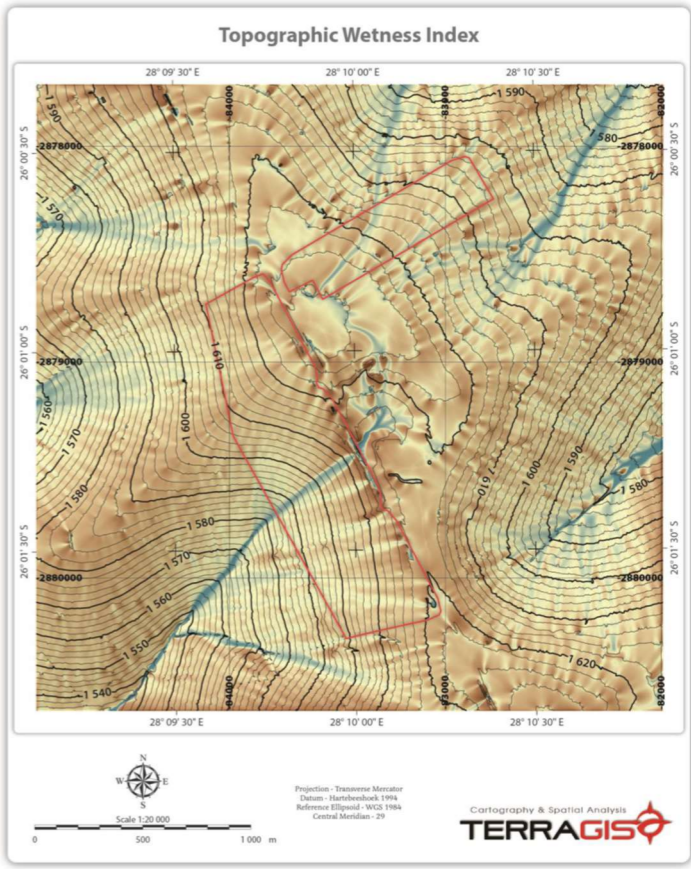
F 2.4.1.1 City of Johannesburg's Comments on the Wetland Reports

Following receipt of the independent specialist wetland studies, SEC submitted all the reports to the COJ, Environmental Impact Management Department, in Sept 2022, as separate addendums to the Draft Scoping Report. SEC requested the commenting authorities' input, to inform the project team which wetland delineation results to best proceed with / adopt for the site. The comments received from this authority are in Appendix 15.

The COJ's comments are as follows:.....*"After a thorough review of the above findings, the Department has come to the following conclusions:*

- 1. The Department accepts the Wetland Delineation by SEF (HGM 1 & 2) and would concede on the remaining HGM's based on the findings, and the fact that the systems are isolated and have been severely degraded.*
 - 2. As per the City's Catchment Management Policy, no development would be permitted within the wetland or riparian zone, or within a buffer of 30 metre from the outer edge of such wetland or riparian zone or riverbank where this is clearly identifiable, or within the 1:100-year floodlines, whichever is the greatest. In this case (HGM 1 & 2).*
 - 3. Due to the presence of an existing road (Dane Road) which would have potentially isolated the wetland system, this road could serve as southern buffer of HGM 1 & HGM 2 wetland units, in a case where the 30m buffer extend beyond the road.*
- Based on the recommendations of the Terrasoil report, and the COJ Environmental Impact comments, the 2013 SEF delineation has been adopted for the RRX7 township, as per the COJ Environments comments.



Item	Sept 2013 SEF Detailed Wetland Assessment	August 2022 SAS Freshwater Ecosystem Assessment	August 2022 Terrasoil High-level Hydro pedology and Wetland Soil Context Report
	 <p>505436 HGM Unit Map</p> <p>Source of Information: Municipal Boundaries (Planet Q18: 2011) Roads: CDSM 2006</p> <p>Map Produced By: S · E · F September 2013</p>		 <p>Topographic Wetness Index</p> <p>Scale 1:20,000</p> <p>TERRAGIS</p>
<p>What the delineation was based on, and what freshwater features were found on site</p>	<p>Wetland areas were delineated based on soil form and identifiable redoximorphic signs and included isolated hillslope seepage wetlands (HGM 1, 3, 4 and 5), hillslope seepage wetlands connected to a watercourse (HGM 3) and an unchannelled valley bottom wetland (HGM 2). The wetlands identified occupied a combined area of 26.84 hectares within the study area.</p>	<p>Wetland areas were delineated based on desktop methods, soil morphological characteristics, and wetness, along with vegetation types were used to verify the freshwater ecosystems. In addition to the freshwater ecosystem boundaries, the appropriate provincial recommended buffers (where applicable), calculated buffers as per the method of Macfarlane <i>et al.</i> (2015) and legislated zones of regulation were depicted, where applicable</p> <p>Four freshwater ecosystems were identified within the footprint of the study area and may potentially be at risk from the proposed development, namely one Unchannelled valley bottom (UCVB) and three Seep wetlands.</p>	<p>For the purposes of the wetland / seep / watercourse identification and site assessment, the context of the identified wetland / seep / watercourse was determined. This was done through 1) the consideration of previous wetland reports pertaining to the site and 2) the thorough consideration of the geological, topographical, climatic, hydro pedological, catchment and historical impact context of the site.</p> <p>Wetland areas were studied according to soil form (the Halfway House Granite Dome (HHGD) area of the Johannesburg Dome (JD)), wetness (topographic wetness index), alteration of landscape hydrology through urban infrastructure, vegetation related wetland signatures and google earth images. The delineation of wetlands in the Halfway House Granite Dome (HHGD) area of the Johannesburg Dome (JD) is challenging due to a range of factors that leads to difficulty in distinguishing between wetland and terrestrial zones. Due to the landscape features any change in hydrological</p>



Item	Sept 2013 SEF Detailed Wetland Assessment	August 2022 SAS Freshwater Ecosystem Assessment	August 2022 Terrasoil High-level Hydrogeology and Wetland Soil Context Report
			functioning of the landscape through urban development and surface sealing will lead to the rapid development of new, but anthropogenic, wetland expressions.
Ecological Scoring	<p>The wetland areas identified on site were assigned a <i>low Ecological Importance and Sensitivity Scores</i>, owing to current land uses, including the cultivation of maize within the wetlands, the dissection of wetlands by roads, dumping of rubble within the wetlands, the removal of almost all natural wetland vegetation species, and the dominance of alien invasive species on site.</p> <p>The wetland vegetation type associated with the study area is categorised as Mesic Highveld Grassland Group 3 which as a group is regarded as being Critically Endangered, and therefore increases the ecological importance of the site. However, due to the low Present Ecological state scores obtained by all HGM units, these particular wetlands are regarded as having a <i>conservation importance</i> within the wetland vegetation type.</p> <p>The moderate scores received by the valley bottom wetland were as a result of the less disturbed nature of this wetland compared to the hillslope seepage wetlands. The <i>Hydrological Importance and Functionality of the wetlands also scored low</i> as a result in the changes to the hydrological and geomorphological processes which govern the functionality of the wetlands. The movement of soil downslope, the building of houses in the wetlands, and the cultivation of crops in the wetlands have all lead to a reduction in the functionality that the wetlands perform.</p>	<p>UCVB wetland: The UCVB wetland system has been largely modified throughout its extent. Despite the modifications to the UCVB wetland, the system is deemed to provide a very low to moderate degree of ecological services. Whilst the ecological integrity of the UCVB wetland has been compromised, it is nevertheless deemed important for hydrological functioning (such as flood attenuation and nutrient/toxicant assimilation). Furthermore, the system may be sensitive to changes in flood peaks and/or water quality.</p> <p>Seep wetland 1: Seep wetland 1 is subject to various ongoing and historical impacts and is classified as Largely modified (Category D). The hydrology of the seep has been altered by numerous impacts. The seep wetland provides a very low degree of Ecoservice provision, and was assessed to have a <i>Moderate</i> EIS due to the anthropogenic disturbance within and along the wetland.</p> <p>Seep wetland 2: Similar to other wetlands within the catchment, Seep wetland 2 is subject to various historical impacts resulting in the wetland being classified as Largely modified (Category D). Seep wetland 2 provides a very low degree of Ecoservices, and was also assessed to have a <i>Low</i> EIS due to the various historical anthropogenic disturbances within the wetland.</p> <p>Seep wetland 3: Seep wetland 3 is subject to various ongoing and historical impacts resulting in the wetland being classified as Seriously to Critically modified (Category E). The hydrology of the Seep wetland 3 has been most notably altered by surrounding informal settlements. Seep wetland 3 provides a very low degree of ecoservices, and was assessed to have a <i>Low</i> EIS due to the anthropogenic disturbance within and along the wetland, specifically owing to the informal settlements.</p>	<p>The “HGM1” and “HGM2” wetland areas identified in the SEF report are confirmed in the SAS report. The TWI is very clear in this case and this wetland / watercourse area is therefore confirmed as a wetland zone.</p> <p>The broader wetland areas on the SAS map (extending south of Dale Road) do not correspond to water flow signatures on the TWI map. The exception is a stormwater signature identified as “Desktop delineated channelled valley bottom” that feeds into an altered watercourse flowing to the north-east.</p> <p>SEF HGM 3: The seepage area to the north of the site is also characterised by greyer soils as well as some surface accumulation of water. However, this area has also been altered significantly through tillage and subsistence crop farming with more recent disposal of rubble. It implies that the original vegetation signatures are not evident anymore and that new signatures have developed.</p> <p>The SAS report also identified this seepage area.</p> <p>The TWI indicates a potential accumulation of surface flow in that area but the vegetation signatures have been muddled by surface alteration for two decades now.</p> <p>SEF HGM 4: The isolated seeps identified in the SEF (2013) report correspond to an area that is characterised by greyer soils (2005 image). However, this area is currently characterised by significant volumes of rubble and land degradation to the point where vegetation signatures have been altered drastically.</p> <p>These seeps were not recorded in the SAS report, as the specialists were unable to access this portion of the site, due to constraints private roads, construction areas and fenced private property.</p> <p>The topographic wetness index (TWI) indicates potential surface flow in that area, but more expressed indicators of seeps are not evident.</p>



Item	Sept 2013 SEF Detailed Wetland Assessment	August 2022 SAS Freshwater Ecosystem Assessment	August 2022 Terrasoil High-level Hydropedology and Wetland Soil Context Report
Recommendations	<p>The proposed development located within the catchment of the hillslope seepage wetlands (HGM 1, 3, 4 and 5) and valley bottom wetland (HGM 2), would result in critical changes to the hydrology of the catchment - especially in terms of increased peak flows and reduction in subsurface flow supporting wetlands. It is important to realise that water moves horizontally within the soil profile within the catchment and that a lack of mitigation would not only result in further desiccation of wetlands, but also pose a threat to the sustainability of structures due to serious damp and water problems.</p> <p>The wetland specialist recommended that a minimum 30m GDARD buffer be placed around HGM wetland units 1 - 3.</p>	<p>It is recommended that the UCVB wetland and associated 30 m GDARD setback buffer be allocated as a “no-go” area as part of the proposed wetland in the study area</p> <p>It is recommended that Seep wetlands 1, 2 and 3, and their 30 m GDARD setback buffer be allocated as a “no-go” area as part of the proposed wetland in the study area.</p>	<p>The soil map provided in the SEF report was drawn up by Willem Lubbe, and is a fair representation of the soils on the site. The soil forms as identified conform to the wetland areas and wetland soils identified on the site. The soil map provided by SEF appears to be accurate and the main wetland features with associated soil forms are accepted as a true reflection of the site before the significant alteration. The soil forms as identified conform to the wetland areas and wetland soils identified on the site.</p> <p>The wetland map provided by SAS cannot be supported as it flags, apart from the one area in common with the SEF report, a few areas clearly associated with stormwater signatures.</p> <p>It is recommended that the SEF delineation outcome be accepted as accurate with the omission of small wetland areas on Westleigh soils in the northern section of the site. This is mainly due to their isolation and current complete degradation due to detrimental land activities (dumping of rubble an surface alteration).</p>



F 2.4.2 Wetlands affected by the township development

See Figure 9 for the wetland features which **will be lost** because of the proposed township.

1. The construction of a business park and residences will result in the infill of the entirety of two wetland features (HGM 4 and 5);

The proposed development will result in the total loss of wetland features HGM 4 and 5, and therefore the impact is of serious severity. However due to the highly modified state, and low ecological importance of these features, the sensitivity of the features is of low significance. HGM 4 was considered to provide few ecosystem services, therefore the loss of this feature will not result in a significant sociocultural impact.

The ecoservices provided by HGM 5 were moderate. It should be considered that one of the most significant services provided by HGM 5 related to streamflow regulation due to its formation at the base of an artificial drainage channel. Should the proposed development proceed, this ecoservice can be readily replaced through adequate stormwater management including soft engineering and environmentally sensitive stormwater system design. Additionally, although the duration of the impact upon the two wetland features can be permanent, the physical extent of the features is relatively limited.

Although the proposed activity would result in the complete loss of vegetation and other biota, any ecologically sensitive or important species identified can be rescued and relocated prior to construction upon the wetland features. However, as no such species were identified at HGM4 or 5 this mitigation measure is unlikely to significantly change the impact.

- 1. The construction and operation of residential units, and associated stormwater infrastructure, which will encroach upon portions of two wetland features (HGM 1 and 3), and the buffer zone of another feature (HGM 2);*
- 2. The construction and operation of new tarred roadways and associated pavement, which will directly traverse four wetland features (HGM1, and HGM 3-5), and;*
- 3. The installation and operation of sewerage and potable water pipelines, which will directly traverse four wetland features (HGM 1 – 3 and 5).*

The proposed development poses two primary environmental and ecological impacts to the affected wetland features; 1) changes to wetland hydrological function and sediment balance, and 2) loss of wetland habitat, ecologically important and sensitive species, as well as ecosystem functions and service provision.

The proposed activities will result in the permanent loss of portions of two wetland features (HGM 1 and HGM 3) prior to the implementation of mitigation measures due to the development of residential structures. Additionally, portions of HGM 1, and HGM 3 – 5 will be lost due to the development of roadways and the installation of bulk services. The severity of the impact of these activities can be considered to be significant, but not particularly severe. Furthermore the ecological scores of all of the wetland features indicated a highly modified system of limited ecological importance and sensitivity.



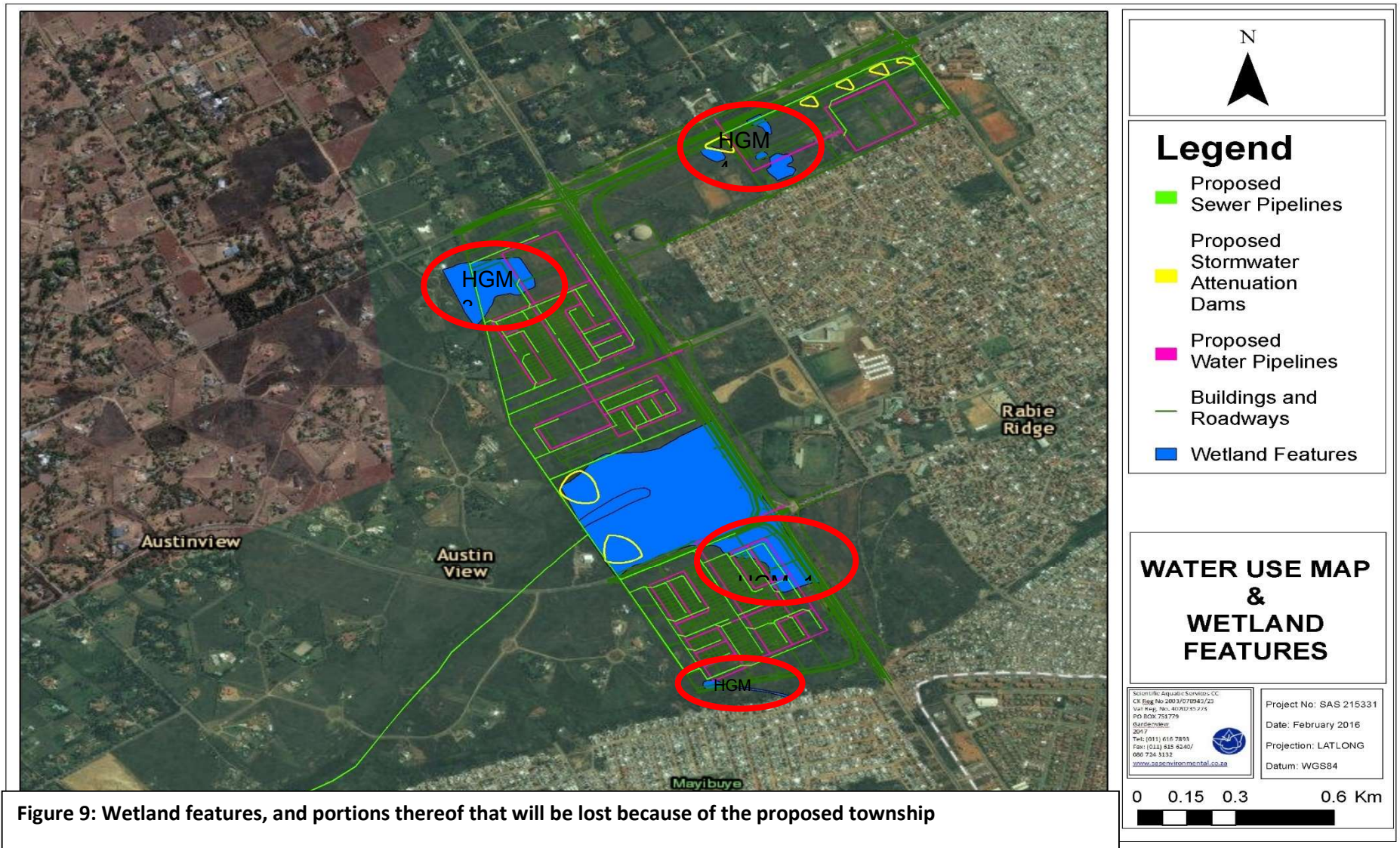


Figure 9: Wetland features, and portions thereof that will be lost because of the proposed township



In terms of changes to wetland hydrological function and sediment balance during the operational phase of the proposed development, it was the opinion of the Wetland Ecologist (SEF 2013) that the proposed development would result in significant changes to the hydrology of the catchment especially in terms of increased peak flows and reduction in subsurface flows supporting the wetland features. In addition to the risk of leaking sewage and water pipelines to HGM 1 and the increased probability of oil-contaminated stormwater runoff into the wetland. HGM 1 – 3 and HGM 5 were considered to provide intermediate ecosystem services and functions, including biodiversity maintenance, water supply, streamflow regulation, sediment trapping, toxicant and nitrate removal. The provided services and functions of the wetland features were limited by the historical impacts upon the features. HGM1 – 3 will continue to provide these services however due to the partial loss of HGM 1 and 3 a degree of ecosystem services and functions may be lost as well.

The Wetland Ecologist (SEF 2013) recommended that no structures be developed within HGM 1 -3, and that a 30m minimum buffer zone be implemented around these wetlands. This was based on the premise that serious rising damp, and water problems might compromise the structural stability of buildings placed there, as exemplified by water damage in the existing residential buildings encroaching upon wetland features. However, the Geotechnical report disputed this stating that no special problems with damp proofing were predicted (WSP 2015).

Water Use License Associates (PTY) LTD has been appointed to submit a Water Use License application to the Department of Water and Sanitation, to facilitate the Water Use Authorisation process as described in the National Water Act (Act No. 36 of 1998) for water uses as defined in Section 21 relating to the RRX7 application. This application is presently underway.

F 2.4.3 Wetland Rehabilitation

SAS compiled a detailed Wetland rehabilitation and Management Plan for the activities proposed within the identified wetland systems. See Appendix 13.

The above mentioned rehabilitation plan and the engineering storm water management plan were both informed by the mitigation measures provided by SEF in the 2013 Wetland Assessment Report (Appendix 12). These measures included the following:

- Attenuation and associated diffuse release infrastructure must be designed and implemented to mimic the hydrology of a pre-development Halfway House granite landscape. This would require integration of the development layout, inclusion of green spaces, stormwater-infrastructure design to include several attenuation facilities as well as diffuse release infrastructure fringing the hillslope seepage wetlands. It is recommended that both soft and hard engineering principles be utilised to ensure that the most cost effective and aesthetically pleasing mitigation options are implemented.

- Restoring the basic ecosystem functions within the seepage wetlands through 're-wetting' wetlands using the following rehabilitation principles and stormwater attenuation:



Swales and attenuation facilities are to be installed along the outer edge of the buffer area of the hillslope seepage wetlands (HGM 1 and HGM 3). The attenuation facility should retain stormwater runoff and then allow the water to diffuse into the wetland at a slower velocity through diffuse release infrastructure, simulating predevelopment geo-hydrological patterns in the catchment. These should help limit further erosion processes from being initiated along the hillslope seepage wetlands, allow for sediment deposition within the swales, re-distribute water more evenly within the seepage areas and eventually re-wet the desiccated wetlands. The higher moisture regime within these seepage wetlands will also subsequently increase the vegetation cover leading to further ecosystem service benefits.

Adjacent to the wetland buffer zone, a 1-2m trench needs to be dug and filled with rock and pebble material to diffuse the release of water. Once water enters this channel it can then infiltrate into the sandy soil profiles found along the hillslope seepage wetlands. This will facilitate the movement of water evenly through the buffer areas and eventually into the hillslope seeps. It should be noted however that the above description of the diffuse release infrastructure is only conceptual and should be appropriately designed by a suitably qualified engineer in collaboration with a wetland specialist.

- Wetland rehabilitation within HGM 3 should be discussed with local authorities as the re-wetting and enhancement of attenuation facilities of this wetland area would cause more water damage to the already developed areas downslope of the wetland. If local authorities are in agreement to re-establish the connectivity of the hillslope seepage with wetland areas downslope of the study area, an integrated rehabilitation plan needs to be developed.
- The wetlands associated with HGM 4 are isolated in nature and lack functionality as a result of heavy urbanisation in the area. The development of this portion of the study area will further degrade the wetlands causing an almost complete loss of functionality. It is therefore recommended that if development encroaches onto these wetlands, artificial attenuation facilities are installed that are linked to the stormwater infrastructure to diffusely release stormwater from the new development.

Conclusion

In order to mitigate potential negative affects to the watercourse, large scale attenuation and associated diffuse release infrastructure would have to be designed and implemented to mimic the hydrology of a predevelopment Halfway House granite landscape. This would require integration of the development layout, inclusion of green spaces, stormwater design to include several attenuation facilities as well as diffuse release infrastructure fringing the hillslope seepage wetlands. SEF further recommended that both soft and hard engineering principles be utilised to ensure that the most cost effective and aesthetically pleasing mitigation options are implemented.



- The 2023 engineered storm water management plan (Appendix 1) has been compiled incorporating SUDS recommendations. The above-mentioned processes require a detail design and rehabilitation planning process, and should only be implemented under the supervision of an Environmental Control Officer and Wetland Specialist.

F 2.5 Hydro-Geology

In 2016, Scientific Aquatic Services (SAS) conducted a hydro census and groundwater quality baseline study for the study area. This specialist assessment was commissioned in response to the IAP's and authorities request to address the potential negative impacts on ground water recharge and ground water contamination, as a result of the Rabie Ridge X 7 township. See Appendix 16.

The hydro census and groundwater quality baseline study for the study area has been updated by SAS (including new site inspections), to conform to the auspices of an Appendix 6 level specialist assessment (NEMA, as amended on 7 April 2017). See Appendix 17.

The comparative results of these assessments is provided in Table 11.

- In light of the need for sustainable development and the urgent need for affordable housing, employment opportunities and educational services, the potential impacts from the proposed development, which may be considered to be limited, are considered acceptable risks.



Item	2016 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report	2023 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report
Objective of report	Determine the potential impacts stormwater poses on groundwater quality (through the analysis of <i>in situ</i> and laboratory borehole samples) and recharge (through consultation of stormwater specialist inputs and conceptual groundwater desktop studies) on proximate groundwater users and suggests mitigation measures to limit these impacts in a risk assessment	
<p>During the hydrocensus, the location and use of boreholes in the area were quantified, and water samples were extracted for analysis from selected boreholes. See Figure 10. The report also presents the results of a baseline groundwater quality assessment in which the concentrations of constituents associated with the South African National Standards (SANS) 241 (DWS 2015) drinking water guidelines were quantified.</p> <p>The data on selected water quality variables were then assessed, tabulated and compared to the South African Water Quality Guidelines for aquatic ecosystems, agricultural use, drinking water, full and intermediate recreational use (DWA 1996).</p>		
Results	<ul style="list-style-type: none"> - Nineteen boreholes were located within 1km of the proposed development area. An additional four boreholes located on the edge of the designated 1km assessment radius were identified by chance. The majority of groundwater users occur to the west of the proposed development area, within President Park; - Nineteen of the 23 boreholes, or 82.6%, of the boreholes were in working order. Of those boreholes that were in use 100% were used for irrigation, 37% were used for drinking and 	<p>Nineteen boreholes were located within 1 km of the proposed development area. An additional four boreholes located on the edge of the designated 1 km assessment radius were identified by chance. The majority of groundwater users occur to the west of the proposed development area, within President Park;</p> <ul style="list-style-type: none"> ➤ Nineteen of the 23 boreholes, or 82.6%, of the boreholes were in working order. Of those boreholes that were in use 100% were used for irrigation, 37% were used for drinking and domestic use, and 5% of boreholes were used for recreational purposes (full physical contact); ➤ At the time of the assessment the groundwater at all four boreholes was considered to be suitable for drinking water. However, the



Item	2016 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report	2023 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report
	<p>domestic use, and 5% of boreholes were used for recreational purposes (full contact);</p> <ul style="list-style-type: none"> - At the time of the assessment (2016) the groundwater at all four boreholes was considered to be suitable for drinking water. However, the compliance of various metals with the standards for domestic use, irrigation, and livestock watering could not be determined. Therefore, it is recommended that a precautionary approach be taken and that the water not be used for these purposes. Furthermore, the water was not deemed suitable for aquaculture purposes. 	<p>compliance of various metals with the standards for domestic use, irrigation, and livestock watering could not be determined. Therefore, it is recommended that a precautionary approach be taken and that the water not be used for these purposes. Furthermore, the water was not deemed suitable for aquaculture purposes, which was not an identified groundwater use in the area.</p>
Recommendations	<ul style="list-style-type: none"> - The stormwater masterplan and the potential impacts thereof, should be reviewed one year post development and incorporate an analysis of changes in the water levels of the boreholes, and measures to address, manage or mitigate any emerging concerns should be investigated accordingly; - It is recommended that water levels be monitored quarterly during the construction phase, and annually during the operational phase 	<ul style="list-style-type: none"> ➤ Wherever possible permeable paving and SUDS should be implemented to increase infiltration and reduce loss of recharge of local aquifers; ➤ The stormwater masterplan and the potential impacts thereof, should be reviewed one year post development and incorporate an analysis of changes in the water levels and water quality of the boreholes, and measures to address, manage or mitigate any emerging concerns should be investigated accordingly;



Item	2016 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report	2023 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report
	<p>of the proposed development. Groundwater and borehole levels (where applicable) should be monitored through monitoring of selected boreholes identified by the Groundwater Hydrocensus Report. The quantified water quality parameters should include <i>in situ</i> measurements of pH, electrical conductivity and total dissolved solids, as well as SANAS accredited laboratory analyses of the parameters associated with the SANS 241 (2015) drinking water standards. The interpretation of the results should include an analysis of compliance with the SANS 241 (2015) drinking water standards as well as the South African Water Quality Guidelines for aquatic ecosystems and agricultural use (DWAF 1996). In light of the need for sustainable development and the urgent need for affordable housing, employment opportunities and educational services, the potential impacts from the proposed development, which may be considered to be limited, are considered acceptable risks.</p>	<ul style="list-style-type: none"> ➤ Water levels must be monitored quarterly during the construction phase, and bi-annually during the operational phase of the proposed development. Groundwater and borehole levels (where applicable) should be monitored through monitoring of selected boreholes identified by the Groundwater Hydrocensus Report. The quantified water quality parameters should include <i>in situ</i> measurements of pH, electrical conductivity and total dissolved solids, as well as SANAS accredited laboratory analyses of the parameters associated with the SANS 241 (2015) drinking water standards. The interpretation of the results should include an analysis of compliance with the SANS 241 (2015) drinking water standards as well as the South African Water Quality Guidelines for aquatic ecosystems and agricultural use (DWAF 1996); ➤ Stormwater quality must be monitored to identify potential problematic point and diffuse sources that could negatively impact groundwater quality; and ➤ Sewer pipelines must be monitored every 5 years with an emergency plan in place in case of sewer pipeline failure. ➤ From the above it is evident that the proposed development area may have a moderate recharge potential, which is in line with the low-moderate recharge potential identified by the NFEPA (2011) database.



Item	2016 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report	2023 Scientific Aquatic Services (SAS) was appointed to undertake a groundwater hydrocensus report
		However, the relative size of the proposed development area, and its location across a catchment divide indicates that the absolute recharge volume from the proposed development area into the groundwater environment is likely to be limited.



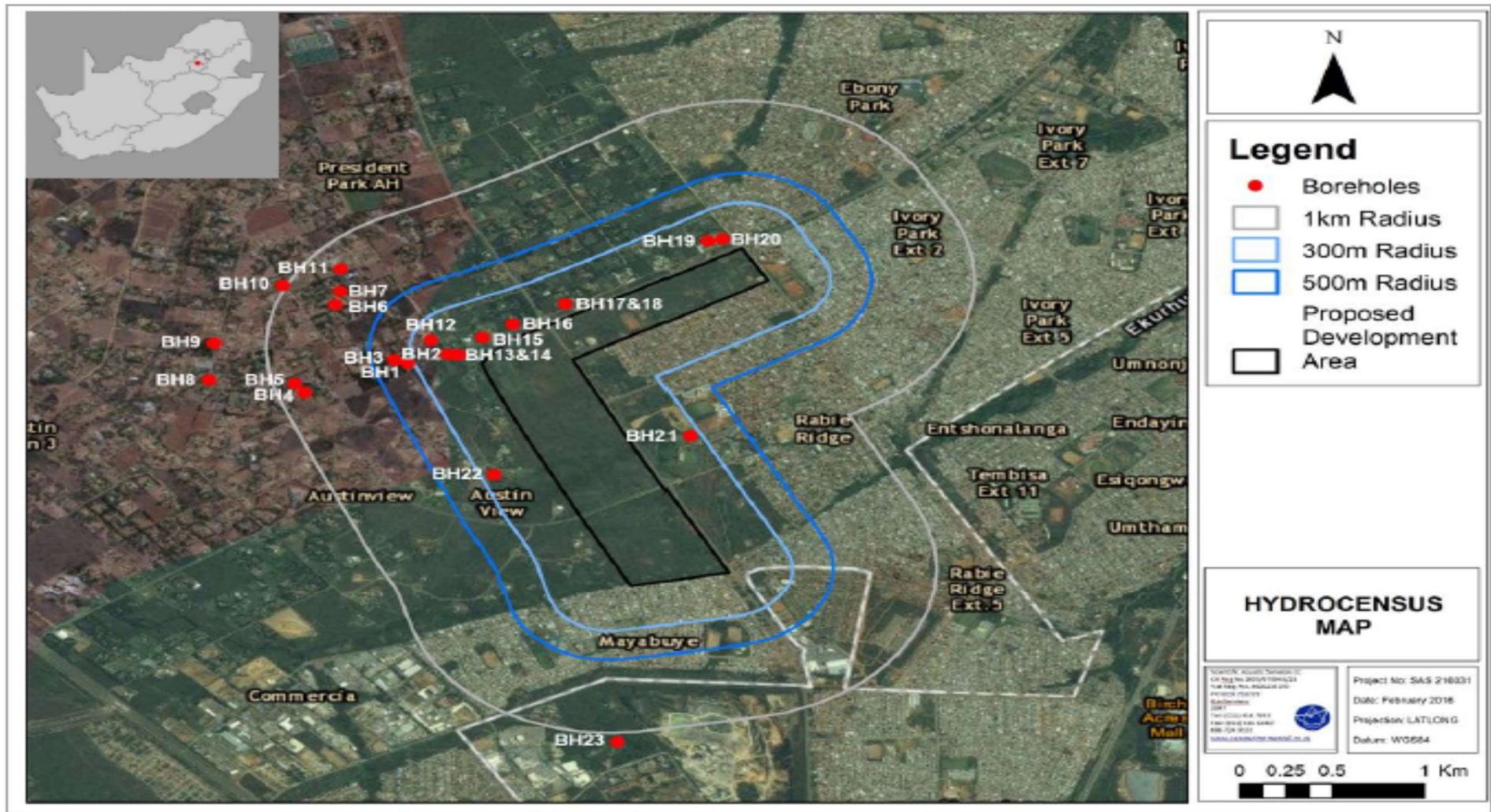


Figure 10: Digital satellite image of all of the boreholes located, and the water quality monitoring points



F 2.6 Terrestrial Ecology

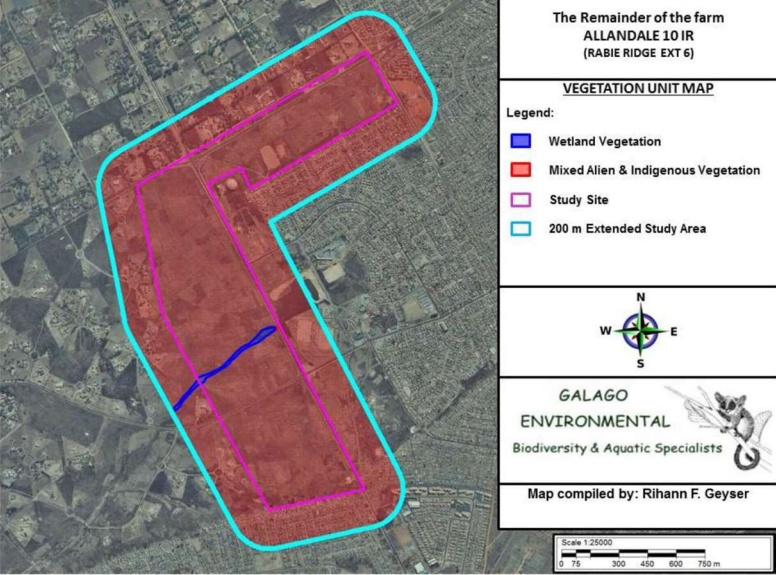
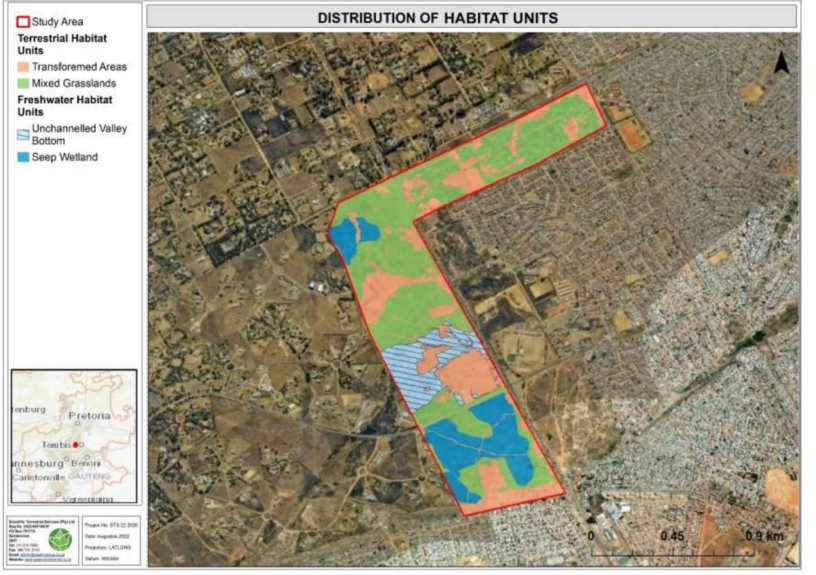
The 2013 Galago Environmental vegetation survey was the initial study to determine which floral species occur on the site. see Appendix 18. Scientific Terrestrial Services CC were appointed to compile an updated Terrestrial Biodiversity and Species Impact Assessment, in adherence to the gazetted Environmental Assessment Protocols, specifically the 'Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Terrestrial Biodiversity (GG 43110 / GN R320, 20 March 2020)), See Appendix 19. The results of these assessments have been tabulated in Table 12, for comparative findings.

- The 2022 SAS results are considered comparable to that of the Galago 2014 report. It is evident that habitat loss and anthropogenic activities were impacting mammal abundances and diversity in 2014, and such has continued to present day. Habitat and species diversity has not improved since the initial 2013 Galago surveys. Habitat degradation due to continued anthropogenic activities and urban expansion is likely the primary reason.



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
Flora	<p>The vegetation of the study site was found to be degraded by informal agriculture. Patches of natural grassland occurred between old and new cultivated fields. Connectivity with natural grassland did not exist. A drainage line with wetland vegetation occurred west of Modderfontein Road. Two vegetation study units were identified on site:</p> <ul style="list-style-type: none"> • Mixed alien and indigenous vegetation; and • Wetland vegetation. <p>As drainage lines form corridors for the movement of species, which include pollinators of plant species, the wetland study unit was considered sensitive and had to be excluded from development.</p>	<p>Three broad Habitat Units were distinguished for the Study Area:</p> <ul style="list-style-type: none"> • Mixed Grasslands; • Freshwater Habitat: Seep Wetland; Unchanneled Valley Bottom; and • Transformed Areas. <p>The data gathered during the site visit indicate that the Mixed Grassland Habitat Unit is of Moderately Low Sensitivity, the Freshwater Habitat Unit is of Intermediate Sensitivity, and the Transformed Areas Habitat Unit is of Low Sensitivity. The proposed development will impact on these Habitat Units to varying degrees and is discussed in more detail in the specialist report.</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	 <p>The Remainder of the farm ALLANDALE 10 IR (RABIE RIDGE EXT 6)</p> <p>VEGETATION UNIT MAP</p> <p>Legend:</p> <ul style="list-style-type: none"> Wetland Vegetation Mixed Alien & Indigenous Vegetation Study Site 200 m Extended Study Area <p>GALAGO ENVIRONMENTAL Biodiversity & Aquatic Specialists</p> <p>Map compiled by: Rihann F. Geysler</p> <p>Scale 1:25000 0 75 300 450 600 750 m</p>	 <p>DISTRIBUTION OF HABITAT UNITS</p> <p>Study Area</p> <p>Terrestrial Habitat Units</p> <ul style="list-style-type: none"> Transformed Areas Mixed Grasslands <p>Freshwater Habitat Units</p> <ul style="list-style-type: none"> Unchannelled Valley Bottom Seep Wetland <p>Scale 0 0.45 0.9 km</p>
<p>Fauna</p>	<p>The study site was found to be ecologically disturbed in parts by small-scale cultivation of maize fields, over-grazing, veld fires, building rubble, encroaching urbanisation and neglect. These factors had a detrimental effect on mammal numbers and diversity. The small drainage line and the few rocky outcrops north of Dane Road, near Modderfontein Road were medium sensitive ecological systems. The 32 metre buffer zone for the wetland should be respected. The terrestrial habitat quality had been seriously jeopardised by small-scale cultivation of maize fields, over-grazing, veld fires, building rubble, encroaching urbanisation and neglect.</p>	<p>The study area is located within an extensively urbanised landscape. As such, the study area has already been subjected to a number of impacts relating to anthropogenic activities, including the disposal of household refuse and construction material and the transformation of areas from grasslands and wetland to agricultural fields. The study area is currently encompassed by urban areas and has resulted in the loss of habitat connectivity to larger natural areas in the region, whilst internal habitat transformation and roads has led to habitat fragmentation. The proposed development within the study area will result in further loss of habitat and loss/displacement of the</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	<p>A very important indirect effect would be the likely impact that the proposed development might have on the surface water runoff and water quality of the drainage line, which is a tributary of the Jukskei River. This could have a negative impact on mammal species. The north-western side of the study site enjoyed a fair degree of connectivity to undeveloped land, but the undeveloped terrain itself was already ecologically disturbed and was also surrounded by roads and residences. Connectivity in general is poor due to the busy roads and suburbs surrounding the study site.</p> <p>The study areas ecology will enter the final stages of a downward spiral towards local extinction, particularly on the terrestrial habitat. Considering the scale of the intended development, the loss/displacement of some mammals is a foregone conclusion, particularly that of terrestrial species, but in the overall picture of the affected species, it will be minimal.</p>	<p>remaining species which inhabit the study area. Although this habitat and species diversity loss is unavoidable, the overall impact is unlikely to lead to significant alterations / impact to species populations in the greater region, as the study area is not considered to be a core home range for fauna.</p> <p>No faunal SCC were observed or are expected to occur within the study area.</p>
Herpetofauna	<p>Special attention had to be given to the habitat requirements of all the Red Data species, which may occur in the area. This survey focused on the current status of threatened herpetofauna species occurring, or which are likely to occur on the proposed development site, and a description of the available and sensitive habitats on the site.</p> <p>During the site visits, reptiles and amphibians were identified by visual sightings through random transect walks. Amphibian diversity was also established by means of acoustic identification. No trapping was</p>	<p>The study area itself is unlikely to host a herpetofaunal diversity as indicated by the Animal Demography Unit (ADU) Virtual Museum (VM). The records thereof are from a far larger scope of area, with many of the records pre-dating the extensive urbanisation of the region. Although the wetlands and grasslands were extensively searched, no amphibians were observed, though it is acknowledged that such species are difficult to detect during surveys of limited duration. The wetland systems, considered ideal habitat for amphibians, were notably devoid of amphibian activity, with no signs</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	<p>conducted, as the terms of reference did not require such intensive work. As the majority of reptiles and amphibians are secretive, nocturnal and/or poikilothermic or seasonal, distributional ranges and the presence of suitable habitats were used to deduce the presence or absence of these species based on authoritative tomes, scientific literature, field guides, atlases and databases. This can be done irrespective of season.</p> <p>During the visit the site was surveyed and assessed for the potential occurrence of Red Data species such as:</p> <ul style="list-style-type: none"> ▪ Giant Bullfrogs (<i>Pyxicephalus adspersus</i>); The Striped Harlequin Snake (<i>Homoroselaps dorsalis</i>); and The Southern African Python (<i>Python natalensis</i>). <p>The results of the faunal assessment were as follows: The wetland area and its 32m buffer zone should be regarded as sensitive. Except for a few vagrant giant bullfrogs which may use the site for feeding and aestivation, no Red Data herpetofaunal species should occur on the study site. Ecologically, the study site is in a downward spiral. The study site has been ecologically disturbed in parts by small-scale cultivation of maize fields, over-grazing, veld fires, building rubble, encroaching urbanisation and neglect. These factors have a detrimental effect on herpetofaunal numbers and diversity.</p> <p>If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have</p>	<p>of tadpoles or frogs within the shallow pools or inundated areas. It is however likely that several common amphibian species will occur within the study area, notably species often observed in and around urban areas, namely <i>Sclerophrys capensis</i> (Raucous Toad), <i>Sclerophrys gutturalis</i> (Guttural Toad) and potentially <i>Kassina senegalensis</i> (Bubbling Kassina).</p> <p>Reptiles are equally hard to detect during assessments of limited duration. Areas of known reptile refuge (rock/rubble piles) were actively searched; however no species were observed. Although no reptile species were observed, it is likely that the study area supports several common reptile species such as <i>Trachylepis punctatissima</i> (Speckled Rock Skink), <i>Panaspis wahlbergi</i> (Wahlberg's Snake-eyed Skink), <i>Pachydactylus affinis</i> (Transvaal Gecko), <i>Lycodonomorphus inornatus</i> (Olive House Snake) and <i>Boaedon capensis</i> (Brown House Snake).</p> <p>Amphibian and reptiles species will likely make use of the fragmented wetland systems as corridors for movement, however they will likely also traverse through the grasslands, although the urban boundaries will likely limit this movement. The study area has been subjected to varying degrees of impacts and habitat degradation, as such, only a limited diversity and abundance of herpetofauna area expected. The Galago 2014 report achieved similar results to this study, evident that habitat and species diversity has not improved since the initial</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	on the surface water runoff and water quality of the drainage line. This could have a negative impact on the herpetofauna.	<p>assessment. Habitat degradation due to continued anthropogenic activities and urban expansion is likely the primary reason for such.</p> <p>The Screening Tool indicated that a small section in the east of the study area is considered to have a medium sensitivity for Sensitive Species 12 (reptile). Post site assessment, it is evident that the study area does not contain suitable habitat for this species. In addition, the extensive urbanisation of the landscape and increased anthropogenic activities within the study area will preclude this species from the study area. In addition to this, there is a low to medium probability that <i>Pyxicephalus adspersus</i> (African Bullfrog) may occur in the study area.</p>
Invertebrates		<p>According to the VM, there are 31 Odonata records and 185 Lepidoptera records associated with the Quarter Degree Square. Such diversity can be expected for grasslands and wetlands within the region, notably where the data records date back as far as 1906. Urban development has subsequently led to habitat loss and fragmentation within the landscape, affecting insect populations, notably for specialist species. The study area did not appear to be particularly diverse in insects, however it is likely that not all species present were observed, as insects are small and can be notoriously hard to detect and sample. The wetlands and adjacent grasslands appeared to be the greatest abundance and diversity of insects. Insects are usually the most abundant macro-organisms within landscapes and often perform services vitally important for ecosystem functioning. A high</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
		<p>abundance and diversity of insects is generally accepted as being needed to help maintain healthy landscapes and ecosystems. In addition to the afore mentioned ecological importance, insects serve as important food resource for various other species. A low insect diversity abundance will invariably negatively influence other species abundances within the study area.</p> <p>The Animal Demography Unit (ADU) Virtual Museum further indicates that there are 16 Spider records and 6 Scorpion records associated with the QDS. No arachnid species were observed during the site assessment; however, this can be attributed to their often secretive nature, small size and tendency to avoid detection, notably during the daylight hours. Although not observed during the site assessment, it is likely that the study area will host several common spider species of the Genus <i>Oxyopes</i> (Grass Lynx Spiders) and Family Lycosidae (Wolf Spiders). Scorpions are notably hard to detect as they are predominantly nocturnal, seeking refuge in burrows and under rocks / fallen logs during the day. The study area may provide habitat to common scorpion species such as <i>Uroplectes triangulifer</i> (Highveld Lesser-Thicktail Scorpion).</p> <p>The Screening Tool indicated that a small section in the east of the study area is considered to have a medium sensitivity for <i>Clonia uvarovi</i> (Uvarov's Clonia: VU). The study provides unsuitable habitat for this species and as such, this species is unlikely to occur therein.</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
Avifauna	<p>The 2013 Galago Environmental CC avifaunal habitat scan (see Appendix 13) included a 500m buffer of adjoining properties which were surveyed for important avifaunal species and habitats.</p> <p>During the site visit, avifaunal species were identified by visual sightings or aural records along random transect walks. No trapping or mist netting was conducted, since the terms of reference did not require such intensive work. In addition, avifaunal species were also identified by means of feathers, nests, signs, droppings, burrows or roosting sites. Locals were interviewed to confirm occurrences or absences of species. The presence of suitable habitats was used to deduce the likelihood of presence or absence of avifaunal species, based on authoritative tomes, scientific literature, field guides, atlases and databases. This can be done irrespective of season.</p> <p>Two major avifaunal habitat systems were identified on the study area.</p> <p>Disturbed Grassland</p> <p>In 2013, 32% (± 183.8620 ha) of the total surface area of the study area (including the 500 m extended study area) consisted of disturbed grassland. Very little natural grassland was left. Large portions of the natural grassland had been ploughed by the local communities surrounding the study site to make room for small scale agricultural croplands and as a result, the small pockets of natural grassland became highly fragmented and are furthermore surrounded by</p>	<p>Pentads 2600_2810 and 2600_2805 were consulted as part of the Avifaunal assessment of the study area. The study area was notably dominated by grassland and wetland associated avifauna common to the region. The wetlands and degraded grasslands provide suitable habitat and food resources to avifaunal species, however, due to the increased human activity and movement through the study area, the study area is not considered suitable for nesting. As such, species likely only forage within the study area, opting to move and nest in other, safer localities in the surrounding areas. Food resources are more plentiful in the wetlands and mixed grasslands, supporting insectivorous, herbivorous and granivorous species as well as common raptors. Avifaunal species are less restricted than other species in terms of habitat connectivity, and many species likely move between the study area and the surrounding areas in accordance with habitat suitability and availability of food resources. The above results are considered comparable to that of the Galago 2014 report had. It is evident that habitat loss and anthropogenic activities were impacting mammal abundances and diversity in 2014, and such has continued to present day.</p> <p>The Screening Tool indicated that a small section in the east of the study area is considered to have a high sensitivity for <i>Tyto capensis</i> (African Grass-owl, VU). Following the site assessment, it is evident that this area, including the rest of the study area, is not suitable for the habitation of these species. According to the South African Bird</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	<p>development. A drainage line runs through the middle of the southern portion of the study site but in terms of avifauna, the species diversity within the drainage line will not differ significantly from the surrounding grassland. The drainage line consists of 0.5% of the total surface area of the study area.</p> <p>The conversion of grassland into cultivated fields has a negative impact on natural grasslands. The only species that could still benefit from the 2013 state of the disturbed habitat were bishops, widowbirds, waxbills, cisticolas and prinias, that forage and breed within the grass but feed among the plants that have been established on these cultivated fields. Aerial feeding birds such as martins, swifts and swallows will hunt for insects over these cultivated fields.</p> <p>Disturbed and Transformed Areas: In 2013, 68% (± 393.2700 ha) of the total surface area of the study area consisted of areas that had been disturbed and transformed by man to make space for urban development and mainly consists of housing developments with mixed exotic and indigenous garden vegetation. These areas also included recreational areas, sport fields and parks.</p> <p>Rural and suburban gardens have created an evergreen habitat for many bird species, where birds can hide, breed and forage for food. Natural predators such as snakes and smaller wild-cat species, which largely are persecuted by man, have been driven out of these areas,</p>	<p>Atlas Project (SABAP2), the last record for <i>Tyto capensis</i> for the associated pentad (2600_2805) was in 2017. Habitat degradation and the ongoing loss of habitat combined with threats from the surrounding communities is considered to be the major limiting factor for avifaunal SCC within the study area.</p>



	2013 Galago Environmental Report	2022 Terrestrial biodiversity assessment
	<p>making it a relatively safe environment for birds apart from domestic cats and dogs.</p> <p>Red Data Species None found on site</p>	
Terrestrial Ecological Sensitivity of the Study Area	<p>A significant portion of the study area comprised the Transformed Grassland Habitat Unit, which had been transformed as a result of historical agricultural activities, which in turn had led to a decrease in floral and faunal species diversity. This habitat unit was considered to have low ecological sensitivity. The Wetland Habitat Unit plays an important role in ecological functioning and provides good habitat and migratory/ dispersal potential for faunal and floral species. This habitat unit is thus considered to be of high ecological sensitivity and care should be taken to minimise the impact on these areas during the various development phases.</p> <p>The floral, faunal and herpetofaunal sensitive areas were all located within the conserved HGM 1 and 2 wetlands located in the southern central portion of the site. HGM wetland units 4 and 5 have not been accommodated in the final township layout plan, due to their fragmented nature, and their low Ecological Importance and Sensitivity Scores.</p>	<p>The Screening Tool identified the Study Area to be in a Medium and High Sensitivity area for the Animal Species Theme (for SCC). Based on the <i>ground-truthed</i> results of the site visit, the high sensitivity indicated by the screening tool for faunal SCC is not supported, nor is the medium sensitivity with specific respect to faunal SCC that may be associated with the study area.</p>



F 2.7 Agricultural Assessment

Scientific Aquatic Services (SAS) CC was appointed in 2015, to conduct an Agricultural Potential assessment for the proposed Rabie Ridge X 7 mixed township development. Please see Appendix 5 for the full specialist report.

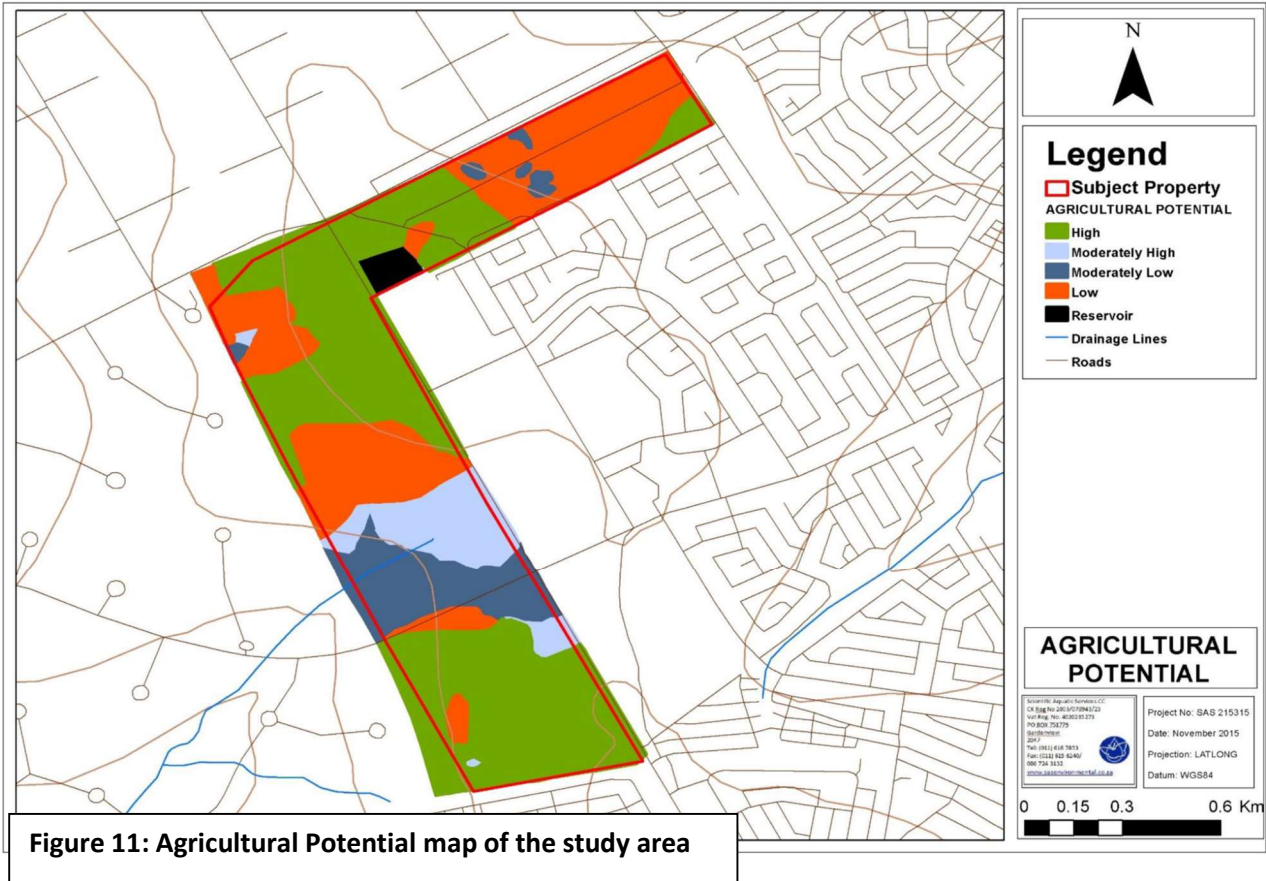
The desktop assessment indicated that the subject property comprises of moderate Land Capability (class IV), with marginal potential for arable agriculture. This suggests that the entire subject property is considered suitable to arable agriculture, however with considerable soil depth limitations. However, the 2014 Gauteng Conservation Plan version 3.3 (C-Plan v.3.3) indicated that the subject property was dominated by low agricultural potential soils of moderate (class IV) land capability. This was most likely due to urbanisation in the area, and relatively small proportion of arable land for sustainable agricultural production.

The majority of the identified soils were classified as Land Capability class III, comprising of Cv and Hu soils, collectively constituting approximately 48.4% (56.7 ha) of the subject property. These soils are considered to be of high agricultural potential. Whereas the identified Av, Pn, and Lo soils were classified as class VI land capability class, collectively constituting approximately 9.4% (11.1 ha) of the subject property. The Av Pn, and Lo were therefore considered to be of moderate-high agricultural potential, as their imperfectly drained nature is known to be considerably beneficial for some deep rooted crops under drought conditions where irrigation water is scarce; hence the common exploitation of these soils for maize production in the Highveld region.

The remainder of the subject property comprises of low agricultural potential soils.

It was the specialist's opinion that the relative extent of the soils with arable agricultural potential identified within the property is unlikely to justify the acquisition and maintenance of essential farm implements, and the extent of these soil is therefore considered unlikely to sustain viable crop production at a commercial scale. With the currently extensively urbanised surrounding area, the likelihood of larger tracts of land being combined into a viable agricultural land use unit is unlikely, and it is deemed more likely that the even in the surrounding area will undergo further and increasing levels of subdivision in the future. These soils are therefore at best well suited to subsistence farming. It is therefore of the specialist's opinion that the proposed mixed land use can be considered favourably from an agricultural potential aspect, provided the recommended mitigation measures are implemented during the execution of this project to prevent impact on adjacent soils.





F 3 Social Environment

F 3.1 Social Amenities

A 2016 Social Impact Assessment (SIA) was conducted for this project. Please see Appendix 20. This Social Impact Assessment has been updated for the present 2022/2023 S&EIR application see Appendix 21. The following information has been extracted from the SIA:

The proposed Rabie Ridge Ext. 7 development is divided into an eastern and western section. The eastern section is situated to the east of Modderfontein Road and to the south of Republic Road. Both the eastern and western sections of the proposed development (west of Modderfontein Road) fall within Ward 110. Rabie Ridge township, however is divided between Ward 110 and Ward 80. The main socio-economic challenges faced in Ward 110 relate to unemployment and the provision of affordable housing.

Infrastructure and Services in the wards

Basic Service Delivery

The majority of households in Ward 80 use electricity for cooking, and heating purposes followed by the use of paraffin. A similar situation prevails in Ward 110. With regards to lighting, the households of Wards 80 and 110 mainly use electricity, followed by candles¹.

¹ www.statssa.gov.za



Within the CoJ, the number of households with access to piped water has increased tremendously however some informal settlements still lag behind. There is a great improvement in the number of people that use proper sanitation system. Within Ward 80, 49% of the households have access to piped water inside their yard, and 23% households have access to piped water inside the dwelling. 21% of households have access to piped (tap) water on the community stand or a distance of less than 200m from the dwelling/institution. The situation in Ward 110 is better with 58% of the households having access to piped water inside their yard and 39% having access to piped water inside the dwelling.

The residents of the President Park and Austin View Agricultural Holdings, however are still reliant on borehole water for drinking purposes. The majority of households (16 158) (85%) in Ward 80 are supplied with a flush toilet connected to the sewerage system, and in Ward 110 this figure raises to 93%. In Ward 80, 90% and in Ward 110, 99% of the refuse is removed once a week in accordance with the Municipality's refuse removal scheme for suburban areas. The occupants of the Rabie Ridge area, as well as the agricultural holdings thus generally have access to basic services and established infrastructure.

Transport

The study area is surrounded by a well-developed road infrastructure, which includes the Modderfontein/M38, Republic Road, Boundary Road and Dane Road. Recent road upgrading and resurfacing were undertaken in the area. Region A also has diverse transportation modes ranging from and dominated by taxis and buses that serve the residents and workers in the area. It is, however, imperative to link the different areas by means of public transport to ensure ease of access to employment opportunities.

Recreational Facilities

The poorer areas to the east of Midrand have fewer leisure amenities, but Ivory Park and Rabie Ridge have sports stadiums, while the latter also has a swimming pool. The sports stadium just east of Modderfontein Road and east of the proposed development is thus within the study area.

Educational Facilities

The following schools are situated in the study area and in close proximity to the proposed Rabie Ridge Ext. 7 development:

- My Way Primary School;
- Dulcie September Primary School;
- Dr. Mathole Motshekga Primary School;
- Maputha Secondary School; and
- Allanridge Secondary School.

The local councillor confirmed that the schools are overcrowded and that there is a definite need for additional schools in the area, but more specifically for secondary schools. It can be assumed that these schools have a teacher-learner ratio of approximately 1:30 or even more.

The proposed Rabie Ridge Ext. 7 mixed land-use development, with the increased population figures would significantly increase the need for early learning facilities for infants, as well as primary schools for younger schoolchildren and secondary schools. According to the 2011 statistics there are 5 013 children between the ages of 5 and 19 in Ward 80 and 10 926 in Ward 110. An estimate of 6 129 residential units



are planned in the Rabie Ridge X 7 development. Therefore, there would be a large number of school going children that would have to be accommodated in the area in the long term. While the issue of capacity applies equally to both high school and primary schools, the issue is more problematic for primary school learners due to the inability to travel unsupervised. Ideally a primary school should thus form part of the development.

As part of the development, various plans are being discussed with the aim of addressing the issue to a certain extent. The Rabie Ridge Ext. 7 township plan includes a planned orphanage and land will be allocated for the construction of a school.

- **Orphanage:** The orphanage will be operated and managed by the Amitofo Care Centre, an internationally operating entity which is focused on rearing and caring for orphans in Africa within the humanitarian and educational umbrella. This entity in association with its other charity institutions will jointly run/fund raise/manage the operations of the orphanage. Services provided will include an administration centre, children's dormitories, youth dormitories, preparatory school, kindergarten, library, activity centre, medical centre, vocational training centre and a religious centre.
- **Educational facilities:** An Educational erf has been provided for in the township layout plan.

Residents and pupils of Rabie Ridge and Ivory Park will benefit if the above options materialise, even if these schools are not developed as part of the first phase of the development. Should no additional schools be built, the significant increase in learner numbers, would result in existing school classes becoming even more overcrowded thereby negatively impacting on the learning experience and possibly on the learners' achievements. Additional infrastructure such as classrooms, furniture, recreational facilities and sanitation facilities would further be required at these schools which currently cannot be provided. Long term spill-over effects could also be felt at schools throughout the Midrand area.

As indicated above, there is a clear need for additional schools in the study area, due to the densification. Failure to address the educational needs could seriously hamper the success of the development and the long term socio-economic stability of the community.

Subsistence Agricultural Practise on site

According to the local Ward Councillor, the agricultural practices undertaken on site refer to individuals illegally using the open space to cultivate maize for subsistence purposes. One could argue that this opportunistic use of the resource is one of several different livelihood activities undertaken in the study area as the activities are not undertaken on a large scale. Construction activities would impact on this resource use which would be unable to continue over the long term. The development would thus impact on the resource and result in the end of the provisioning services (mealies). Due to the extent of the agricultural activities on site it is highly unlikely that the resource use served as the main cash income for households. Although the individuals involved in this practice are probably vulnerable to sudden changes such as the loss of possible earnings from the resource use, it should also be acknowledged that these opportunistic farming practices on vacant land was not lawfully implemented. These individuals would thus have to find other suitable land to enable them to continue their subsistence farming practices, thereby ensuring a continued food source and/or income.



F 3.2 Air Pollution

The study site is located adjacent to the existing high density Rabie Ridge and Ivory Park Townships. The air quality in the area is polluted from pollutant sources such as dust, smoke and ash outfall from burning waste dumps, wood and coal for cooking and heating, etc.

No formal study of the air quality in the study area will be undertaken, due to the non-noxious land uses of the Rabie ridge X 7 project. The upgraded living conditions of the residents will mean that the residents are provided with power, thereby eliminating their dependence on burning fossil fuels. Other detrimental practices which cause air pollution in the study area currently, includes the burning of waste and tyres.

F 3.3 Noise

Currently, no noise is generated on the site. Potential Noise sources created by the new development will be:

Construction Noise: During construction activities, people are often exposed to different levels of pounding, roaring, beeping and other loud noises from construction work. Construction noise abatement measures have been provided in the EMP, to ensure that the construction activities are not a source of excessive noise to the adjacent residents.

Operational Noise: Noise generated from the new development includes accepted urban sources of noise including traffic, school sirens, etc. These noise sources will not be a nuisance noise source.

F 4 Qualitative Environment

F 4.1 Visual Impact

According to the screening report for the site, based on the selected classification and the environmental sensitivities of the proposed development footprint, a landscape/visual Impact Assessment has been identified for inclusion in the Scoping and EIA assessment.

The proposed Rabie Ridge X 7 development will change the character of the site from an unbuilt, vacant area to a high-density residential area, including all affiliated township amenities. The disturbance of the environment during the *construction phase* will lead to temporary negative visual impacts. Properties closest to the development would be mostly affected, as well as commuters making use of Modderfontein, Republic, and Dane Roads. The construction site will be visible from some of the residents' dwellings located adjacent to the site. These impacts will be temporary in nature. The construction of the township will be phased over a long term. The area surrounding the site is already marred by other visual elements such as existing infrastructure (power lines, water tower, roads, illegal dumping, informal settlement), traffic movement, littering and human traffic across the site, as well as other townships, such as the existing Rabie Ridge, Ivory Park, Commercia, and Chloorkop/Phomolong. Although the formalised township buildings will be clearly visible, it is anticipated that the development will be accepted over time, as the inevitable extension of the above-mentioned existing townships. Vacant land owned by the province is either formally developed, or informally invaded. Formally planned development is the preferable option.



The constructed development (*operational phase*) will have a permanent visual impact. The most marked impact would be for the residents of the agricultural holdings to the north and west of the development. Such a high-density development with all the related infrastructure would disturb their viewpoints and change the character of their surrounding area significantly. It is fair to say that the proposed Rabie Ridge x 7 Mixed Land use development would not be aesthetically pleasing to the residents of the agricultural holdings. It would influence their sense of place (rural type of environment). However, considering that the site is earmarked for urbanisation, the development of the site in line with councils' high density housing strategies is inevitable. Where the high-density erven of the residential erven will incur the maximum level of visual change, building line setbacks from adjacent rural – residential land owners, and the orientation of buildings on the property must be such that the impact on the amenity and privacy of adjacent landowners is kept to a minimum.

The City of Joburg's development planning and urban management assert that the department is actively promoting higher densities across the city, and especially in areas that are well connected to existing and new public transportation networks. Higher densities mean greater efficiency in the use of land and bulk infrastructure, more viable public transport systems, and better levels of servicing for communities to support facilities such as schools, hospitals and libraries. Significant constraints in terms of bulk infrastructure and road capacity are being addressed.

To this end, no specialist visual impact assessment is deemed necessary for the development.

F 5 Socio Economic Environment

Demographics of a study area are important to ensure that new developments will complement/fit into the existing land uses. The following information was obtained from the SIA, see Appendix 21. Information from the City of Joburg Municipality's Integrated Development Plan (IDP) for 2012/2016 has also been used to complete this section.

The administration of the City of Johannesburg Metropolitan Municipality has been decentralised into 7 regions. Each region is operationally responsible for the delivery of health care, housing, sports and recreation, libraries, social development, and other local community-based services. The study area of Rabie Ridge Ext 7 falls under Region A. Region A is the northern gateway to the city, combining the best of urban and rural living. The western part of the region is characterised by open space and is predominantly made up of agricultural holdings and large tracts of undeveloped land. Two substantial townships, Ebony Park and Ivory Park, are situated on the region's western and eastern borders. The eastern part of the region is characterised by townhouse developments and cluster villages, as well as large agricultural holdings. With easy access to the Johannesburg inner city, the West Rand, Pretoria central business district and Ekurhuleni, Region A is ideally placed for metropolitan economic development.

Social Profile:

Population Figures

Region A is home to more than 250 000 residents, most of whom are concentrated in Midrand. Unemployment levels in most settlement are above 50% and more than 70% of the residents live below the poverty line. In the Midrand area, approximately 70% of residents earn less than R2500 a month,



while 34% earn no income at all. According to the Census 2011 figures, the total population within Ward 80 is 28 130 individuals and within Ward 110 it totals 56 947 individuals.

Age Groups and Gender

The population in the region is relatively young, with some 24 percent being between the ages of 20 and 29. While the formal residential areas are home to prosperous and well-educated residents, most of the people living in the townships and informal settlements are poor, with low levels of school education.

Education and Skills Levels

It is clear that the majority of the local population has some form of secondary schooling followed by those that have completed secondary school. It is thus highly likely that the overall skills levels in the local area are low. The municipality should thus embark on a programme to ensure a suitable environment for education and training. Efforts should also be focused on ensuring that learners complete their secondary education

Employment and Income

The high unemployment rate remains a challenge to the municipality and for the region as a whole. Priority should thus be given to addressing the issue. From the income profile of the residents in the area, it is clear that high levels of poverty exist. In Ward 80, 26% of the households have no income, while 5% of the households earn less than R4 800 per month. In ward 110, 19% of the households have no income and 2% of the households earn less than R4 800 per month².

Health and Community Health Services

The effects of HIV/Aids in the region has meant that health facilities have come under increasing pressure, leading to a need for an increased level of service provision and additional services such as counselling and support centres³.

Crime

The CoJ IDP states that “Johannesburg faces widespread insecurity and vulnerability across socio-economic groups; historical geographical, social and economic engineering inequities; together with current stresses and poor economic opportunities. This impacts significantly on the quality of life experienced due to high levels of crime and violence”. Based on this statement and local media reports it is thus implicit that the study area also experience high levels of crime. The nearest police stations to the study area are the Midrand Police Station, the Ivory Park Police Station, followed by the Tembisa Police Station.

Housing

Large numbers of residents in the jurisdiction of the CoJ still live in overcrowded informal settlements without adequate access to engineering and social infrastructure. Within the study area the issue of backyard shack rentals worsens the problem and due to the in-migration of outsiders to the area, this problem is not readily solved. In Region A, the number of informal settlements and housing backlog are still on the increase despite the implementation of the Housing Strategy. The need for well-located

² www.statssa.gov.za

³ City of Johannesburg Metropolitan Municipality: 2012/16 Integrated Development Plan: 2013/14 Review



housing developments that provides the poor with access to urban opportunities is prominent in this Region. The creation of sustainable human settlements therefore remains critical.

Local Economy

Midrand, situated in the eastern part of Region A is one of the fastest economic growth points in the country. Strategically positioned between Johannesburg and Sandton to the south and Pretoria to the north, it attracts numerous investments in commerce and industry. Development trends in the region are towards hi-tech business, logistics, warehousing and distribution-related businesses and office space provision. Midrand plays a vital role in the conferencing and hospitality industry, being home to venues such as Gallagher Estate, Kyalami Exhibition and Conference Centre and the Eskom Conference and Exhibition Centre, with various hotels and other places of accommodation catering for visitors. Due to it being perceived as an economic growth point, the area is challenged by an in-migration of people in search of employment. One of the major constraining factors to the economy of Region A, however, is the fact that current employment opportunities within the Region require intensive skilled labour force and this is in contrast with the skills profile of the Region.

The CoJ should thus ensure economic growth by creating an enabling environment, enhancing economic capacity, and leveraging private investment in order to create jobs and increase the tax base.

Local Economic Contribution of the Rabie Ridge X 7 Development

The Rabie Ridge Ext. 7 mixed land use development will create a significant demand for building material and services. During the construction phase some local economic benefits may thus be realised through the purchase and/or contract of local goods and services associated with the construction industry such as concrete, bricks, pipes, glass and wood, thus stimulating production in these industries. It is anticipated that the direct benefits in terms of building materials and so forth would be experienced on a regional scale as it would probably be sourced from suppliers or manufactures located throughout the Midrand and Gauteng area. This positive spin-off could also be extended over a number of years in light of the possible phased construction approach.

F 6 Heritage and Palaeontological Resources

In 2014, an independent heritage consultant was appointed to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features, or objects of cultural heritage significance occur within the boundaries of the area where the development is planned. Please see Appendix 22 for this specialist report. The findings of this report include the following:

Stone Age

No sites, features or objects dating to the Stone Age were identified in the study area.

Iron Age

No sites, features or objects dating to the Iron Age were identified in the study area.

Historic period

No sites, features or objects dating to the historic period were identified in the study area.



The site visit undertaken by the Specialist confirms that the largest extent of the proposed project site is found to be of very low heritage sensitivity. This does not mean that no heritage resources will be present in these very low sensitive areas, but the probability of resources of high cultural significance being found there are highly unlikely. From a heritage point of view it is recommended that the proposed development be allowed to continue, on condition of acceptance of the proposed mitigation measures. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

No Palaeontological assessment was recommended by the specialist.

F 7 Civil Aviation

Figure 12 indicates the Civil Aviation theme sensitivity as assigned by the Screening Tool.



The sensitivity of this theme affecting the project site is classified as medium to high for the following features:

Sensitivity	Feature(s)
High	Within 15 km of a civil aviation radar
High	Between 8 and 15 km from a major civil aviation aerodrome
High	Within 8 km of other civil aviation aerodrome
Medium	Within 5 km of an air traffic control or navigation site
Medium	Between 15 and 35 km from a civil aviation radar
Medium	Between 15 and 35 km from a major civil aviation aerodrome

The Grand Central Aerodrome is located 4.5km south-east of the study area. OR Tambo International Airport, Lanseria International Airport, and Rand Airport are all located more than 20km from the study



area in various cardinal directions. No specialist assessment will be conducted for this theme, as the nature of the development will not negatively impact on overhead aircraft. The height of the residential erven will not be an influencing factor and, provided the development does not make use of large reflective surfaces, the safety of civil air navigation will not be impacted by the development. Similarly, aircraft noise has not been raised as a factor for the ground users in the local region.

F 8. Environmental Composite Map

The preferred township layout plan, [Figure 2 of this report], has been configured to incorporate the various environmental characteristics and areas of significance that must be taken into consideration. The preferred township layout plan, indicates the following in relation to the proposed development site:

- 1:100-year flood line delineation;
- Storm water attenuation ponds;
- Adequate open space; and
- Wetlands with buffer areas to be conserved in the development.

See figure 13 for the Environmental Composite Map of the proposed township.

SECTION G: ALTERNATIVES

One of the objectives of the S&EIR process is to investigate alternatives to the proposed project. The Integrated Environmental Management procedure stipulates that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a reasonable number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. To ensure that the proposed development enables sustainable development, *reasonable* and *feasible* alternatives must be explored.

G.1 Reasonable and Feasible alternatives

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process. Alternatives are considered as a *norm* within the Environmental Process. Alternatives should include the consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The no-go alternative must also in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

“Alternatives”, in relation to a proposed activity, refers to different means of meeting the general purpose and requirements of the activity, which may include alternatives to;

- a) the property on which or location where it is proposed to undertake the activity.
- b) the type of activity to be undertaken.
- c) the design or layout of the activity.
- d) the option of not implementing the activity.



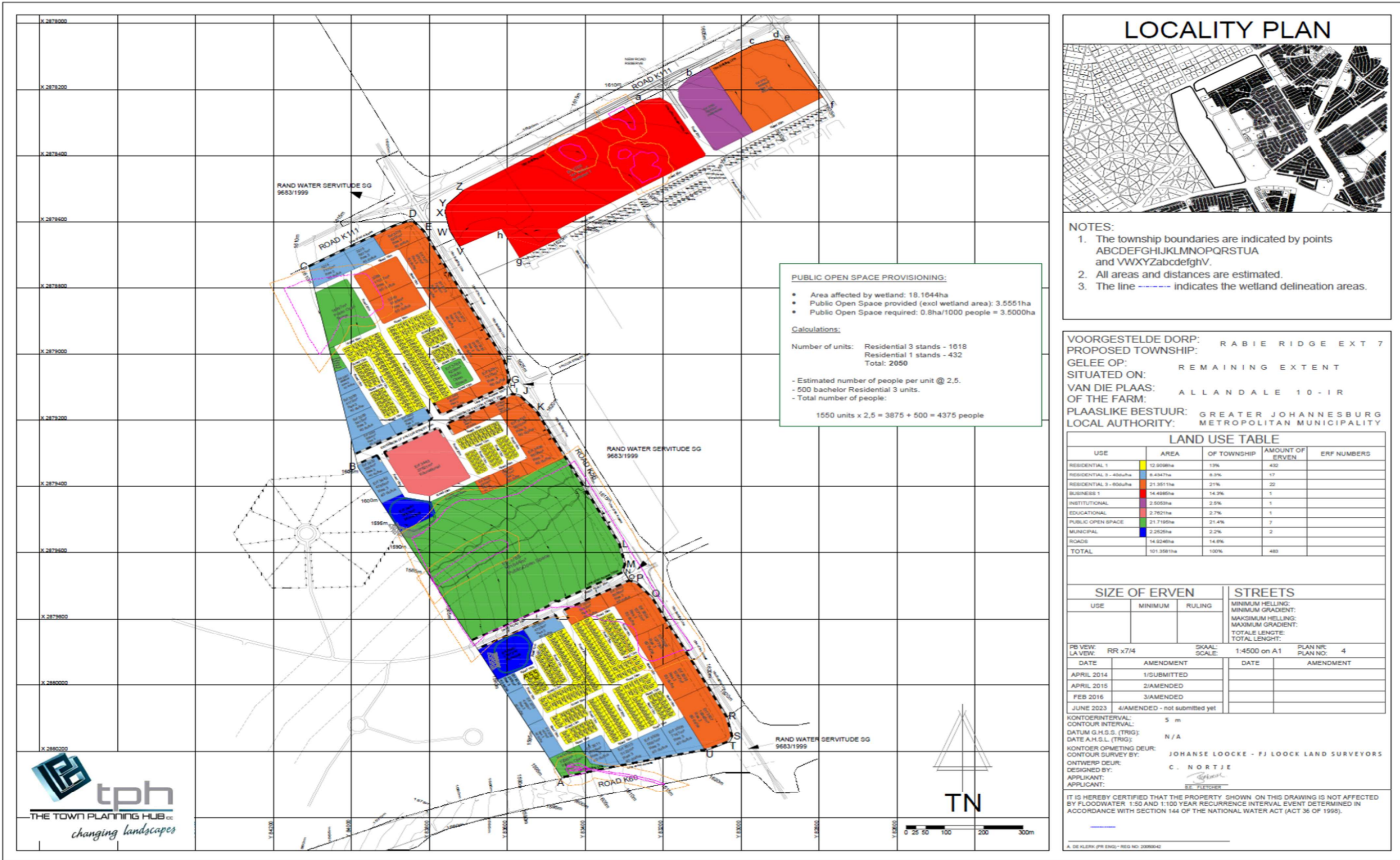


Figure 13: Environmental Composite Map



G.2 Fundamental alternatives

Fundamental alternatives are developments that are *totally* different from the proposed project description and include the following:

- Alternative property or location where it is proposed to undertake the activity.
- Alternative type of activity to be undertaken.
- Alternative technology to be used in the activity.

G.3 Incremental alternatives

Incremental alternatives relate to *modifications* or *variations* to the *design* of a project that provide different options to reduce or minimise environmental impacts. There are several incremental alternatives that can be considered, including:

- Alternative design or layout of the activity.
- Alternative technology to be used in the activity.
- Alternative operational aspects of the activity

G.4 No-Go Development

The EIA process is obligated to assess the status quo (i.e. the “No-Go” option). The No-Go alternative provides the assessment with a baseline against which predicted impacts resulting from the proposed development may be compared. A “No-Go” alternative has been assessed for the development.

G.5 Analysis of alternatives

The alternatives considered for the proposed Rabie Ridge Extension 7 mixed Land use Township include location alternatives, land use alternatives (including the No-go option), and layout alternatives.

A summary of the alternatives assessed is provided in Table 8 below. Table 9 illustrates the methodology used to assess the identified alternatives. The table assesses the advantages and disadvantages and provides further comments on the selected alternatives.

Table 8: A summary of the alternatives that were assessed.

Alternative level	Alternative	Description
Property or location	1 alternative) (Preferred	Current proposed site
	2	None identified.
Layout alternatives	1 alternative) (Preferred	Current proposed layout accommodating the 2013 SEF wetland delineation, as approved by the COJ
	2	Township layout accommodating the 2022 SAS wetland delineation, including all wetland features on the site
Land use alternatives	1 (Preferred alternative)	Mixed Land Use Township
	2	Single Land Use: Housing only
Technology alternatives	1 (Preferred alternative)	Alternative technologies for methods of construction, energy provision, water management and waste management



	2	Conventional methods of construction, energy provision, water management and waste management are
No-go option	1	Current land use of the proposed sites is mainly rural grazing and subsistence agricultural land.



Table 9: The alternatives for the Rabie Ridge x 7 Project

Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
Property or location (Fundamental location alternative)	Alternative location 1 - Current proposed site (preferred alternative).	<ul style="list-style-type: none"> - The property belongs to the applicant. - The property has an inner-city location which is environmentally, socially and economically viable. - The project aims to improve the housing and working environment of the local people, and to enhance service delivery. - The site was chosen many years ago based on the following criteria: population density, available capacity of infrastructure, the housing backlog in the area, and the potential retail catchment area. - The project will stimulate economic growth in the area. 	<ul style="list-style-type: none"> - Removal of indigenous vegetation. - Wetlands affected. 	YES	NO	<p>The present project location has no bio-physical fatal flaws.</p> <p>A critical flaw presently being addressed by the applicant is the lack of electrical supply to the development.</p> <p>In terms of the socio-economic environment, if the township can be sustainably serviced (water, power, sewer), no fatal flaws are anticipated.</p>



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
	Alternative location 2 – None identified.	N/A	N/A	N/A	N/A	No alternative location will be assessed in the impact assessment.
Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
Land Use (Fundamental location alternative)	Alternative Land Use 1 - Current proposed Mixed Land Use (preferred alternative): The preferred land use proposal for the RRX7 development is predominantly housing, with complimentary land uses such	<ul style="list-style-type: none"> - Mixed land use developments can create more vibrant and diverse communities, with a variety of amenities, services, and activities in close proximity. This can enhance the quality of life and promote social interaction. - Mixed land use developments can be more walkable, with shorter distances between homes, businesses, and public spaces. This can promote 	<ul style="list-style-type: none"> - Mixed land use developments can increase noise and pollution levels, as different land uses may have different operating hours, equipment, and environmental impacts. This can result in reduced quality of life and negative health impacts for residents. - Mixed land use developments can lead to increased 	YES	NO	The proposed mix use development has been discussed with the council planning office, and is responsive to the Local Municipality's requirements in terms of open space provision, providing educational erven, and accommodating the local environmental authorities wetland targets. The mixed land use proposal achieves a balance between environmental, social and economic requirements. The mixed land use proposal is seen as the optimal utilisation



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
	<p>as Business, Institutional, Municipal, and Educational.</p>	<p>active lifestyles, reduce reliance on cars, and support local businesses.</p> <ul style="list-style-type: none"> - Sustainability: Mixed land use developments can be more sustainable, with reduced travel distances, shared infrastructure, and more efficient use of resources. This can reduce environmental impacts, enhance resilience, and lower costs. - The following aspects will be addressed within the proposed developments planning to adequately cater for service provision and management of on-site alterations to the land character: <ul style="list-style-type: none"> • Retention ponds for storm water management purposes 	<p>traffic congestion, as people need to travel further to access different activities and services. This can result in higher transport costs, longer travel times, and reduced productivity.</p> <ul style="list-style-type: none"> - Mixed land use developments may have limited property value growth, as some people may prefer single land use developments or homogeneous neighbourhoods. This can result in lower demand and lower prices for mixed-use properties. - Mixed land use developments can increase the potential for conflict between different land uses, as 			<p>of land to promote an accessible development.</p>



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<p>will be provided on the various erven</p> <ul style="list-style-type: none"> • Internal road reticulation will be provided to adequately feed all proposed facilities. • External road reticulation and intersections will be improved where necessary, according to the Traffic Impact Assessment. • Sewer and water reticulation services in the area will be improved where necessary, according to the Civil Service Reports. 	<p>they may have different interests, priorities, and impacts.</p>			
	<p>Alternative Land Use 2 – Single Land Use,</p>	<p>- Efficiency: Single land use developments can be designed and optimized for specific purposes, such as residential,</p>	<p>- Single land use developments can limit their flexibility to adapt to changing market conditions,</p>	<p>YES</p>	<p>NO</p>	<p>The result of a single land use development will not have social responsibility, economic sustainability. Alternative land</p>



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
	Residential only	<p>commercial, or industrial. This can result in more efficient use of space, infrastructure, and resources.</p> <ul style="list-style-type: none"> - Reduced Conflict: Single land use developments may have fewer conflicts between different land uses, such as noise complaints, traffic congestion, or incompatible activities. - Predictability: Single land use developments can be more predictable in terms of property values, land use regulations, and market demand. This can provide more certainty for developers, investors, and buyers. 	<p>demographics, or technological advancements.</p> <ul style="list-style-type: none"> - Increased dependency on private vehicles, as different land uses are often located far apart. This can lead to higher transport costs, traffic congestion, and air pollution. - Inefficient land use, as some land may be underutilized or not used at all. This can result in higher land costs, reduced density, and lower productivity. - Limited opportunities for social interaction, as people tend to interact more with those who share similar lifestyles and interests. This can result in social 			uses will not be assessed further.



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
			isolation and a lack of community cohesion. - Limited access to amenities and services, as people need to travel further to access them. This can result in higher costs, reduced convenience, and limited choices.			
Layout alternative (Incremental alternative)	Alternative layout 1 – Current proposed layout, see Figure 2.	The development of the preferred layout has been informed by the following: <ul style="list-style-type: none"> • Council’s planning requirements, ie. the inclusion of adequate open space and an educational erf; • Wetland systems on site; and • Layout relative to existing infrastructure, such as access roads; and servitudes. 	- Loss of wetlands	YES	YES	The preferred layout plan will be assessed in detail in this DEIAR.



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		The preferred layout plan has been informed by the full scope of technical, terrestrial, aquatic, socio-economic and geological studies conducted for this EIA, as well as the comments received from the COJ.				
	Alternative Layout 2 See Figure 7	- Conservation of <i>all</i> identified wetlands on site.	- Loss of space for housing and other proposed land uses	YES	YES	A high level hydrogeology and wetland soil study supports the omission of the small wetland areas on Westleigh soils in the northern section of the site. This is mainly due to their isolation and current complete degradation due to detrimental land activities (dumping of rubble and surface alteration). The Alternative Layout will not be addressed further in this EIA.
Technology alternatives	Alternative 1 Implementation of Alternative technologies	Conventional methods of construction, energy provision, water management and waste management are replaced with technology that, as an alternative to resource-intensive and	None	YES	YES	The need to incorporate technology into everyday building and site management has never been more important.



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<p>wasteful industry, aims to utilize resources sparingly, with minimum damage to the environment, at affordable cost and with a possible degree of control over the processes.</p> <p>Alternative technologies are paving the way building companies look at making new structures, whether that is a residential site, corporate building, or government establishment. As trends have evolved, there is also a need to incorporate greener practices into building methods, plus smart technology is also taking shape in construction practices.</p> <p>These trends will be shaping the future of the construction industry for years to come, so it is important for the applicant to look at some of the most prevalent changes that are coming into effect for a more efficient and sustainable building process.</p>				



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<p>Prefabricated buildings In a world which is increasingly looking towards more cost-effective building materials, prefabricated and modular buildings are the answer to a changing economic climate, particularly in the business world. A specially created modular structure offers a toolkit and building blueprint to help one get started, and can usually be constructed in a short space of time with efficiency and precision. Each element is made to fit exact specifications and saves time and money in the long-term. These buildings are also able to be relocated easily.</p> <p>The use of mobile technology As all industries see the increase of mobile technology to improve productivity, the construction sector is starting to make use of this innovative tool. Mobile</p>				



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<p>technology is helping to shape the processes and methods of traditional building practices and streamline them with other areas of the business for greater visibility. Everything can be managed from software systems, and each person on a project has responsibility for the process within the job. All systems can function under one hub and includes everything from tracking and assigning tasks to reporting, which can be seen and evaluated by managers and employees for effective communication and dispute resolution.</p> <p>Incorporating green practices Green or sustainable buildings are a major talking point throughout the industry and have been a big focus for government targets. As concern for the environment and how the industry impacts on it grows, constructing green buildings is</p>				



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<p>high on the agenda for many firms. Buildings that incorporate renewable energy is also the way forward, as the government aims to incorporate this type of energy into residential and commercial properties rather than dirtier fuel types.</p> <p>The construction of the development will be at the forefront of major change in the building industry. which include but will not be limited to:</p> <ul style="list-style-type: none"> - Structural elements - Thermal and energy performance and/ or efficiency of material - Water penetration - Quality management system - Cost and design - Alternative energy sources 				



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
		<ul style="list-style-type: none"> - Alternative water management systems - Green buildings and Green infrastructure etc - Innovative building systems in terms of human settlements designs and delivery processes - Use of new materials in building houses - New ways or methods of applying traditional materials - Improvements in designs to enhance functionality of a house - System designs (designing for energy efficient house) - Performance based design-fit for purpose. 				
	<p>Alternative 2 Conventional methods of</p>	<p>None.</p>	<p>Conventional methods of construction, energy provision, water</p>	<p>YES</p>	<p>NO</p>	<p>The site must be developed with sustainable principles and</p>



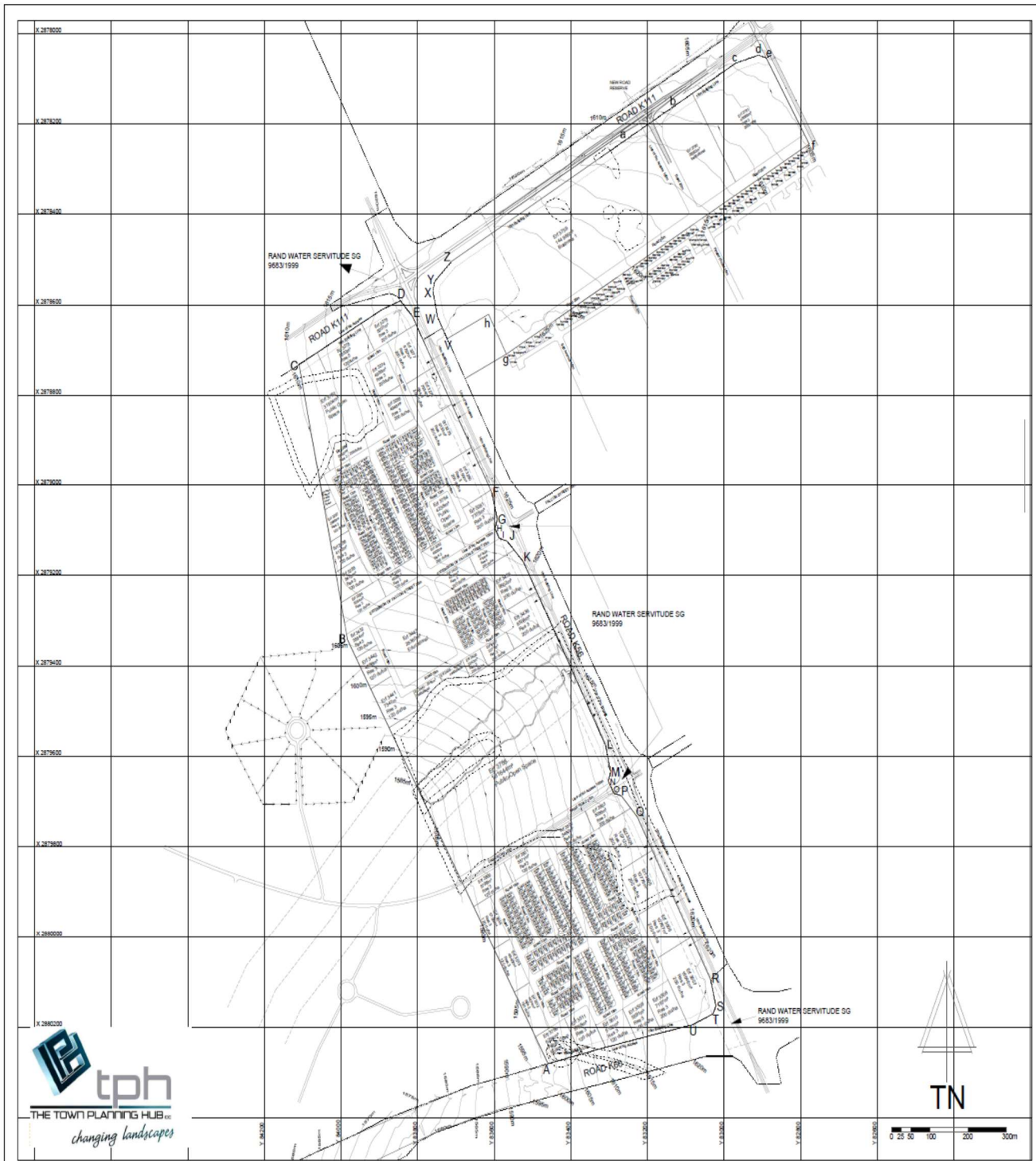
Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
	construction, energy provision, water management and waste management		management and waste management are not in line with current day sustainable thinking and is not recommended for this project.			current day state of the art technologies.
No-go option The continuation of the existing land use (i.e. maintaining the status quo) of undeveloped land		<ul style="list-style-type: none"> - The wetlands on site will not be impacted. 	<ul style="list-style-type: none"> - Less job creation. - Will negatively affect socio-economic development in the region. - The risk is present that the site will be impacted by indiscriminate informal settlement, illegal site invasion, and dumping. - The study area is currently owned by the Gauteng Department of Human Settlements. The existing land use does not provide formal housing, or 	YES	YES	The 'do nothing' alternative or keeping the current status quo of no activities occurring on-site, also provides the baseline against which the impacts of other alternatives should be compared. Will be assessed further in the impact assessment process. Due to the pressure and demand for the opportunities that the mixed land use development will bring to the area, and given the fact that the site will eventually degenerate if left unmanaged, and the fact that it is unsuitable to be utilised for large scale, profitable grazing or agricultural purposes, it is reasonable to state that the no-go option is less



Alternative level	Alternatives	Advantages	Disadvantages	Reasonable and feasible	Further assessment	Comment
			<p>employment opportunities to residents in the area. Should the proposed development not proceed, the land will remain underutilized, with no additional job creation and no contribution to economic development and social upliftment within the region.</p>			<p>favourable than some of the other options presented.</p>



Figure 7: Alternative Township Layout 2: Conserving all the wetlands on site.



Conclusion and recommendations for the alternatives considered for the application

The property was selected as the applicant seeks to rezone and subdivide the property to establish a mixed-use development. The selection of the development footprint followed a precautionary approach, to ensure that any unacceptable environmental impacts related to the proposed development are avoided as far as possible. This avoidance approach reduces the degree of mitigation required to ensure that potential environmental impacts are within acceptable levels. This approach was achieved by appointing specialists to undertake constraints and sensitivity analysis for the entire study area to inform the scoping & EIA process. These constraints identified were used to determine the areas acceptable for development from an ecological, freshwater resource, archaeological, groundwater, agricultural, heritage, and socio-economic perspective, ensuring potential impacts are kept to an absolute minimum.

A mixed-use development allows for a variety of amenities and conveniences to the residents, and is the preferred option. The development must implement alternative technologies as a standard practise. Alternative energy sources is the only alternative for the township.

All environmental impacts and risks identified are discussed in Section J of this report for the preferred layout, Figure 2.

SECTION H THE PUBLIC PARTICIPATION PROCESS (PPP)

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation, and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted and involved, their opinions are taken into account, and a record of their comments is included in the reports submitted to relevant authorities. The process aims to ensure that all stakeholders are provided an opportunity as part of a transparent process, which allows for a robust and comprehensive environmental study. The PPP for any development project needs to be managed properly and according to best practises in order to ensure and promote:

- Compliance with international best practise options;
- Compliance with national legislation;
- Establish and manage relationships with key stakeholder groups; and
- Encourage involvement and participation in the environmental study and authorisation / approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Provide an opportunity for I&APs to obtain clear, accurate and comprehensible information about the proposed activity, its alternatives or the decision and the environmental impacts thereof;
- Provide I&APs with an opportunity to indicate their viewpoints, issues and concerns regarding the activity, alternatives and / or the decision;
- Provide I&APs with the opportunity to suggest ways of avoiding, reducing or mitigating negative impacts of an activity and enhancing positive impacts;



- Enable the applicant to incorporate the needs, preferences and values of I&APs into the activity;
- Provide opportunities to avoid and resolve disputes and reconcile conflicting interests;
- Enhance transparency and accountability in decision-making;
- Identify all significant issues for the project; and
- Identify possible mitigation measures to minimise and / or prevent environmental impacts associated with the project.

The PPP for the RRX7 project has been undertaken in accordance with the requirements of the NEMA, as well as in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project.

H 1 Initiating the Public Participation Process; Public participation during the Scoping Phase

The public participation process followed during the *Scoping Phase* of the EIA included the following actions:

- Delivery of the Draft Scoping Report (DSR) to commenting authorities and key stakeholders (DWS, COJ Environment, ACSA, Ward Councillors, Residents Associations, ect), The availability of the Draft Scoping Report (DSR) was announced via an advert in the Midrand Report, circulating regionally, site notices, and email communication to interested and affected parties including government departments;
- Notifying adjacent landowners of the availability of the Draft Scoping report;
- Placing the BID and scoping report on the EAP website for review;
- All comments were addressed and incorporated into the Final Scoping Report.
- The final scoping Report was made available to the Registered Interested & Affected parties including organs of state and submitted to GDARDE at the same time.

The approach adopted for the scoping phase of the project, was to identify as many I&APs as possible initially, through a suite of activities, as follows:

- Placing advertisements in a local newspaper;
- Placing notice boards on site;
- Meeting and telecom with the councillors to inform them of the project;
- Providing written notice and a Background Information Document (BID) to potential I&APs including adjacent property owners, property owners associations, previously registered I&AP's, relevant municipal departments, ward councillors and relevant commenting authorities;
- Requesting potential I&APs to recommend other potential I&APs to include on the database; and
- Collaborating with the Social Impact Assessment to identify and engage with affected adjacent parties.

H 1.1 Identification of stakeholders

The identification of Interested and Affected Parties (I&APs) has been undertaken through the following:



Contacting IAP's through the distribution of the Background Information Document (BID):

A BID for the proposed project was compiled in English. The BID provided background to the proposed project and highlighted the legal requirements and EIA process to be followed for the project. A Response Form was attached to the BID, inviting I&APs to provide comments on the proposed activities, to identify any further I&APs who should be consulted, and to register on the I&AP database. The BID and Response Form were distributed via e-mail to I&APs on the 24th and 25th May 2022. A copy of the BID is included in Appendix 23.

H1.2 Newspaper advertisements

The formal announcement of the project was done by placing an advertisement in the Midrand Reporter, dated 26 May 2022. The change of applicant details was also advertised in the Midrand Reporter, dated 15 September 2022 as well. Proof of these advertisements were included in the approved Scoping Report.

The objective of the newspaper advertisement was to:

- Inform I&APs of the proposed project;
- Inform I&APs of the Scoping and EIA Application and the way in which I&APs could deliver any comments to the proposed development; and
- Invite I&APs to become involved in the proposed project by registering as I&APs
- Inform them of any changes to the project details, ie. Applicant details.

H 1.3 Site Notices

On-site notice boards were placed at highly visible locations on the site, on the 25th May 2022. The site notice contained information regarding the project, the applicant, locality description, property description, the public participation process and contact details of the environmental assessment practitioner. Photographs of the site notices were included in the approved Final Scoping Report.

H1.4 List of Authorities identified and notified

Relevant government departments, municipal departments and key stakeholders (adjacent property owners) were contacted to inform them of the proposed project and to obtain their issues and comments in this regard. See Appendix 24 for the database informed of this application.

H1.5 Other key stakeholders identified and notified

The following key stakeholders have been identified and notified of the proposed project:

1. Ward Councillors. SEC personally hand delivered BID's to the offices of both Councillors.
2. Individual Community members
3. Community Associations / Forums

Background Information Documents were provided to the IAP's via email. Due to the POPI Act, no names or contact details of members of the public have been included in the reports, only the issues raised. The DSR was made available on SEC's website at <https://publications.seedcrackers.co.za/>, and a hardcopy was placed at the Rabie Ridge Community Library, Korhaan Crescent, Rabie Ridge



Community Hall, Rabie Ridge, Johannesburg, from 25 May – 24 June 2022. I&APs had 30 days to submit their written comments on the DSR.

H1.6 Comment on the Scoping Report

The EIA Regulations specify that I&APs must have an opportunity to verify that their issues have been captured. Issues raised during the public review period of the Scoping Report, have been captured in the Comments and Response Report, Appendix 25 of this report. Comments received were addressed and/or incorporated into the Final Scoping Report. The final report was made available on EAP's website to all Registered I&AP. The report was also submitted to GDARD for decision-making.

Contact was made with representatives of the President Park Residents Association and Glen Austin/Austin View Residents Association to arrange project specific meetings. The aim of such meetings would be to gather specific information related to the social environment and insight into community and stakeholder perceptions with regards to the proposed development, as well as to note issues, comments and concerns pertaining to the proposed project. No such meetings could however be finalised, as the representatives did not confirm their eagerness to proceed with such meetings.

H 2 Public Participation During the EIA Phase

H2.1 Notices and Advertising

The availability of the Draft EIA Report has been advertised in The Citizen. In addition, notices have been placed on site to notify and invite I&AP to register and review the Draft EIA Report, and to provide comments as appropriate. Registered IAP's have been notified via Email notifications.

H2.2 Public Review of the Draft EIR

The Draft EIA Report has been made available for public review on SEC's website at <https://publications.seedcrackers.co.za>, from 19 July 2023 and ending on 18 August 2023.

H2.3 Organs of state and authority consultation

The availability of the report has been provided to the ward councillors, municipality and DWS. Other relevant organs of state will be notified of the availability of the report and directed to access the electronic versions on the website.

H2.4 Issues and Response Report

All comments and issues raised during the EIA phase of the public participation process will be addressed and incorporated into the Final EIA Report.

H2.5 Environmental Authorisation and Notifications

On receipt of the environmental authorisation, an email will be sent out to inform stakeholders and Registered I&APs of the authorisation, its associated conditions and the provisions for the appeal process.



SECTION I: SUMMARY AND RECOMMENDATIONS OF THE SPECIALIST ASSESSMENTS

This section provides a summary of the findings and impact management measures identified by all Specialist and an indication of how these findings and recommendations have influenced the proposed development.

I 1. Terrestrial Impact Assessment

Scientific Terrestrial Services (Pty.) Ltd. (STS) was appointed to conduct a terrestrial biodiversity assessment as part of the Environmental Authorisation process for the proposed mixed-use development at Rabie Ridge X7. The purpose of the study is to define the biodiversity of the Study Area from a conservation database perspective. It is furthermore the objective of this study, to provide detailed information to guide the fieldwork components to ensure that all relevant ecological aspects were considered prior to performing the field assessments.

Findings and Conclusion

Based on the results of the field investigation of 26th April 2022, three broad Habitat Units were distinguished for the Study Area:

- Mixed Grasslands;
- Freshwater Habitat: Seep Wetland; Unchanneled Valley Bottom; and
- Transformed Areas.

The data gathered during the site visit indicate that the Mixed Grassland Habitat Unit is of Moderately Low Sensitivity, the Freshwater Habitat Unit is of Intermediate Sensitivity, and the Transformed Areas Habitat Unit is of Low Sensitivity. The proposed development will impact on these Habitat Units to varying degrees and is discussed in more detail below.

The impacts ESAs associated with the Study Area are anticipated to be residual in nature, resulting in losses of floral habitat and diversity on a local to regional scale. For floral habitat and diversity, the construction phase will have the greatest impact, with the pre-construction and operational phases having more localised impacts if mitigation measures are implemented. Prior to mitigation measures implemented, the impact significance on floral habitat and diversity varies between Very low (Transformed Areas) and Low to Medium Low (Mixed Grassland and Freshwater Habitat Units). With mitigation measures implemented, the direct and indirect impacts on the floral habitat and diversity can be reduced to Very low (Transformed Areas) and Low (Mixed Grassland Habitat Unit) significance levels.

For floral SCC, without mitigation measures implemented, the anticipated impact significance on floral SCC communities varied between Very Low for the Transformed Areas Habitat Unit, Low for the Mixed Grassland and Freshwater Habitat Units. With mitigation measures implemented, the anticipated impacts on SCC can be reduced to Very low sensitivity for all Habitat Units.

The study area is located within a highly urbanised region and surrounded by extensive housing development. Several areas of the study area have been used as disposal grounds for both households and construction waste/rubble. Further, the local community has cleared extensive areas of ground for subsistence agricultural activities. These anthropogenic impacts and urban nature of the region has resulted in notable habitat fragmentation, impacting on habitat connectivity. As a result of these impacts and long-term land uses, faunal species diversity has been compromised, comprising only of



small common species which are better adapted to surviving in landscapes within an urbanised context. Similarly, faunal SCC are unlikely to occur within or rely upon the study area. The proposed development will result in the clearance of vegetation and the displacement of faunal species currently inhabiting the disturbance footprints, however, these impacts are expected to be largely localised and of decreased significance. Prior to mitigation measures being implemented, impact significance is expected to range from very low to medium low. Post mitigation, these impacts are expected to reduce to very low and low.

Recommended Mitigation Measures

See Section I and Appendix 20 for the mitigation measures provided by the specialist report.

It is the opinion of the ecologists that this study provides the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the Study Area will be made in support of the principle of sustainable development.

This study provides the Environmental Assessment Practitioner (EAP) and the relevant authorities with sufficient information to apply the principles of Integrated Environmental Management (IEM) and the concept of sustainable development. It is the opinion of the ecologist that, provided all mitigation measures are implemented, the proposed development is unlikely to lead to significant impacts to faunal communities or SCC within the region.

I 2. SEF Wetland Assessment

Strategic Environmental Focus (Pty) Ltd (SEF) was appointed by the 2013 applicant, to undertake wetland assessments, including wetland delineation and functionality studies, of the areas that will be potentially affected by the proposed development on Rabie Ridge Ext 7, on the Remainder of Allendale 10-IR, Gauteng.

Findings and Conclusion

Based on the findings of the investigation, the proposed development within the catchment of the hillslope seepage wetlands and valley bottom wetland would result in significant changes to the hydrology of the catchment, especially in terms of increased peak flows and reduction in subsurface flows supporting these wetlands. In order to mitigate potential negative affects to the watercourse, large scale attenuation and associated diffuse release infrastructure would have to be designed and implemented to mimic the hydrology of a pre-development Halfway House granite landscape. This would require integration of the development layout, inclusion of green spaces and stormwater design to include several attenuation facilities as well as diffuse release infrastructure fringing the hillslope seepage wetlands.

Recommended Mitigation Measures

It is recommended that both soft and hard engineering principles be utilised to ensure that the most cost effective and aesthetically pleasing mitigation options are implemented. It is important to take cognisance that water moves vertically and horizontally within the soil profile of the catchment and that development within wetland areas may pose a threat to the sustainability of any structures constructed due to



serious rising damp, water problems and structural instability.

I 3. SAS Freshwater Ecosystem Assessment

Scientific Aquatic Services (SAS) was appointed by Seedcracker Environmental Consulting CC to conduct a freshwater ecosystem assessment as part of the Environmental Authorisation (EA) process for the proposed Rabie Ridge Extension 7 mixed-use development.

Findings and Conclusion

A freshwater ecosystem assessment was undertaken in April 2022. Four freshwater ecosystems were identified within the footprint of the study area and may potentially be at risk from the proposed development, namely an Unchannelled valley bottom (UCVB) and three Seep wetlands.

Following the freshwater ecosystem assessment, the Department of Water and Sanitation (DWS) Risk Assessment Matrix (2016) was applied to determine the significance of impacts of the proposed development on the UCVB and three Seep wetlands. Based on the findings of the Risk Assessment Matrix, the activities associated with the proposed development will pose a “Moderate” risk to the UCVB and three Seep wetlands.

Recommended Mitigation Measures

Overall, it is the recommendation of the freshwater ecologist that the risk associated with the proposed development must be mitigated through avoidance of the UCVB and Seep wetlands and their associated 30 m GDARD setback buffers. This will ensure minimisation of impacts and the residual risk can be considered acceptable, provided that the mitigation measures as stipulated within the contents of this report are strictly adhered to. Of specific importance, it is recommended that the proposed development must be scheduled for the drier winter period to minimise the potential risk of sediment-laden runoff reaching the UCVB and Seep wetlands as a result of the construction activities. In addition, ongoing maintenance and monitoring of the proposed development in the study area is recommended to be undertaken regularly, to ensure stormwater is adequately managed and that no sewage spills and leakages occur within the study area which will further contribute to the degradation of freshwater ecosystems in the region (specific mention of the UCVB wetland). In addition, it is further recommended that an in-depth hydrogeological assessment be undertaken, prior to commencement of the proposed development which will guide the management of the wetlands, particularly in regard to a recharge and hydrological drivers perspective, considering that the underlying material is considered typical of the Halfway House Granite Dome.

I 4. High Level Hydrogeology and wetland soil context report

Terra Soil Science was appointed by Seedcracker to provide a specialist report on the presence and context of wetlands identified on the proposed Rabie Ridge X7 development area in two previous wetland reports.

Findings and Conclusion

1. The site has suffered extensive alteration since the initial assessments.
2. I can concur with the identification of a wetland feature that correlates with the feature identified on the TWI. The other wetland features identified in the SEF and SAS reports could not be verified through the field investigation nor the Google Earth images interpretation. The comparison details



are: a. The “isolated seeps” flagged in the SEF report are not recorded in the SAS report. The TWI indicates potential surface flow in that area but more expressed indicators of seeps are not evident. The vegetation has been altered significantly and can therefore not be used as an accurate indicator of the historic presence of wetlands.

b. The “HGM3” seep identified in the SEF report is also indicated in the SAS report. The TWI indicates a potential accumulation of surface flow in that area but the vegetation signatures have been muddled by surface alteration for two decades now.

c. The “HGM1” and “HGM2” wetland areas identified in the SEF report are confirmed in the SAS report. The TWI is very clear in this case and this wetland / watercourse area is therefore confirmed as a wetland zone.

d. The broader wetland areas on the SAS map do not correspond to water flow signatures on the TWI map. The exception is a stormwater signature identified as “Desktop delineated channelled valley bottom” that feeds into an altered watercourse flowing to the north-east. This signature is strictly a man-made one.

3. The soil map provided by SEF appears to be accurate and the main wetland features with associated soil forms are accepted as a true reflection of the site before the significant alteration. The soil forms as identified conform to the wetland areas and wetland soils identified on the site. The drawback is that the site has been altered significantly since the generation of the soil map and it is very challenging confirming the results. In this sense the main wetland area on the map corresponds to the wetland features identified from the Google Earth images.

4. The wetland map provided by SAS cannot be supported as it flags, apart from the one area in common with the SEF report, a few areas clearly associated with stormwater signatures.

5. The problematic nature of the delineation correlations emphasise the concerns raised in the current report regarding the difficulty in the correct interpretation of redox morphology indicators on the JD.

Recommended Mitigation Measures

It is recommended that the SEF delineation outcome be accepted as accurate with the omission of small wetland areas on Westleigh soils in the northern section of the site. This is mainly due to their isolation and current complete degradation due to detrimental land activities (dumping of rubble and surface alteration).

I 5. Wetland Impact Assessment, Rehabilitation and Management Plan (WIARMP)

Scientific Aquatic Services (SAS) was appointed to develop a Wetland Impact Assessment, Rehabilitation and Management Plan (WIARMP) for the wetland features that will be traversed by the proposed Rabie Ridge Extension 6 mixed land use township development on the remainder of farm Allandale 10 in Midrand, Gauteng Province

Findings and conclusions

It is the opinion of the wetland ecologists that provided that the management, mitigation and rehabilitation recommendations as provided in Sections 5 and 6 of the specialist report are strictly adhered to as planned, impacts on the wetland features are likely to range from medium low to low



during the construction phase and medium to high during the operational phase of the proposed development.

Recommended Mitigation Measures

- All development footprint areas, including where roadways are constructed should remain as small as possible and should not encroach into wetland areas unless planned or absolutely essential. If essential and bare ground is exposed then rehabilitation with the use of indigenous species must take place (as referred to in Annexure B);
- Planning of temporary roads and access routes should avoid wetland areas and be restricted to existing or planned roads where possible;
- A storm water management plan, including erosion / run-off control for the construction phase should be developed and implemented. The following 're-wetting' principles and design, as recommended by the Wetland Ecologist (SEF 2013) should be included in this plan:
- As far as possible, all construction near to wetland areas which remain undeveloped should occur in the low flow season, during the drier winter months; and
- No vehicular or pedestrian movement may take place within wetland features or buffer zones where erosion is already present, excluding the planned development portions (including the entirety of HGM 4 and 5);
- All/any erosion and silt control mechanisms (including those described in the activity specific management sections below) need to be regularly maintained for the duration of the construction phase;
- Reduce airborne dust at construction sites
- No mixed concrete shall be deposited outside of the designated construction footprint. A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing. Concrete spilled outside of the demarcated area must be promptly removed and taken to a permitted waste disposal site;
- Installation of concrete washouts. Concrete washouts are used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solids for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of local waters and harm aquatic life. Solids that are improperly disposed of can clog storm drainpipes and cause flooding;
- All areas within 5m of the proposed roads should be monitored for erosion and incision, and revegetated if necessary. Monitoring should take place after every rainstorm or flood that takes place and has an influence on the water flow into the wetland features for a period of three months post construction;
- Permanent roadside swales must be created and maintained at places where runoff from the road is not collected in stormwater system as to allow it to be biologically cleansed prior to seeping into wetland areas. Runoff that is collected from the road should be integrated into a stormwater management plan for example consideration should be given to the attenuation of runoff from paved surfaces by the strategic placement of berms to prevent gully formation and siltation of the wetland resource.
- Retain indigenous floral and faunal assets



- Reprofiling and revegetation of wetland areas disturbed as a result of the proposed activities must take place immediately after completion of construction phase with indigenous wetland vegetation stipulated in Annexure B, and should be monitored during the operational phase for three months after heavy rainstorms and flooding;
- Any excess topsoil left in the development area must be levelled onto the site or used for revegetation purposes;
- Any areas where active erosion is observed following construction must be immediately rehabilitated in such a way as to ensure that the hydrology of the area is re-instated to conditions which are as natural as possible. Revegetation and/or redirection of stormwater or the installation of energy dissipating structures may be used for this purpose and should be integrated into the stormwater management plan;
- Revegetation and erosion control must be monitored periodically in wetland features within the development area for three months post construction following heavy rainstorms and flooding. Should any bare or eroded areas be noted, remedial measures are to be implemented immediately. This may include importing additional topsoil, reseeding and mulching, depending on the reasons for the failure of the prior revegetation;
- An alien and invasive floral species control program should continue on from that developed during the construction phase according to the principles outlined in Annexure C. Alien vegetation should be removed from wetland features, and buffer zones within the development footprint and the site rehabilitated with indigenous species (as specified in Annexure B). Monitoring should be conducted monthly during the first growing season after construction and thereafter every two months until the control of alien species is achieved. Further monitoring and control should be conducted annually for five years post construction.

I 6. Agricultural Potential Assessment

Scientific Aquatic Services (SAS) CC was appointed by the 2013 applicant, to conduct an Agricultural Potential assessment for the proposed mixed land use development on the remainder of Allandale 10 IR, located within the jurisdiction of the City of Johannesburg Metropolitan Municipality, in Midrand, Gauteng Province.

Findings and conclusions

The subject property falls into the Climate Capability Class 5 or 6, with a restricted choice of arable crops due to low temperatures, frost, and water stress. From this assessment it is evident that the investigated property is dominated by Hu and Ms/Gs soil forms, constituting approximately 35.6 and 34.4 ha, amounting to 30.4 and 29.3%; with the Cv, We, and Av/Pn soil forms also occupying a considerably large portion of the site, estimated at 21.1, 13.1, and 10.9 ha, each amounting to 18.0, 11.2, and 9.3 % of the subject property. The remainder of the subject property is occupied by relatively small portions of Cf, Ka, Lo, and Dr soil forms, each constituting less than 2% of the subject property.

The majority of the identified soils were classified as Land Capability class III, comprising of Cv and Hu soils, collectively constituting approximately 48.4% (56.7 ha) of the subject property. These soils are considered to be of high agricultural potential. Whereas the identified Av, Pn, and Lo soils were classified as class VI land capability class, collectively constituting approximately 9.4% (11.1 ha) of the subject property. The Av Pn, and Lo were therefore considered to be of moderate-high agricultural



potential, as their imperfectly drained nature is known to be considerably beneficial for some deep rooted crops under drought conditions where irrigation water is scarce; hence the common exploitation of these soils for maize production in the Highveld region.

The remainder of the subject property comprises of low agricultural potential soils, including of Ms/Gs, Cf, Dr, and Ka soil forms, collectively occupying approximately 36.5 ha, amounting to 31.2% of the subject property. The low agricultural potential of these soils is primarily attributed to physical restrictions of the consolidated hard rock or lithocutanic B horizon encountered at shallow depth in case of the Ms/Gs, Cf, and Dr soil forms; and susceptibility to seasonal inundation of the Ka soil form. Ka soil forms are therefore best suited to conservation as habitat for wetland vegetation and faunal species. Whereas the Ms/Gs, Cf, and Dr soil forms on the other hand are suitable to low intensity land uses such as natural woodlands/grasslands for wildlife forage and habitat; furthermore, these soils could potentially be used for light grazing under careful stocking rates where land is scarce.

Recommended Mitigation Measures

It is the specialist's opinion that the relative extent of the soils with arable agricultural potential identified within the investigated subject property is unlikely to justify the acquisition and maintenance of essential farm implements, and the extent of these soil is therefore considered unlikely to sustain viable crop production at a commercial scale. With the currently extensively urbanised surrounding area, the likelihood of larger tracts of land being combined into a viable agricultural land use unit is unlikely, and it is deemed more likely that the erven in the surrounding area will undergo further and increasing levels of subdivision in the future. These soils are therefore at best well suited to subsistence farming. It is therefore of the specialist's opinion that the proposed mixed land use can be considered favourably from an agricultural potential aspect, provided the recommended mitigation measures are implemented during the execution of this project to prevent impact on adjacent soils.

17. Flood line Determination

WSP Group Africa (Pty) Ltd conducted the floodline assessment on the proposed Rabie Ridge development.

Findings and conclusions

An inquiry into the Rabie Ridge drainage system, lead to the identification of one the upper reaches of a tributary to the Jukskei River. The current hydrological flow regime is overland flow and not a defined watercourse. A preliminary hydrological assessment was conducted, quantifying the flow depth and volumetric flowrate for a upstream (A) and downstream (B) section.

The results indicate that the anticipated flood water will be relatively shallow (not more than 200 mm) and wide (not more than 82 m). This confirms the overland flow regime.

Recommended Mitigation Measures

In order to optimise the land use of the proposed development, it is proposed that the flood water be contained with a purposeful structure. The dimensions of the structure (i.e. width and depth and location) can be established by taking the engineering, environmental and developer concerns into account.



18. Social Impact Assessment

Batho Earth was appointed to conduct a Social Impact Assessment (SIA) as part of the Environmental Impact Assessment (EIA) for the proposed Rabie Ridge Ext. 7 Mixed Land-Use development.

Findings and conclusions

The locality of the site is as such that the proposed Rabie Ridge development would stimulate economic growth in the area and attend to the need for additional local housing. It is further suitably located due to the distance to the CBD of Midrand and various transport infrastructure and services.

The development proposal will further offer a range of community facilities, educational services, open spaces and services to the surrounding community.

From a social perspective the following general conclusions can be made:

- The proposed Rabie Ridge Ext. 7 mixed land-use development would assist in providing a range of different housing types for different economic needs within the same township. It could further add to the on-going revitalisation, development and support that the study area needs.
- The proposed development could be accommodated without severely negatively compromising the day-to-day life of the communities in close proximity to the site.
- It is expected that the proposed development would be supported should it be undertaken in a responsible and sustainable way.
- At this stage there is no evidence of attitude formation against the proposed development, but given the experience in the area with previous protests against the inflow of settlers and poor service provision, these sensitive issues should be noted and attended to, to avoid any possible mobilisation against the proposed project.
- From a social perspective, in terms of the location of the specific housing development the following should be noted:
 - The development is in close proximity to existing high density townships such as Ivory Park, Rabie Ridge, Chloorkop/Phomolong, and Commercia and could serve as integration link between these nodes. It is not perceived to contribute to urban sprawl and inefficient types of land use.
 - The development is situated next to major routes in the area (Modderfontein and Republic Roads) which links various urban nodes. Access from these roads should be carefully planned but is perceived to be appropriate.
 - Depending on the number of local labour to be employed and the source of labour, the development is not expected to result in excessive commuting by the bulk of the construction workers
 - The proposed project would have the following anticipated positive social impacts:
 - The project is expected to result in some positive impacts on job opportunities in this poverty stricken area, although the majority of these jobs would be limited and only of a temporary nature. The development would not significantly reduce the unemployment rate of the area, but it would still contribute to relieving poverty in the area.
 - The CoJ Municipality's tax base would be extended resulting in improved income due to the proposed development.



- New business developments could materialise to meet the needs of the increase in the population.
- The proposed development would provide a choice in housing which could encourage social mix and integration.
- The benefits that would accrue through the provision of housing infrastructure as such would be enhanced if the local community members would be the occupiers of the houses.
- Further enhancement of benefits would refer to the local procurement and use of local labour, especially during the construction phase.
- The positive impacts should be considered in view of the socio-economic profile of the communities of the area. The economic benefits of the project could be maximised through pro-active planning by the community, the developer, local leadership and the CoJ Municipality.

The main negative social impacts refer to the following:

- The possible impact on the resource use of the boreholes at the agricultural holdings can be mitigated through the development of evaporation ponds and the monitoring of boreholes. Mitigation should be strictly implemented as negative impacts on this resource use could result in severe economic impacts for the property owners.
- Concerns from the residents with regards to safety risks should not be dismissed as irrational and therefore unimportant. With the high crime statistics in the area, safety and security issues would remain a concern and the mitigation measures to avoid any increase in criminal activities should be critical.
- The increased population would lead to indirect social impacts such as the impact on the daily living and movement patterns of existing residents especially those of the agricultural holdings used to a rural and relative quiet lifestyle. Mitigation could address these impacts although it should also be noted that the impacts are commonly associated with urbanisation.
- There is discrepancy between the need for housing in the area, and the protection of the property values of the surrounding agricultural holdings. Property values, however, are difficult to ascertain as a detailed assessment by a valuator should be undertaken over time to determine the actual impacts in this regard. Mitigation measures should ensure that integrated development principles are applied and that infrastructure such as roads, water and sanitation be properly maintained. Safety and security issues would also have to be attended to.
- The need for additional education facilities must be addressed to ensure the success of the development and the long term socio-economic stability of the community.

Recommended Mitigation Measures

- The improved municipal income generated by the proposed project should be used to ensure enhanced service delivery and infrastructure developments in the area. This would thus add to ensuring that the broader community also experience the benefits created by the proposed development.
- Community concerns should be addressed prior to the construction phase, with specific emphasis on the safety and security concerns.



- A critical aspect that could, to some extent, be addressed as part of this development is poverty alleviation. Social benefits in terms of training, skills development and the use of local labour should thus be aspired to. Should these skills be transferable to other employment sectors it would result in further sustainable benefits.
- It is imperative that local labour be sourced otherwise no benefits would accrue to the locals, apart from those obtaining accommodation. Preference should thus be given to the use of local labour during the construction and operational phases of the project as far as possible. Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers.
- Maximising the use of local labour during the construction phase would also ensure direct local benefits from the proposed development, and this could prevent conflict between the local community members, outsiders and the developer and contractors as such. Such an approach would also limit some negative impacts associated with the influx of large construction teams (possible increase in crime, pressure on infrastructure, social conflict and so forth) and the construction of and activities at construction areas.
- Securing of jobs is a sensitive issue which should be taken into account.
- A comprehensive skills audit would be valuable for the implementation of a local employment programme.
- The property owners and community members should be kept informed of progress, decisions taken with regards to the development and construction schedules. The establishment of a community Management and Monitoring Committee consisting of key community representatives and representatives of the CoJ could assist in this regard.
- The proposed development should fit in with the intended integrated plans to upgrade infrastructure and amenities in the area.
- The development should ensure quality sustainable housing to ensure safe, productive and quality living conditions which would assist in attaining social and economic development.
- Efficient public transportation opportunities for the poor should be linked to the housing development to allow residents to commute to and from places of employment.
- Urban agriculture should be considered.
- Safe places for children to play should be established.
- To ensure the success of the project there has to be a great deal of interaction with the communities in the area, the beneficiaries and adjacent property owners. Concerns should pro-actively be addressed and included in the planning process.
- The designs should cater for sufficient recreational areas spread out on the property and easily accessible to all the residents.

A well-managed housing development would thus result in an improvement to the neighbourhood and remove possible negative perceptions with the undeveloped and unmaintained area. Strict procedures and enforcement of environmental regulations are thus vital to the well-being of all the residents. Based on the findings of the SIA, it is thus recommended that the proposed development be considered by the Gauteng Department of Agriculture and Rural Development (GDARD).



19. Traffic Impact Assessment

WSP was appointed to amend the Traffic Impact Assessment (TIA) for Rabie Ridge Extension 7, City of Johannesburg, Gauteng Province. The township will be situated on the remainder of the farm Allandale 10-IR.

Findings and conclusions

- The TIA was undertaken in support of Rabie Ridge Extension 7, City of Johannesburg, Gauteng Province.
- The township will be situated on the remainder of the farm Allandale 10-IR;
- The development includes 442 Residential 1 units, 5 687 Residential 3 units, 40 000 m² Business 1 rights, a community facility (1 200 student public primary school) and a 5 133 m² private hospital;
- It is estimated that the development will generate a total of 2 061 and 2 643 peak hour trips during the weekday AM and PM peak traffic hours;

The following accesses to the development are proposed:

- K56 accesses: Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.
- K111 access: A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.
- Boshoff Road access: Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.
 - The study scope for this TIA included the following intersections:
 - Main Road (future K111)/ Boshoff Road (Intersection 1)
 - Main Road (future K111)/ Modderfontein Road (future K56) (Intersection 2)
 - Modderfontein Road (future K56)/ Falcon Street (Intersection 3)
 - Modderfontein Road (future K56)/ Dane Road (Intersection 4)
 - Modderfontein Road (future K56)/ Unnamed Gravel Road (Intersection 5)
 - Dane Road/ West Road (Intersection 6)
 - West Road/ Republic Road (Intersection 7)
 - Boshoff Road/ Tlangelani Road (Intersection 8)
 - New traffic surveys were carried out at the study intersections on Monday 5 September 2022. The new survey indicated a 14.6% growth in AM peak hour traffic volumes, and a 16.9% growth in PM peak hour traffic volumes since 2016. This equates to an average annual traffic growth rate of between 2.3% and 2.6%;
 - Known latent developments considered by this study are shown in Figure 6, and the peak hour traffic volumes for latent developments considered are shown in Figure 7. In order to accommodate any other possible latent rights, an annual background traffic growth factor of 3.0% over 5 years was also applied to the existing traffic volumes;



Recommended mitigation measures

- To mitigate the impact of the development traffic, road upgrades as per Table 7.1 and as shown in Drawings SKC002-SKC010 are proposed, and
- The proposed development is expected to generate a significant demand for public transport and it is therefore proposed public transport lay-bys be provided at the following intersections:
 - o Main Road/Development Access (Intersection A)
 - o Modderfontein Road/Falcon Street (Intersection 3)
 - o Modderfontein Road/Dane Road (Intersection 4)
 - o In order to aid pedestrian movement to and from the proposed development, it is suggested that paved pedestrian walkways be provided along at least one side of all Class 3 roads within the development. It is further recommended that paved sidewalks be provided along Main Road and Modderfontein Road between the new public transport lay-bys and the access to the development.

The proposed development is supported from a traffic engineering perspective provided that the recommendations made in this study are implemented.

I 10. Heritage Impact assessment

In accordance with Section 38 of the NHRA, an independent heritage consultant, Mr J A Van Schalkwyk, was appointed by to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where the development is planned.

Findings and conclusions

No heritage sites occur in the study area, there would be no impact resulting from the proposed development.

Recommended mitigation measures

Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

SECTION J ENVIRONMENTAL IMPACT ASSESSMENT

This section identifies and assesses the key issues and environmental impacts associated with the proposed mixed land use development. This impact assessment has been used to guide the identification and selection of the preferred alternatives, and management and mitigation measures, applicable to the proposed activities.

General and specialist impact assessments have been conducted based on site visits, previous assessments completed for the site, and information relating to the planning and design, construction, and operation of the RRX7 development. A series of specialist studies were conducted during the EIA for the proposed RRX7 development. The completed specialist studies and their findings have been integrated into this EIA Report. The key findings of each specialist were evaluated in relation to each other to provide an overall and integrated assessment of the project impacts.



J 1 Identification and assessment of impacts

The identification and assessment of environmental impacts is a multi-faceted process, which combines quantitative and qualitative descriptions and evaluations. It involves the application of scientific measurements and professional judgment to determine the significance of environmental impacts associated with the proposed project. The potential impacts associated with the proposed activities were identified and assessed via the following:

1. Site inspection to better understand the study terrain and the local context.
2. Review of applicable guidelines, policies, plans, legislation and literature available from EIA's conducted for the adjacent townships.
3. Review of specialist study findings.
4. Critically review proposed activities to identify feasible alternatives.
5. Consult with relevant state departments (on going).
6. Consult with interested and affected parties (on going).
7. Identify and assess potential impacts associated with the proposed activities.

The impacts and the proposed management thereof are discussed on a qualitative level and quantitatively assessed by evaluating the nature, extent, magnitude, duration, probability and ultimately the significance of the impacts (refer to methodology provided in section J2). Where applicable, the impact assessments and significance ratings provided by the respective specialists are included.

The assessment considers impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is evaluated.

The above methods are believed to have been adequate for the purposes of this environmental impact assessment process.

J 2. Impact Assessment Methodology

The Impact Assessment Methodology has been aligned with the requirements for EIA Reports as stipulated in Appendix 3 (3) (1) (j) of the 2014 NEMA EIA Regulations, as amended, which states the following: "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 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".



The identification of potential impacts includes impacts that will occur during the construction and operational phases of the development. The assessment of impacts includes direct, indirect as well as cumulative impacts. The nature of the proposed project is well understood. As such, the impacts (both positive and negative) associated with the project has been adequately assessed.

The following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of direct, indirect and cumulative impacts:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are associated with the construction, operation or maintenance of an activity.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The Impact Assessment Methodology includes the following aspects:

Nature of impact - this reviews the type of effect that a proposed activity will have on the environment.

Status - Whether the impact on the overall environment (social, biophysical and economic) will be:

- Positive - environment overall will benefit from the impact;
- Negative - environment overall will be adversely affected by the impact; or
- Neutral - environment overall will not be affected.

Spatial extent – The size of the area that will be affected by the impact:

- Site specific;
- Local (<10 km from site);
- Regional (<100 km of site);
- National; or
- International (e.g. Greenhouse Gas emissions or migrant birds).

Duration – The timeframe during which the impact/risk will be experienced:

- Very short term (instantaneous);
- Short term (less than 1 year);
- Medium term (1 to 10 years);



- Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Consequence – The anticipated severity of the impact/risk:

- Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);
- Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
- Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
- Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or
- Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).

Reversibility of the Impacts - the extent to which the impacts are reversible assuming that the project has reached the end of its life cycle (operational phase) will be:

- High reversibility of impacts (impact is highly reversible at end of project life, i.e. this is the most favourable assessment for the environment).
- Moderate reversibility of impacts;
- Low reversibility of impacts; or
- Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).

Irreplaceability of Resource Loss caused by impacts – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (operational phase) will be:

- High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).

Using the criteria above, the impacts/risk will further be assessed in terms of the following:

Likelihood – The probability of the impact occurring:

- Extremely unlikely (little to no chance of occurring);
- Very unlikely (<30% chance of occurring);
- Unlikely (30-50% chance of occurring)



- Likely (51 – 90% chance of occurring); or
- Very likely (>90% chance of occurring regardless of prevention measures).

Significance – Will the impact cause a notable alteration of the environment?

- 0 – Impact will not affect the environment. No mitigation necessary.
- 1 - Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision making);
- 2 - Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
- 3 - High (the risk/impacts will result in a considerable alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision making); or

J 3. Impacts and Risks Assessed in the EIA Phase

A description of all environmental issues and risks that were identified during the EIA process, an assessment of the significance of each impact and risk, and an indication of the extent to which the impact and risk could be avoided or addressed by the adoption of mitigation measures are provided in the following tables. The following tables encompass the planning, construction and operational phases of the development.

J 3.1 Geological and Physical Aspects

	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Destabilisation of surface geology and soil	Destabilisation of surface geology and soil	Status quo remains. No development will be undertaken.
Project Life-cycle	Construction and Operation		
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and medium term	Local and medium term	N/A
Consequence of impact or risk	Potential foundation problems, sink hole formation	Potential foundation problems, sink hole formation	
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	Partially reversible	Partially reversible	N/A
Indirect impacts:	None	None	N/A
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact



Significance rating of impact prior to mitigation:	Low negative (1)	Low negative (1)	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation:	<p>Excavations: Excavations for services will not encounter any problems.</p> <p>Groundwater: No ground water was encountered during the 2010 Engineering survey,</p> <p>Soil Permeability: The material in the upper 1.m soil layer is fairly permeable.</p> <p>Dolomite: The site is not underlain by dolomitic rocks and soils, and therefore the risk of karstic sinkhole formation is not possible.</p> <p>Soil conditions on site are suitable for development, and normal brick construction may be employed without excessive additional foundation costs.</p> <p>The SEF 2013 Wetland report recommended that no structures be developed within HGM 1 -3, and that a 30m minimum buffer zone be implemented around these wetlands. This was based on the premise that serious rising damp, and water problems might compromise the structural stability of buildings placed there, as exemplified by water damage in the existing residential buildings encroaching upon wetland features.</p>	<p>Excavations: Excavations for services will not encounter any problems.</p> <p>Groundwater: No ground water was encountered during the 2010 Engineering survey,</p> <p>Soil Permeability: The material in the upper 1.m soil layer is fairly permeable.</p> <p>Dolomite: The site is not underlain by dolomitic rocks and soils, and therefore the risk of karstic sinkhole formation is not possible.</p> <p>Soil conditions on site are suitable for development, and normal brick construction may be employed without excessive additional foundation costs.</p> <p>The SEF 2013 Wetland report recommended that no structures be developed within HGM 1 -3, and that a 30m minimum buffer zone be implemented around these wetlands. This was based on the premise that serious rising damp, and water problems might compromise the structural stability of buildings placed there, as exemplified by water damage in the existing residential buildings encroaching upon wetland features.</p>	None required
Residual impacts:	No residual impacts anticipated.	No residual impacts anticipated.	N/A



Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	Problematic excavation conditions Groundwater Soil Permeability Dolomite	Specific founding recommendations such as damp proofing measures to be incorporated into the design of all structures.
Indirect	No significant indirect impacts on geological and physical aspects are anticipated	Damp proofing measures to be incorporated into the design of all structures.
Cumulative	No significant cumulative impacts on geographical, geological and physical aspects are anticipated.	

J 3.2 Soil Erosion and contamination

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Soil pollution Soil Erosion	Soil pollution Soil Erosion	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Site	Site	N/A
Consequence of impact or risk	Soil pollution Soil Erosion	Soil pollution Soil Erosion	
Probability of occurrence:	Soil pollution: Unlikely Soil Erosion: Unlikely	Soil pollution: Unlikely Soil Erosion: Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Loss of topsoil, Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Non-reversible	Non-reversible	N/A
Indirect impacts:	Once soil is disturbed by construction related activities, it becomes far more susceptible to erosion and a decrease in quality. Erosion of	Once soil is disturbed by construction related activities, it becomes far more susceptible to erosion and a decrease in quality. Erosion of	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	the soil surface greatly increases the risk of losing topsoil to erosion and impairing the soils ability to support vegetation growth. Nutrients and seed banks are lost to sun baking and humus content will often be reduced (oxidised). This makes future rehabilitation/re-vegetation difficult and favours colonising species like invasive aliens.	the soil surface greatly increases the risk of losing topsoil to erosion and impairing the soils ability to support vegetation growth. Nutrients and seed banks are lost to sun baking and humus content will often be reduced (oxidised). This makes future rehabilitation/re-vegetation difficult and favours colonising species like invasive aliens.	
Cumulative impact prior to mitigation:	High negative	High negative	No impact
Significance rating of impact prior to mitigation:	High negative	High negative	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMPr must be implemented 	<p>Soil pollution:</p> <p>Repairs done to construction vehicles should be conducted on hardened surfaces.</p> <p>2. Under no circumstances should oil, diesel or any other chemical be disposed of at the site.</p> <p>3. Minimise petrol, diesel, and oil leaks by allocating a loading zone, which is protected against such leaks. Drip trays must be secured and emptied regularly.</p> <p>4. Chemical toilets must be provided by the contractor in accordance with DWS requirements A</p> <p>5. A Spill Contingency Plan should be adopted.</p> <p>Soil erosion:</p> <p>On any areas where the risk of erosion is evident, appropriate temporary or permanent works</p>	<p>Soil pollution:</p> <p>Repairs done to construction vehicles should be conducted on hardened surfaces.</p> <p>2. Under no circumstances should oil, diesel or any other chemical be disposed of at the site.</p> <p>3. Minimise petrol, diesel, and oil leaks by allocating a loading zone, which is protected against such leaks. Drip trays must be secured and emptied regularly.</p> <p>4. Chemical toilets must be provided by the contractor in accordance with DWS requirements A</p> <p>5. A Spill Contingency Plan should be adopted.</p> <p>Soil erosion:</p> <p>On any areas where the risk of erosion is evident, appropriate temporary or permanent</p>	None required



	Preferred Alternative	Alternative 2	No-Go Option
	<p>and water energy dispersion structures must be installed.</p> <p>There needs to be minimal vegetation clearance and exposure of soils.</p> <p>Wind screening and barriers should be installed where necessary.</p> <p>The Stormwater Management Plan as proposed in Appendix 5 must be implemented.</p> <p>Avoid vegetation clearance and earthworks during the rainy season when chances of runoff and water erosion are highest</p> <p>Minimise the extent of the disturbance footprint at each instance and progressively clear required areas in order to minimise the cumulative loss of soil from disturbed areas through erosion and dust emission</p> <p>The development activities should preferably commence on the upgradient (northern) section of the subject property, such that the downgradient section can remain temporarily undisturbed in order to naturally attenuate stormwater runoff and associated erosion from the cleared area upgradient</p> <p>Avoid soil disturbance in the vicinity of drainage lines as soils are periodically waterlogged due to slow drainage and will likely be excessively prone to erosion once disturbed;</p>	<p>works and water energy dispersion structures must be installed.</p> <p>There needs to be minimal vegetation clearance and exposure of soils.</p> <p>Wind screening and barriers should be installed where necessary.</p> <p>The Stormwater Management Plan as proposed in Appendix 5 must be implemented.</p> <p>Avoid vegetation clearance and earthworks during the rainy season when chances of runoff and water erosion are highest</p> <p>Minimise the extent of the disturbance footprint at each instance and progressively clear required areas in order to minimise the cumulative loss of soil from disturbed areas through erosion and dust emission</p> <p>The development activities should preferably commence on the upgradient (northern) section of the subject property, such that the downgradient section can remain temporarily undisturbed in order to naturally attenuate stormwater runoff and associated erosion from the cleared area upgradient</p> <p>Avoid soil disturbance in the vicinity of drainage lines as soils are periodically waterlogged due to slow drainage and will likely be</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Avoid soil disturbance on steep slopes as such areas inherently prone to erosion;</p> <p>The upper 300 mm of topsoil should be removed and stockpiled on site for re-use (top-dressing) during rehabilitation and landscaping where possible, as this horizon is the most fertile and carries the seedbank;</p> <p>A gradient of not more than 2:1 and ≤ 2 m height should be maintained in order to preserve biological viability and reduce soil deterioration of the topsoil stockpiles;</p> <p>The location of the topsoil stockpile should be selected strategically such that minimal re-handling is required until rehabilitation. Revegetate and mulch progressively as each section of works is completed, such that the interval between clearing and revegetation is kept to an absolute minimum. Furthermore, a grass cover should be established as soon as possible on the stockpile(s), and stockpiled soils should be maintained naturally covered with vegetation until rehabilitation commences;</p> <p>A diversion berm should be provided on the up-slope side of stockpiles to divert overland flow around the stockpile, and sediment control fencing should be placed around the lower sides and ends of the stockpile to provide minimal washing away of soil during high runoff events;</p>	<p>excessively prone to erosion once disturbed;</p> <p>Avoid soil disturbance on steep slopes as such areas inherently prone to erosion;</p> <p>The upper 300 mm of topsoil should be removed and stockpiled on site for re-use (top-dressing) during rehabilitation and landscaping where possible, as this horizon is the most fertile and carries the seedbank;</p> <p>A gradient of not more than 2:1 and ≤ 2 m height should be maintained in order to preserve biological viability and reduce soil deterioration of the topsoil stockpiles;</p> <p>The location of the topsoil stockpile should be selected strategically such that minimal re-handling is required until rehabilitation. Revegetate and mulch progressively as each section of works is completed, such that the interval between clearing and revegetation is kept to an absolute minimum. Furthermore, a grass cover should be established as soon as possible on the stockpile(s), and stockpiled soils should be maintained naturally covered with vegetation until rehabilitation commences;</p> <p>A diversion berm should be provided on the up-slope side of stockpiles to divert overland flow around the stockpile, and sediment control fencing should be placed around the lower sides and ends of the</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Avoid any further stripping/excavation and stockpiling of in-situ soils as far as possible to ensure that the soils remain in their natural horizon sequence;</p> <p>Dampen the disturbed areas to suppress dust emission from cleared areas and access roads;</p> <p>A stormwater pollution prevention plan (SWPPP) should be compiled and implemented to control flow of potentially contaminated stormwater from the construction areas to the receiving environment. For instance, stormwater can be captured and stored on-site for re-use to manage dust during dry, windy conditions;</p> <p>In addition, a spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans should also be compiled to guide the construction works.</p>	<p>stockpile to provide minimal washing away of soil during high runoff events;</p> <p>Avoid any further stripping/excavation and stockpiling of in-situ soils as far as possible to ensure that the soils remain in their natural horizon sequence;</p> <p>Dampen the disturbed areas to suppress dust emission from cleared areas and access roads;</p> <p>A stormwater pollution prevention plan (SWPPP) should be compiled and implemented to control flow of potentially contaminated stormwater from the construction areas to the receiving environment. For instance, stormwater can be captured and stored on-site for re-use to manage dust during dry, windy conditions;</p> <p>In addition, a spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans should also be compiled to guide the construction works.</p>	
Residual impacts:	<p>Loss of topsoil</p> <p>Water pollution</p> <p>Ecosystem disruption</p> <p>Health hazard anticipated.</p>	<p>Loss of topsoil</p> <p>Water pollution</p> <p>Ecosystem disruption</p> <p>Health hazard</p>	N/A
Cumulative impact post mitigation:	Moderate to Low	Moderate to Low	N/A
Significance rating of impact after mitigation:	Moderate to Low (1)	Moderate to Low (1)	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
	operational failures that may cause environmental pollution.	cause environmental pollution.	
Residual impacts:	Loss of topsoil Water pollution Ecosystem disruption Health hazard anticipated.	Loss of topsoil Water pollution Ecosystem disruption Health hazard	N/A
Cumulative impact post mitigation:	Moderate to Low	Moderate to Low	N/A
Significance rating of impact after mitigation:	Moderate (2) to Low (1)	Moderate (2) to Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	<p>Soil erosion removes the top layer of soil, which is rich in organic matter and nutrients. This loss of topsoil reduces the overall soil depth and quality, affecting its ability to support plant growth and sustain agriculture.</p> <p>Erosion disrupts the natural structure and composition of the soil. The removal of the protective topsoil layer exposes the underlying soil to degradation, compaction, and reduced water-holding capacity.</p> <p>Soil erosion can result in changes to the physical landscape. The removal of soil can lead to the formation of gullies, or channels, altering the natural topography of the land. These features can negatively impact land use, restrict access, and affect the overall aesthetic value of the landscape.</p> <p>Eroded soil particles, along with attached pollutants such as pesticides, can enter nearby water bodies through runoff. This sedimentation can degrade water quality by increasing turbidity, reducing light penetration, and negatively impacting aquatic habitats. It can also contribute to the eutrophication of water bodies, leading to oxygen depletion and harm to aquatic organisms.</p> <p>Soil erosion reduces the soil's ability to absorb and retain water. As a result, there is an increased risk of flooding as runoff flows more rapidly over the surface, overwhelming natural drainage systems. Additionally, eroded soil particles carried by runoff can deposit in rivers,</p>	<p>Soil erosion can cause damage to infrastructure such as roads, bridges, and buildings. Eroded soil can clog drainage systems, block culverts, and undermine the stability of structures. This can lead to increased maintenance costs.</p> <p>Eroded soil is often carried by runoff into rivers, streams, and other water bodies. The deposition of sediment in water bodies can affect aquatic habitats, and can lead to the siltation of river tributaries. Sedimentation can also impact water quality by carrying pollutants from eroded soil into water sources.</p> <p>Soil erosion can affect water quality by carrying pollutants from the land surface into water bodies. This can result in contamination of drinking water sources, aquatic ecosystems, and negatively impact aquatic biodiversity. Additionally, erosion can reduce water availability by decreasing the soil's ability to retain water, leading to increased runoff and reduced groundwater recharge.</p> <p>Soil erosion can contribute to increased flood risk. As eroded soil is transported and deposited in waterways, it can obstruct natural water flow, reduce channel capacity, and lead to the elevation of riverbeds. These factors can exacerbate the severity and frequency of floods, causing damage to infrastructure, property, and posing risks to human lives.</p>



	Construction	Operation
	reservoirs, and other water bodies, leading to sedimentation. Excessive sedimentation reduces water storage capacity, affects aquatic ecosystems, and impacts water management. Soil erosion can directly affect infrastructure and human-made structures. As soil erodes, it can undermine the stability of slopes, embankments, and foundations, increasing the risk of landslides, slope failures, and structural damage. This poses a threat to buildings, roads, bridges, pipelines, and other infrastructure systems.	
Indirect	Once soil is disturbed by construction related activities, it becomes far more susceptible to erosion and a decrease in quality. Erosion of the soil surface greatly increases the risk of losing topsoil to erosion and impairing the soils ability to support vegetation growth. Nutrients and seed banks are lost to sun baking and humus content will often be reduced (oxidised). This makes future rehabilitation/re-vegetation difficult and favours colonising species like invasive aliens. Erosion can further be compounded by flooding. Increased erosion can be the result of natural vegetation removal, overgrazing or exotic vegetation encroachment. Soil contamination due to chemical spills (Waste, sewage, paints, herbicides etc) or leaks (Hydrocarbons) is a further issue which can result in a health hazard to both humans and local flora and fauna. Soil contamination can also compromise future rehabilitation of the site.	Loss of ecosystem services: Eroded soil can lead to the loss of habitat for various plant and animal species, reduce biodiversity, and disrupt ecosystem functioning. Water resource management challenges: Soil erosion can create challenges for water resource management. Erosion can contribute to sedimentation in rivers and streams, which can impair water quality and impact aquatic ecosystems.
Cumulative	Soil degradation: Continuous soil erosion leads to the gradual degradation of soil quality. As topsoil, which is rich in organic matter and nutrients, is lost, the remaining soil becomes less fertile and less capable of supporting plant growth. This degradation can result in diminished ecosystem functioning, and a decline in soil health. Reduced water quality: Soil erosion contributes to sedimentation in water bodies, which can lead to reduced water quality. Sediments, along with associated pollutants can enter rivers, lakes, and streams, impacting aquatic ecosystems and compromising water supplies for human consumption. Poor water quality can harm aquatic organisms, disrupt ecological balance, and create challenges for water treatment processes. Nutrient imbalance and eutrophication: Soil erosion can disrupt the natural balance of nutrients in ecosystems. As eroded soil carries away nutrients it can lead to nutrient imbalances in downstream	



	Construction	Operation
	<p>areas. Excessive nutrient runoff can contribute to eutrophication, a process in which water bodies become enriched with nutrients, causing algal blooms, oxygen depletion, and ecological degradation.</p> <p>Loss of biodiversity: Soil erosion can negatively impact biodiversity. As soil is eroded, it can result in the loss of habitat for various plant and animal species. Soil erosion can disrupt ecological processes, reduce plant diversity, and negatively affect soil microorganisms and invertebrates critical for ecosystem functioning. The loss of biodiversity can have ripple effects on ecosystem resilience, food webs, and overall ecosystem health.</p> <p>Climate change impacts: Soil erosion can exacerbate the impacts of climate change. Soil erosion can decrease water infiltration, leading to increased surface runoff and reduced groundwater recharge, exacerbating the effects of drought and water scarcity.</p>	

J 3.3 Water quality and quantity

Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Pollution of groundwater/ surface water Stormwater and runoff on site Water quantity	Pollution of groundwater/ surface water Stormwater and runoff on site Water quantity	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and medium term	Local and medium term	N/A
Consequence of impact or risk	Pollution of water resources	Pollution of water resources	
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Partially Reversible	Partially Reversible	N/A
Indirect impacts:	Disruption of aquatic ecosystems, Disruption in the ecological balance, Impact on the availability and quality of water resources, rendering water bodies unsuitable for various purposes, including drinking water supply.	Disruption of aquatic ecosystems, Disruption in the ecological balance, Impact on the availability and quality of water resources, rendering water bodies unsuitable for various purposes, including drinking water supply.	N/A
Cumulative impact prior to mitigation:	High negative	High negative	No impact
Significance rating of impact prior to mitigation:	High negative (3)	High negative (3)	No impact
Degree to which the impact can be avoided:	High	High	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	<p>Pollution of ground and surface water:</p> <p>Chemical toilets must be provided by the contractor in accordance with DWS requirements.</p> <p>2. Machine maintenance of the equipment must as far as possible be undertaken off site.</p> <p>3. Watercourses must be avoided and a buffer implemented.</p> <p>4. Hazardous substances must be stored away from the buffer areas surrounding any water bodies on site to avoid pollution.</p> <p>5. Any construction required at ephemeral drainage line should ensure surface water flows freely and that erosion is adequately managed long term.</p> <p>Stormwater runoff:</p> <p>Implement storm water management measures as stipulated in the Storm Water Management Report</p> <p>2. Regular maintenance of the system must be carried out to ensure that blockages of the pipes do not occur.</p> <p>Divert stormwater away from the construction footprint area. Stormwater must not be discharged directly into the ephemeral drainage line.</p> <p>Water quantity:</p>	<p>Pollution of ground and surface water:</p> <p>Chemical toilets must be provided by the contractor in accordance with DWS requirements.</p> <p>2. Machine maintenance of the equipment must as far as possible be undertaken off site.</p> <p>3. Watercourses must be avoided and a buffer implemented.</p> <p>4. Hazardous substances must be stored away from the buffer areas surrounding any water bodies on site to avoid pollution.</p> <p>5. Any construction required at ephemeral drainage line should ensure surface water flows freely and that erosion is adequately managed long term.</p> <p>Stormwater runoff:</p> <p>Implement storm water management measures as stipulated in the Storm Water Management Report</p> <p>2. Regular maintenance of the system must be carried out to ensure that blockages of the pipes do not occur.</p> <p>Divert stormwater away from the construction footprint area. Stormwater must not be discharged directly into the ephemeral drainage line.</p> <p>Water quantity:</p>	None required



	Preferred Alternative	Alternative 2	No-Go Option
	Place water saving measures in place 2. Limit the wastage of water 3. Plant indigenous plant species in the open spaces.	Place water saving measures in place 2. Limit the wastage of water 3. Plant indigenous plant species in the open spaces.	
Residual impacts:	Long-lasting effects on aquatic ecosystems, polluted water will harm aquatic organisms, disrupt food chains, and lead to biodiversity loss. Water pollution can contaminate groundwater, which is a crucial source of drinking water for the surrounding communities who use boreholes. Contaminated water bodies can impact industries such as agriculture, tourism, and manufacturing, leading to revenue losses, reduced productivity, and increased production costs. Polluted water sources cause risks to human health.	Long-lasting effects on aquatic ecosystems, polluted water will harm aquatic organisms, disrupt food chains, and lead to biodiversity loss. Water pollution can contaminate groundwater, which is a crucial source of drinking water for the surrounding communities who use boreholes. Contaminated water bodies can impact industries such as agriculture, tourism, and manufacturing, leading to revenue losses, reduced productivity, and increased production costs. Polluted water sources cause risks to human health.	N/A
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A
Significance rating of impact after mitigation:	Medium (2) to low (1)	Medium (2) to low (1)	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Pollution of groundwater/surface water Stormwater and runoff on site Water quantity	Pollution of groundwater/surface water Stormwater and runoff on site Water quantity	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and medium term	Local and medium term	N/A
Consequence of impact or risk	Pollution of, and waste of water	Pollution of, and waste of water	N/A
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Degree to which the impact can be reversed:	Partially Reversible	Partially Reversible	N/A
Indirect impacts:	Water wastage relating to the general usage of water (household, business, irrigation, etc)	Water wastage relating to the general usage of water (household, business, irrigation, etc)	N/A
Cumulative impact prior to mitigation:	High negative	High negative	No impact
Significance rating of impact prior to mitigation:	High negative (3)	High negative (3)	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	<p>Wastewater to be recycled and re-used as far as possible to ensure that minimum amounts are required for aspects like irrigation.</p> <p>Good monitoring and management measurements to be set in place for service infrastructure</p>	<p>Wastewater to be recycled and re-used as far as possible to ensure that minimum amounts are required for aspects like irrigation.</p> <p>Good monitoring and management measurements to be set in place for service infrastructure</p>	None required
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A
Significance rating of impact after mitigation:	Medium (2) to low (1)	Medium (2) to low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	<p>Sedimentation and erosion: Sediment-laden runoff can enter nearby water bodies, leading to sedimentation. Sedimentation reduces water clarity, can smother aquatic habitats, and impair the health of aquatic organisms.</p> <p>Nutrient and chemical runoff: Construction sites may have exposed soils, stockpiled materials, or chemical storage areas that can contribute to nutrient and chemical runoff. Stormwater runoff from these areas can carry construction chemicals, and other pollutants into surface waters. Nutrient-rich runoff can</p>	<p>Water quality degradation: Surface water pollution can directly degrade the quality of freshwater resources within the development. Pollutants such as sediment, nutrients, pesticides, fertilizers, chemicals, and household waste can enter surface waters through stormwater runoff, improper disposal practices, or malfunctioning wastewater treatment systems. This contamination can lead to elevated levels of pollutants, reduced oxygen levels, altered pH levels, and overall degradation of surface and groundwater water quality.</p>



	Construction	Operation
	<p>lead to eutrophication, causing algal blooms and oxygen depletion in water bodies, while chemicals can be toxic to aquatic organisms.</p> <p>Altered hydrological patterns: Construction activities can change the natural flow and drainage patterns of water. Excavation, grading, and the installation of impervious surfaces, such as roads, parking lots, and buildings, can redirect and concentrate stormwater runoff. This alteration can lead to increased runoff volume and velocity, exacerbating erosion, and increasing the potential for flooding downstream.</p> <p>Spills and leaks: Accidental spills and leaks of construction materials, fuels, lubricants, or hazardous substances can occur during construction activities. These spills can directly contaminate surface waters if they enter storm drains or runoff pathways. Spilled substances can have toxic effects on aquatic organisms, degrade water quality, and require immediate containment and cleanup.</p> <p>Soil compaction: Construction equipment, vehicles, and heavy machinery used during construction can compact the soil, reducing its permeability and infiltration capacity. Compacted soils can increase surface runoff and decrease the natural filtration and absorption of stormwater, leading to increased erosion and sedimentation in nearby water bodies.</p>	<p>Harm to aquatic life: Elevated nutrient levels, particularly from excessive fertilizers or wastewater discharges, can lead to eutrophication, causing algal blooms and oxygen depletion in water bodies.</p> <p>Habitat destruction: Surface water pollution can cause direct habitat destruction within the open spaces of the development. Sedimentation from erosion or construction activities can smother aquatic habitats, such as the conserved wetlands on site, and disrupt the natural flow of water. This can lead to the loss of critical habitats for various species, impacting their reproduction, feeding, and overall survival.</p> <p>Contaminated drinking water sources: Surface water pollution in a residential development can directly contaminate drinking water sources, such as groundwater or surface water intakes. If pollutants infiltrate groundwater sources, it can affect boreholes and public water supply systems. Contaminated drinking water can pose health risks to residents, including exposure to harmful pathogens, chemicals, heavy metals, or other contaminants.</p> <p>Recreational and aesthetic impacts: Direct impacts of surface water pollution can affect recreational activities and the aesthetics of open spaces within the residential development. Algal blooms or foul odors caused by pollution can discourage recreational use and reduce the aesthetic appeal of water bodies, impacting the quality of life for residents.</p>
Indirect	<p>Disruption of aquatic ecosystems, Disruption in the ecological balance, Impact on the availability and quality of water resources, rendering water bodies unsuitable for various purposes, including drinking water supply.</p>	<p>Environmental degradation: Surface water pollution from residential development can lead to environmental degradation. Runoff from construction sites and improperly managed stormwater can carry sediment, pollutants, and nutrients into nearby water bodies, causing water pollution. This pollution can harm aquatic ecosystems, degrade water quality, and negatively impact flora and fauna in the surrounding area. It can also lead to the loss of habitat for aquatic species and a decline in the remaining biodiversity on site.</p>



	Construction	Operation
		<p>Infrastructure damage: Surface water pollution can cause damage to the infrastructure in a residential development. Excessive runoff carrying sediment and debris can clog drainage systems, leading to flooding, erosion, and damage to roads, driveways, and sidewalks. This can result in increased maintenance costs, potential safety hazards, and inconvenience for residents.</p> <p>Water supply concerns: Surface water pollution can raise concerns about the quality and safety of the water supply for residential developments. If water sources are contaminated, there may be a need for additional water treatment processes to ensure that the water supplied to residents meets the required standards. This can lead to increased costs for water treatment and potentially affect the reliability and availability of clean water for residents.</p> <p>Impact on recreational activities: Surface water pollution can impact recreational activities in and around a residential development. Pollutes water bodies can reduce the quality of life for residents and limit the attractiveness and market value of the residential development.</p> <p>Public health concerns: Indirectly, surface water pollution can raise public health concerns for residents. Contaminated water sources can pose risks to human health through direct contact or consumption of contaminated water or seafood. Pathogens, harmful chemicals, or toxins present in polluted surface waters can cause waterborne diseases, gastrointestinal illnesses, or other health issues. This can lead to increased healthcare costs and potential long-term health impacts on residents.</p>
Cumulative	<p>Degradation of water bodies: Continuous surface water pollution from a residential development can lead to the cumulative degradation of nearby water bodies. Persistent inputs of pollutants, such as sediment, nutrients, chemicals, and contaminants, can gradually impair water quality, disrupt aquatic ecosystems, and degrade the overall health of the conserved wetlands. This cumulative degradation can result in the loss of biodiversity, reduced ecosystem services, and long-term harm to aquatic habitats.</p>	



	Construction	Operation
	<p>Impaired water resource availability: Cumulative surface water pollution can affect the availability and quality of water resources within and around the residential development. Over time, the pollution can accumulate in water bodies, making them unsuitable for various uses, including drinking water supply, irrigation, and recreational activities. This can lead to increased costs for water treatment, limited access to clean water, and potential conflicts over water resource allocation.</p> <p>Persistent contamination of groundwater: Surface water pollution from a residential development can have cumulative impacts on groundwater quality. Contaminants and pollutants from surface waters can infiltrate the underlying aquifers over time, leading to persistent contamination of groundwater sources. This can pose risks to drinking water supplies and require costly remediation measures to restore water quality.</p> <p>Ecological and habitat loss: Cumulative surface water pollution can result in the loss of habitats and biodiversity in the surrounding ecosystems. The ongoing pollution inputs can lead to the decline or elimination of sensitive species, disruption of food chains, and alteration of natural habitats. These cumulative impacts can cause long-term ecological imbalances, reduce overall biodiversity, and hinder the recovery of affected ecosystems.</p> <p>Health risks and concerns: The cumulative impacts of surface water pollution can pose risks to human health over time. Persistent exposure to contaminated surface waters, whether through direct contact or consumption of polluted seafood or drinking water, can result in adverse health effects. Contaminants such as pathogens, heavy metals, chemicals, and toxins can accumulate in the environment and enter the human body, leading to waterborne diseases, toxicological effects, and increased risks of chronic illnesses.</p> <p>Socio-economic implications: Cumulative surface water pollution can have socio-economic implications for the residential development and surrounding communities. The degradation of water bodies and reduced water quality can negatively impact local industries. This can result in economic losses, reduced job opportunities, and diminished quality of life for residents.</p>	

J 3.4 Terrestrial Biodiversity encompassing Flora, Avi-Fauna and Herpetofauna Impacts

Three habitat units were described by SAS within the study area, namely the Mixed Grassland habitat, the Freshwater habitat and the Transformed Areas. The data gathered during the site visit indicate that the Mixed Grassland Habitat Unit is of Moderately Low Sensitivity, the Freshwater Habitat Unit is of Intermediate Sensitivity, and the Transformed Areas Habitat Unit is of Low Sensitivity.

The study area is located within a highly urbanised region and surrounded by extensive housing development. Several areas of the study area have been used as disposal grounds for both households and construction waste/rubble. Further, the local community has cleared extensive areas of ground for subsistence agricultural activities. These anthropogenic impacts and urban nature of the region has resulted in notable habitat fragmentation, impacting on habitat connectivity. As a result of these impacts and long-term land uses, faunal species diversity has been compromised, comprising only of small common species which are better adapted to surviving in landscapes within an urbanised



context. Similarly, faunal SCC are *unlikely* to occur within or rely upon the study area. The proposed development will result in the clearance of vegetation and the displacement of faunal species currently inhabiting the disturbance footprints, however, these impacts are expected to be largely localised and of decreased significance. Prior to mitigation measures being implemented, impact significance is expected to range from very low to medium low. Post mitigation, these impacts are expected to reduce to very low and low.



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Clearing of natural vegetation and resultant loss of floral and faunal habitat and diversity	Clearing of natural vegetation and resultant loss of floral and faunal habitat and diversity	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Site and long term	Site and long term	Site and long term
Consequence of impact or risk	Loss of fauna, floral, herpetofauna and avi-faunal biodiversity	Loss of fauna, floral, herpetofauna and avi-faunal biodiversity	If the site is not managed, further ecological losses will be suffered, including the proliferation of alien invasive species, and destructive impacts to wetlands
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	Irreplaceable
Degree to which the impact can be reversed:	Irreversible	Irreversible	Reversible
Indirect impacts:	Loss of ecosystem services, increased air pollution, reduced water quality, Reduced biodiversity, Increased invasive species, Climate change impacts, Impacts on human health and well-being: through increased heat stress, and degraded air quality	Loss of ecosystem services, increased air pollution, reduced water quality, Reduced biodiversity, Increased invasive species, Climate change impacts, Impacts on human health and well-being: through increased heat stress, and degraded air quality	None
Cumulative impact prior to mitigation:	Low negative	Low negative	Low negative
Significance rating of impact prior to mitigation:	Medium (2)	Medium (2)	Low negative
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	High



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Degree to which the impact can be managed:	Very limited (low) opportunity for impact management	Very limited (low) opportunity for impact management	High
Degree to which the impact can be mitigated:	Low	Low	High
Proposed mitigation:	<p>Flora: At all times, ensure that sound environmental management is in place during the planning phase;</p> <p>Minimise loss of indigenous vegetation where possible</p> <p>Where possible, minimise paved areas to reduce habitat loss and to increase on-site infiltration of stormwater.</p> <p>Where possible / feasible, the landscaping plan must aim to retain native species in the open space areas, removing all AIPs and reinstating native species from the reference vegetation type</p> <p>An AIP Management/Control Plan should be compiled for implementation: Removal of alien invasive species, especially within the footprint area must preferably commence during the pre-construction phase and continue throughout the construction, operational and maintenance phases.</p> <p>A walkdown of the approved footprint area is required before construction activities can commence, where all anticipated floral SCC are searched and marked for</p>	<p>Flora: At all times, ensure that sound environmental management is in place during the planning phase;</p> <p>Minimise loss of indigenous vegetation where possible</p> <p>Where possible, minimise paved areas to reduce habitat loss and to increase on-site infiltration of stormwater.</p> <p>Where possible / feasible, the landscaping plan must aim to retain native species in the open space areas, removing all AIPs and reinstating native species from the reference vegetation type</p> <p>An AIP Management/Control Plan should be compiled for implementation: Removal of alien invasive species, especially within the footprint area must preferably commence during the pre-construction phase and continue throughout the construction, operational and maintenance phases.</p> <p>A walkdown of the approved footprint area is required before construction activities can commence, where all anticipated floral SCC are searched and marked for relocation</p>	<p>The applicant is held responsible for maintaining the property and removing alien invasive species. However, if the owner will derive income from the property, it is highly unlikely that the applicant will be able to maintain the property. This will lead the site to fall into disrepair.</p>



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>relocation and/or destruction so that all necessary permits and authorisations can be obtained from the GDARD and DFFE;</p> <p>The site walkdown must occur within the flowering periods of the SCC flagged for concern in this report. The relocation site will need to be fenced-off (or somehow barricaded) and monitoring of relocated / transplanted species will be essential until it is evident that the species have successfully established;</p> <p>Geophytes are good candidates for rescue and relocation, and these should be targeted for such initiatives.</p> <p>A rescue and relocation plan must be drafted and approved by the relevant authorities for all floral SCC that will be impacted by the proposed development (based on the outcome of the walkdown).</p> <p>Translocation of species may only occur onto directly adjacent areas (including protected areas) considered to be part of the same original population and within the same home range. Where landscaped gardens are envisioned, these species can be relocated to such areas. Monitoring of their relocation success will still be a high priority.</p>	<p>and/or destruction so that all necessary permits and authorisations can be obtained from the GDARD and DFFE;</p> <p>The site walkdown must occur within the flowering periods of the SCC flagged for concern in this report. The relocation site will need to be fenced-off (or somehow barricaded) and monitoring of relocated / transplanted species will be essential until it is evident that the species have successfully established;</p> <p>Geophytes are good candidates for rescue and relocation, and these should be targeted for such initiatives.</p> <p>A rescue and relocation plan must be drafted and approved by the relevant authorities for all floral SCC that will be impacted by the proposed development (based on the outcome of the walkdown).</p> <p>Translocation of species may only occur onto directly adjacent areas (including protected areas) considered to be part of the same original population and within the same home range. Where landscaped gardens are envisioned, these species can be relocated to such areas. Monitoring of their relocation success will still be a high priority.</p> <p>The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment (edge effect management)</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment (edge effect management)</p> <p>Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved development footprint. Where possible / feasible, any remaining natural areas should be utilised as part of the landscaping of the proposed development;</p> <p>Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities.</p> <p>No collection of indigenous floral species is allowed by construction personnel, especially with regards to floral SCC and medicinal species;</p> <p>Care should be taken during the construction of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by:</p> <ul style="list-style-type: none"> • Demarcating all footprint areas during construction activities; • Demarcating sensitive species and habitat that must be maintained as open space; • All soils compacted as a result of construction activities should be ripped and profiled and re-seeded; • Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. 	<p>Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved development footprint. Where possible / feasible, any remaining natural areas should be utilised as part of the landscaping of the proposed development;</p> <p>Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities.</p> <p>No collection of indigenous floral species is allowed by construction personnel, especially with regards to floral SCC and medicinal species;</p> <p>Care should be taken during the construction of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by:</p> <ul style="list-style-type: none"> • Demarcating all footprint areas during construction activities; • Demarcating sensitive species and habitat that must be maintained as open space; • All soils compacted as a result of construction activities should be ripped and profiled and re-seeded; • Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. Specific mention in this regard is made to Category 1b and 2 species identified within the development footprint areas and surrounding, connected Habitat Units; and • 	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>Specific mention in this regard is made to Category 1b and 2 species identified within the development footprint areas and surrounding, connected Habitat Units; and</p> <p>No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation.</p> <p>Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility;</p> <p>If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops.</p> <p>Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area.</p>	<p>No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation.</p> <p>Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility;</p> <p>If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops.</p> <p>Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area.</p> <p>Any areas outside of the approved development area that have been left bare as a result of the construction activities should be rehabilitated using indigenous species.</p> <p>Floral SCC and medicinal plants must be monitored where they were either relocated or if used in landscaped gardens;</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>Any areas outside of the approved development area that have been left bare as a result of the construction activities should be rehabilitated using indigenous species.</p> <p>Floral SCC and medicinal plants must be monitored where they were either relocated or if used in landscaped gardens;</p> <p>No collection of floral SCC or medicinal floral species must be allowed by construction personnel;</p> <p>Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area.</p> <p>Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed.</p> <p>Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas;</p> <p>Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon</p>	<p>No collection of floral SCC or medicinal floral species must be allowed by construction personnel;</p> <p>Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area.</p> <p>Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed.</p> <p>Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas;</p> <p>Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards.</p> <p>As far as possible, no collection of floral SCC or medicinal floral species within the Study Area, or adjacent natural habitat must be allowed during the operational phase of the development;</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards.</p> <p>As far as possible, no collection of floral SCC or medicinal floral species within the Study Area, or adjacent natural habitat must be allowed during the operational phase of the development;</p> <p>Floral SCC and medicinal plants must be monitored (where they were either relocated or used within landscaped gardens);</p> <p>Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC or suitable habitat for such species outside of the proposed development footprint.</p> <p>Fauna: At all times, ensure that sound environmental management is in place during the planning phase;</p> <p>Develop a plan to control and manage alien plants during the construction phase;</p> <p>Clearly demarcate the construction footprint boundary;</p>	<p>Floral SCC and medicinal plants must be monitored (where they were either relocated or used within landscaped gardens);</p> <p>Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC or suitable habitat for such species outside of the proposed development footprint.</p> <p>Fauna: At all times, ensure that sound environmental management is in place during the planning phase;</p> <p>Develop a plan to control and manage alien plants during the construction phase;</p> <p>Clearly demarcate the construction footprint boundary;</p> <p>As far as possible, plan for vegetation clearance activities to be undertaken in winter, outside of faunal breeding periods.</p> <p>Vegetation clearance must be limited to the designated areas only. No clearance of vegetation outside of the construction footprint is permissible;</p> <p>Vegetation clearance should be undertaken in a phased manner, ideally progressing towards the wetlands and undeveloped areas so that faunal species can self-relocate</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>As far as possible, plan for vegetation clearance activities to be undertaken in winter, outside of faunal breeding periods.</p> <p>Vegetation clearance must be limited to the designated areas only. No clearance of vegetation outside of the construction footprint is permissible;</p> <p>Vegetation clearance should be undertaken in a phased manner, ideally progressing towards the wetlands and un-developed areas so that faunal species can self-relocate ahead of clearance activities into the areas not earmarked for clearance;</p> <p>All edge effects are to be managed and controlled, notably AIP proliferation and erosion;</p> <p>Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities;</p> <p>No collection of faunal species by construction personnel is allowed, unless as part of a rescue and relocation process;</p> <p>No hunting / trapping of faunal species by construction personnel is allowed;</p>	<p>ahead of clearance activities into the areas not earmarked for clearance;</p> <p>All edge effects are to be managed and controlled, notably AIP proliferation and erosion;</p> <p>Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities;</p> <p>No collection of faunal species by construction personnel is allowed, unless as part of a rescue and relocation process;</p> <p>No hunting / trapping of faunal species by construction personnel is allowed;</p> <p>No development is to occur within the conserved freshwater habitat or the stipulated buffer areas as per the freshwater assessment;</p> <p>No dumping of litter, rubble or cleared vegetation is allowed on site or in the surrounding open space areas. All waste material must be disposed of at an authorised site;</p> <p>No illicit fires may be allowed during the construction phase.</p> <p>No dumping of litter, garden refuse or any waste must be allowed on-site or within surrounding habitats;</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	<p>No development is to occur within the conserved freshwater habitat or the stipulated buffer areas as per the freshwater assessment;</p> <p>No dumping of litter, rubble or cleared vegetation is allowed on site or in the surrounding open space areas. All waste material must be disposed of at an authorised site;</p> <p>No illicit fires may be allowed during the construction phase.</p> <p>No dumping of litter, garden refuse or any waste must be allowed on-site or within surrounding habitats;</p> <p>Erosion and stormwater should be managed to ensure no further impacts to the wetland habitats occur, notably increased sediment deposition;</p> <p>Cultivation activities should not be allowed to occur within the wetland habitat or the adjacent grassland areas;</p> <p>No trapping or killing of any faunal species is to be allowed; and</p> <p>Landscaped / garden areas should use indigenous plant species, whilst rock features should also be considered to create additional habitat for invertebrates and reptiles that select for rocky areas.</p>	<p>Erosion and stormwater should be managed to ensure no further impacts to the wetland habitats occur, notably increased sediment deposition;</p> <p>Cultivation activities should not be allowed to occur within the wetland habitat or the adjacent grassland areas;</p> <p>No trapping or killing of any faunal species is to be allowed; and</p> <p>Landscaped / garden areas should use indigenous plant species, whilst rock features should also be considered to create additional habitat for invertebrates and reptiles that select for rocky areas.</p> <p>No faunal SCC were observed or are expected, however, should an SCC be encountered for whatever reason, a suitably qualified specialist should be contacted in order to advise on the best way forward.</p>	



Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
	No faunal SCC were observed or are expected, however, should an SCC be encountered for whatever reason, a suitably qualified specialist should be contacted in order to advise on the best way forward.		
Residual impacts:	Edge effects such as habitat fragmentation and AIP proliferation; The ongoing loss of SCC and suitable habitat for such species; and Disturbed areas not rehabilitated to an ecologically functioning state.	Edge effects such as habitat fragmentation and AIP proliferation; The ongoing loss of SCC and suitable habitat for such species; and Disturbed areas not rehabilitated to an ecologically functioning state.	None
Cumulative impact post mitigation:	Low negative	Low negative	Low negative
Significance rating of impact after mitigation:	Low negative (1)	Low negative (1)	Low negative



Project Life-cycle	Operational Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Clearing of natural vegetation and resultant loss of floral and faunal habitat and diversity	Clearing of natural vegetation and resultant loss of floral and faunal habitat and diversity	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Site and long term	Site and long term	Site and long term
Consequence of impact or risk	General human interference and impact leading to Loss of species diversity and habitat characteristics	General human interference and impact leading to Loss of species diversity and habitat characteristics	Proliferation of alien invasive species, and destructive impacts to wetlands
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	Irreplaceable
Degree to which the impact can be reversed:	Irreversible	Irreversible	Reversible
Cumulative impact prior to mitigation:	Low negative	Low negative	Low negative
Significance rating of impact prior to mitigation:	Low (1)	Low (1)	Low negative
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	High
Degree to which the impact can be managed:	Very limited (low) opportunity for impact management	Very limited (low) opportunity for impact management	High
Degree to which the impact can be mitigated:	Low	Low	High
Proposed mitigation:	Fence off the conserved wetland on site, otherwise residents will continue to utilize the open space	Fence off the conserved wetland on site, otherwise residents will continue to utilize the open space	The applicant is held responsible for maintaining the property and removing alien invasive species.
Cumulative impact post mitigation:	Low negative	Low negative	Low negative
Significance rating of impact after mitigation:	Low negative (1)	Low negative (1)	Low negative

Direct, Indirect and Cumulative Impact discussion:

For floral habitat and diversity, the construction phase will have the greatest impact, with the pre-construction and operational phases having more localised impacts if mitigation measures are implemented. Prior to mitigation measures implemented, the impact significance on floral habitat and diversity varies between Very low (Transformed Areas) and Low to Medium Low (Mixed Grassland and Freshwater Habitat Units). With mitigation measures implemented, the direct and



indirect impacts on the floral habitat and diversity can be reduced to Very low (Transformed Areas) and Low (Mixed Grassland Habitat Unit) significance levels.

For floral SCC, without mitigation measures implemented, the anticipated impact significance on floral SCC communities varied between Very Low for the Transformed Areas Habitat Unit, Low for the Mixed Grassland and Freshwater Habitat Units. With mitigation measures implemented, the anticipated impacts on SCC can be reduced to Very low sensitivity for all Habitat Units.

	Construction	Operation
Direct	Habitat loss, Increased stormwater runoff from hard surfaces, potential reduced water quality through irresponsible resident activities and poorly maintained municipal infrastructure.	Maintenance of conserved open spaces
Indirect	Loss of ecosystem services, increased air pollution, reduced water quality, Reduced biodiversity, Increased invasive species, Climate change impacts, Impacts on human health and well-being: through increased heat stress, and degraded air quality.	
Cumulative	<p>Apart from urban expansion, the greatest threat to the floral ecology within the Study Area is the continued proliferation of AIP species, resulting in the overall loss of native floral communities within the local area. The proposed development will increase the movement of humans within the area and could lead to increased harvesting of floral SCC and / or the degradation of suitable floral habitat for SCC due to continued exposure to anthropogenic disturbances.</p> <p>The proposed development will result in the clearance of vegetation within the study area, leading to further displacement of faunal species within the local area. Furthermore, ineffective control and monitoring of edge effects can result in the further degradation of the surrounding habitats not earmarked for development. Further degradation of the wetland habitats will not only impact the habitat within the study area, but also the downstream habitat outside thereof.</p>	

J 3.5 Wetlands and Aquatic biodiversity impacts

The preferred layout plan will result in the permanent loss of portions of the wetland features: Portions of HGM 1, HGM 3– 5 will be lost due to the development. Most of the potential aquatic ecosystem impacts of the project are likely to take place during the construction phase.

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	<p>Loss of wetland habitat and ecological structure;</p> <p>Changes to the sociocultural and service provision;</p>	<p>Loss of wetland habitat and ecological structure;</p> <p>Changes to the sociocultural and service provision;</p>	<p>Status quo remains. No development will be undertaken.</p>



	Preferred Alternative	Alternative 2	No-Go Option
	Impacts on the hydrology and sediment balance of the wetlands; and Impacts on water quality.	Impacts on the hydrology and sediment balance of the wetlands; and Impacts on water quality.	
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Immediate and permanent	Immediate and permanent	N/A
Consequence of impact or risk	Loss of wetland habitat and the ecoservices it provides	Loss of wetland habitat and the ecoservices it provides	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Indirect impacts:	Permanent loss or displacement of any invertebrates, birds and small mammals dependant on this particular wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the wetland and the surrounding landscape will be altered	Permanent loss or displacement of any invertebrates, birds and small mammals dependant on this particular wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the wetland and the surrounding landscape will be altered	Unmanaged and un-mitigated subsistence agriculture will continue and proliferate in the wetland systems on site
Cumulative impact prior to mitigation	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Medium (2) to Low (1), given the Ecological Importance and Sensitivity (EIS) ratings of the wetland units on site	Medium (2) to Low (1), given the Ecological Importance and Sensitivity (EIS) ratings of the wetland units on site	No impact
Degree to which the impact can be avoided	Low	Low	N/A
Degree to which the impact can be managed:	Low	Low	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	No structures may be developed within the conserved portion of the HGM 1 wetland unit. A 30m minimum GDARD buffer must be placed around this wetland area, as a no-go area. A Water Use License Application (WULA) must be submitted to the Department of Water Affairs	No structures may be developed within the conserved portion of the HGM 1 wetland unit. A 30m minimum GDARD buffer must be placed around this wetland area, as a no-go area. A Water Use License Application (WULA) must be submitted to the Department of Water Affairs	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Attenuation and associated diffuse release infrastructure must be designed and implemented to mimic the hydrology of a pre-development Halfway House granite landscape. The attenuation facility should retain stormwater runoff and then allow the water to diffuse into the wetland at a slower velocity through diffuse release infrastructure, simulating predevelopment geo-hydrological patterns in the catchment.</p> <p>Attenuation facilities should potentially be linked, from the top of the catchment towards the valley bottom in order to retain water within the landscape as long as possible.</p> <p>Stormwater-infrastructure must be designed to include attenuation facilities as well as diffuse release infrastructure.</p> <p>Swales and attenuation facilities are to be installed along the outer edge of the buffer area of the retained wetland on site.</p> <p>The wetlands associated with HGM 4 require artificial attenuation facilities that are linked to the stormwater infrastructure to diffusely release stormwater from the new development.</p> <p>All construction and site clearing must take place during the dry season to limit potential impacts to the conserved HGM 1 wetland of construction activities.</p>	<p>Attenuation and associated diffuse release infrastructure must be designed and implemented to mimic the hydrology of a pre-development Halfway House granite landscape. The attenuation facility should retain stormwater runoff and then allow the water to diffuse into the wetland at a slower velocity through diffuse release infrastructure, simulating predevelopment geo-hydrological patterns in the catchment.</p> <p>Attenuation facilities should potentially be linked, from the top of the catchment towards the valley bottom in order to retain water within the landscape as long as possible.</p> <p>Stormwater-infrastructure must be designed to include attenuation facilities as well as diffuse release infrastructure.</p> <p>Swales and attenuation facilities are to be installed along the outer edge of the buffer area of the retained wetland on site.</p> <p>The wetlands associated with HGM 4 require artificial attenuation facilities that are linked to the stormwater infrastructure to diffusely release stormwater from the new development.</p> <p>All construction and site clearing must take place during the dry season to limit potential impacts to the conserved HGM 1 wetland of construction activities.</p> <p>In order to gain access to the study area, existing formal and gravel access roads must be utilised. This will ensure no encroachment and</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>In order to gain access to the study area, existing formal and gravel access roads must be utilised. This will ensure no encroachment and indiscriminate vehicle movement and limit disturbance to the conserved wetland.</p> <p>Areas which are to be cleared of vegetation including contractor laydown areas must remain as small as possible and it must be ensured that vegetation clearing is focused to the proposed development footprint.</p> <p>Protect exposed soil/ soil stockpiles by means of a geotextile fabric such as hessian sheeting;</p> <p>Contractor laydown areas should remain outside of the delineated boundaries of the conserved wetland area and associated buffer zone.</p> <p>A designated contractor laydown area should be approved by the Environmental Control Officer (ECO) prior to use</p> <p>An Environmental Control Officer (ECO) must be appointed in order to ensure all water related aspects are adequately mitigated for the life of the proposed development within the study area.</p> <p>The delineated boundaries of the conserved wetland and associated 30 m GDARD Setback buffer zones are recommended to be demarcated as private open space and incorporated as part of the proposed</p>	<p>indiscriminate vehicle movement and limit disturbance to the conserved wetland.</p> <p>Areas which are to be cleared of vegetation including contractor laydown areas must remain as small as possible and it must be ensured that vegetation clearing is focused to the proposed development footprint.</p> <p>Protect exposed soil/ soil stockpiles by means of a geotextile fabric such as hessian sheeting;</p> <p>Contractor laydown areas should remain outside of the delineated boundaries of the conserved wetland area and associated buffer zone.</p> <p>A designated contractor laydown area should be approved by the Environmental Control Officer (ECO) prior to use</p> <p>An Environmental Control Officer (ECO) must be appointed in order to ensure all water related aspects are adequately mitigated for the life of the proposed development within the study area.</p> <p>The delineated boundaries of the conserved wetland and associated 30 m GDARD Setback buffer zones are recommended to be demarcated as private open space and incorporated as part of the proposed development within the study area.</p> <p>During excavation activities, it must be ensured that stockpiles are not higher than 2 m in height and all exposed soil must be protected for the duration of the construction</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>development within the study area.</p> <p>During excavation activities, it must be ensured that stockpiles are not higher than 2 m in height and all exposed soil must be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) to prevent erosion and sedimentation of the conserved wetland.</p> <p>Measures should be undertaken to limit the time in which soil is exposed</p> <p>Dust suppression measures must be implemented (such as spray watering on any gravel roads created) throughout the proposed development activities to prevent excessive dust which may smother hydrophytic vegetation of the wetland.</p> <p>Concrete and cement-related mortars can be toxic to aquatic life and other biota. Proper handling and disposal is considered imperative to minimise and eliminate discharge into the wetland. High alkalinity associated with cement can dramatically affect and contaminate both soil and ground water.</p> <p>Fresh concrete and cement mortar should not be mixed near the proximity of the wetland</p> <p>Mixing of cement should only be undertaken within the construction camp and may not be mixed on bare soil;</p>	<p>phase with a suitable geotextile (e.g. Geojute or hessian sheeting) to prevent erosion and sedimentation of the conserved wetland.</p> <p>Measures should be undertaken to limit the time in which soil is exposed</p> <p>Dust suppression measures must be implemented (such as spray watering on any gravel roads created) throughout the proposed development activities to prevent excessive dust which may smother hydrophytic vegetation of the wetland.</p> <p>Concrete and cement-related mortars can be toxic to aquatic life and other biota. Proper handling and disposal is considered imperative to minimise and eliminate discharge into the wetland. High alkalinity associated with cement can dramatically affect and contaminate both soil and ground water.</p> <p>Fresh concrete and cement mortar should not be mixed near the proximity of the wetland</p> <p>Mixing of cement should only be undertaken within the construction camp and may not be mixed on bare soil;</p> <p>Mixing of concrete is also to be strictly undertaken within a lined, bound or bunded portable mixer. Consideration must be taken to use ready mix concrete;</p> <p>A batter board or other suitable platform/mixing tray is to be provided onto which any mixed</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Mixing of concrete is also to be strictly undertaken within a lined, bound or banded portable mixer. Consideration must be taken to use ready mix concrete;</p> <p>A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing;</p> <p>A washout area should be designated outside of the confines of the wetland;</p> <p>Cement bags must be disposed of in the demarcated hazardous waste receptacles;</p> <p>Concrete spillage outside of the demarcated area must be promptly removed and taken to a suitably licenced waste disposal site</p> <p>Careful planning of the placement of all construction machinery must be undertaken beforehand to ensure that the minimum impact on the wetland occurs during the installation of any service infrastructure;</p> <p>It should be ensured that during the laydown of service infrastructure, the conserved wetland must not be inundated as a result of leaks or spillages associated with joining of pipelines (potentially to the municipal networks), and that an emergency plan should be compiled to ensure a quick response and attendance to the matter in case of a leakage or bursting of a pipeline;</p>	<p>concrete can be deposited whilst it awaits placing;</p> <p>A washout area should be designated outside of the confines of the wetland;</p> <p>Cement bags must be disposed of in the demarcated hazardous waste receptacles;</p> <p>Concrete spillage outside of the demarcated area must be promptly removed and taken to a suitably licenced waste disposal site</p> <p>Careful planning of the placement of all construction machinery must be undertaken beforehand to ensure that the minimum impact on the wetland occurs during the installation of any service infrastructure;</p> <p>It should be ensured that during the laydown of service infrastructure, the conserved wetland must not be inundated as a result of leaks or spillages associated with joining of pipelines (potentially to the municipal networks), and that an emergency plan should be compiled to ensure a quick response and attendance to the matter in case of a leakage or bursting of a pipeline;</p> <p>All manholes that form part of the lateral sewer network and municipal pipeline connections are to be raised outside of 30m GDARD setback buffer zone of. No manholes should be constructed within the delineated boundary of the wetland and 30 m GDARD Setback buffer zones that are to be demarcated as "no-go" areas;</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>All manholes that form part of the lateral sewer network and municipal pipeline connections are to be raised outside of 30m GDARD setback buffer zone of. No manholes should be constructed within the delineated boundary of the wetland and 30 m GDARD Setback buffer zones that are to be demarcated as "no-go" areas;</p> <p>It is recommended that the managing authority test the integrity of the sewer pipelines at least once every five years or more often should there be any sign or reports of a leak;</p> <p>Should a blockage occur, all possible steps must be taken to prevent the pollution of the wetlands during repair including the placement of sheeting around the manholes used for access as well as containment barrels for any effluent withdrawn.</p> <p>An AIP management plan should be developed and implemented following the construction phase of the proposed development which should be applied to wetland. AIP's should be removed by hand and no machinery should be allowed in the UCVB and Seep wetlands;</p> <p>The portions of the wetlands disturbed by construction activities must be rehabilitated with indigenous wetland vegetation, thus reinstating faunal and floral habitats. This will ensure that the current levels of ecological service provision of</p>	<p>It is recommended that the managing authority test the integrity of the sewer pipelines at least once every five years or more often should there be any sign or reports of a leak;</p> <p>Should a blockage occur, all possible steps must be taken to prevent the pollution of the wetlands during repair including the placement of sheeting around the manholes used for access as well as containment barrels for any effluent withdrawn.</p> <p>An AIP management plan should be developed and implemented following the construction phase of the proposed development which should be applied to wetland. AIP's should be removed by hand and no machinery should be allowed in the UCVB and Seep wetlands;</p> <p>The portions of the wetlands disturbed by construction activities must be rehabilitated with indigenous wetland vegetation, thus reinstating faunal and floral habitats. This will ensure that the current levels of ecological service provision of the wetlands are maintained and where feasible, improved.</p> <p>Rehabilitation of these areas should take place after the construction of the proposed development has been completed and ongoing maintenance is required to ensure vegetation growth;</p> <p>Areas within and along the wetlands that have been historically disturbed by infill and deposition must be removed thus reinstating the natural topographical sequences of the landscape and ensuring runoff and</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>the wetlands are maintained and where feasible, improved.</p> <p>Rehabilitation of these areas should take place after the construction of the proposed development has been completed and ongoing maintenance is required to ensure vegetation growth;</p> <p>Areas within and along the wetlands that have been historically disturbed by infill and deposition must be removed thus reinstating the natural topographical sequences of the landscape and ensuring runoff and sediment regimes are maintained as natural as possible.</p>	<p>sediment regimes are maintained as natural as possible.</p>	
Residual impacts:	<p>Long-lasting effects on aquatic ecosystems, polluted water will harm aquatic organisms, disrupt food chains, and lead to biodiversity loss.</p> <p>Water pollution can contaminate groundwater, which is a crucial source of drinking water for the surrounding communities who use boreholes. Contaminated water bodies can impact industries such as agriculture, tourism, and manufacturing, leading to revenue losses, reduced productivity, and increased production costs.</p> <p>Polluted water sources cause risks to human health.</p>	<p>Long-lasting effects on aquatic ecosystems, polluted water will harm aquatic organisms, disrupt food chains, and lead to biodiversity loss.</p> <p>Water pollution can contaminate groundwater, which is a crucial source of drinking water for the surrounding communities who use boreholes. Contaminated water bodies can impact industries such as agriculture, tourism, and manufacturing, leading to revenue losses, reduced productivity, and increased production costs.</p> <p>Polluted water sources cause risks to human health.</p>	N/A
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A



Project Life-cycle	Operational Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Loss of wetland habitat and ecological structure; Changes to the sociocultural and service provision; Impacts on the hydrology and sediment balance of the wetlands; and Impacts on water quality.	Loss of wetland habitat and ecological structure; Changes to the sociocultural and service provision; Impacts on the hydrology and sediment balance of the wetlands; and Impacts on water quality.	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Immediate and permanent	Immediate and permanent	N/A
Consequence of impact or risk	General human interference and impact resulting in the loss of protective freshwater resource and associated habitat.	General human interference and impact resulting in the loss of protective freshwater resource and associated habitat.	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Cumulative impact prior to mitigation	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Medium (2) to Low (1), given the Ecological Importance and Sensitivity (EIS) ratings of the wetland units on site	Medium (2) to Low (1), given the Ecological Importance and Sensitivity (EIS) ratings of the wetland units on site	No impact
Degree to which the impact can be avoided	Low	Low	N/A
Degree to which the impact can be managed:	Low	Low	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: • Mitigation measures stated in the EMP must be implemented	Fence off the conserved wetland on site, otherwise residents will continue to utilize the open space	Fence off the conserved wetland on site, otherwise residents will continue to utilize the open space	N/A
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A



Direct, Indirect and Cumulative Impact discussion:

Wetlands are renowned for their ability to improve water quality, and the potential loss or further degradation to the remainder of these wetlands will definitely decrease the ecological servicing in this area. It must however be acknowledged that these wetlands have undergone transformation as a result of historical agricultural practices which have disturbed the soil profile, resulting in the proliferation of alien vegetation species along the wetland boundaries. Therefore wetland ecological functioning is considered already impaired.

	Construction	Operation
Direct	<p>Loss of floral and faunal habitat, Increase in sediment laden and catchment wide runoff (potentially of a deteriorated water quality), AIP proliferation within the receiving environment due to regular entry of surface water inputs, disturbance of soil and removal of indigenous vegetation, and the alteration of the natural pattern of water in the landscape.</p> <p>Increased stormwater runoff if not attenuated on site, loss of surface and subsurface water recharge to groundwater, Impacts on the Jukskei River catchment downstream of the site</p>	<p>Increase in sediment laden and catchment wide runoff (potentially of a deteriorated water quality), AIP proliferation within the receiving environment due to regular entry of surface water inputs, disturbance of soil and removal of indigenous vegetation, and the alteration of the natural pattern of water in the landscape.</p> <p>Hydrological impacts result in a knock-on impact on geomorphological state with increased channelisation and erosion often occurring. Other indirect impacts include an increase in alien and invasive species entering the system due to regular disturbance of soil and removal of indigenous vegetation.</p> <p>Regular maintenance and monitoring by the municipality is required as part of the proposed development, to ensure stormwater is adequately managed and that no sewage spills and leakages occur within the study area which will further contribute to the degradation of freshwater ecosystems in the region.</p>
Indirect		
Cumulative	<p>Cumulative impacts are activities and their associated impacts on the past, present and foreseeable future, both spatially and temporally, considered together with the impacts identified in the above</p>	



J 3.6 Hydrocensus, Groundwater Use and Groundwater Quality

Project Life-cycle	Construction Phase		
Potential impact and risk:	Changes in the groundwater environment upon borehole users	Changes in the groundwater environment upon borehole users	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Local and Long term	Local and Long term	N/A
Consequence of impact or risk	Groundwater pollution	Groundwater pollution	N/A
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Indirect impacts:	<p>Groundwater contamination can lead to the degradation of drinking water supplies over time, it can alter the quality and availability of water for plants, animals, and microorganisms. This can disrupt ecological balance, affect biodiversity, and lead to the decline or loss of species that depend on groundwater habitats.</p> <p>Contaminated groundwater can seep into surface water bodies, affecting aquatic ecosystems downstream.</p> <p>Groundwater contamination can pose risks to public health.</p>	<p>Groundwater contamination can lead to the degradation of drinking water supplies over time, it can alter the quality and availability of water for plants, animals, and microorganisms. This can disrupt ecological balance, affect biodiversity, and lead to the decline or loss of species that depend on groundwater habitats.</p> <p>Contaminated groundwater can seep into surface water bodies, affecting aquatic ecosystems downstream.</p> <p>Groundwater contamination can pose risks to public health.</p>	N/A
Cumulative impact prior to mitigation	High negative	High negative	No impact
Significance rating of impact prior to mitigation:	Medium (2) to Low (1)	Medium (2) to Low (1)	No impact
Degree to which the impact can be avoided	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation:	<p>At the time of the assessment the groundwater at the boreholes was considered to be suitable for drinking water.</p> <p>Water levels must be monitored quarterly during the construction phase, and bi-annually during the operational phase of the proposed development.</p> <p>The stormwater masterplan and the potential groundwater implications thereof, should be reviewed one year post development and incorporate an analysis of changes in the water levels and water quality of the boreholes, and measures to address, manage or mitigate any emerging concerns should be investigated.</p> <p>The 1:2 year run-off will be attenuated and will be used to recharge the ground water table.</p> <p>Through the use of attenuation measures, the post-development run-off from the development will have similar drainage characteristics as in a permeable, undeveloped state;</p> <p>The absolute recharge volume from the proposed development area into the groundwater environment is likely to be limited;</p> <p>Wherever possible permeable paving and Sustainable Urban Drainage Systems (SUDS) should be implemented to increase infiltration and reduce</p>	<p>At the time of the assessment the groundwater at the boreholes was considered to be suitable for drinking water.</p> <p>Water levels must be monitored quarterly during the construction phase, and bi-annually during the operational phase of the proposed development.</p> <p>The stormwater masterplan and the potential groundwater implications thereof, should be reviewed one year post development and incorporate an analysis of changes in the water levels and water quality of the boreholes, and measures to address, manage or mitigate any emerging concerns should be investigated.</p> <p>The 1:2 year run-off will be attenuated and will be used to recharge the ground water table.</p> <p>Through the use of attenuation measures, the post-development run-off from the development will have similar drainage characteristics as in a permeable, undeveloped state;</p> <p>The absolute recharge volume from the proposed development area into the groundwater environment is likely to be limited;</p> <p>Wherever possible permeable paving and Sustainable Urban Drainage Systems (SUDS)</p>	None required



	Preferred Alternative	Alternative 2	No-Go Option
	<p>loss of recharge of local aquifers;</p> <p>It is recommended that water levels be monitored quarterly during the construction phase, and annually during the operational phase of the proposed development.</p> <p>The groundwater resource has a buffering capacity and the SUDs will assist to treat poor water quality prior to groundwater recharge;</p> <p>Stormwater quality must be monitored to identify potential problematic point and diffuse sources that could negatively impact groundwater quality.</p> <p>Sewer pipelines must be monitored every 5 years;</p> <p>An emergency plan must be in place in case of sewer pipeline failure;</p> <p>It is recommended that water levels be monitored quarterly during the construction phase, and bi-annually during the operational phase of the proposed development.</p>	<p>should be implemented to increase infiltration and reduce loss of recharge of local aquifers;</p> <p>It is recommended that water levels be monitored quarterly during the construction phase, and annually during the operational phase of the proposed development.</p> <p>The groundwater resource has a buffering capacity and the SUDs will assist to treat poor water quality prior to groundwater recharge;</p> <p>Stormwater quality must be monitored to identify potential problematic point and diffuse sources that could negatively impact groundwater quality.</p> <p>Sewer pipelines must be monitored every 5 years;</p> <p>An emergency plan must be in place in case of sewer pipeline failure;</p> <p>It is recommended that water levels be monitored quarterly during the construction phase, and bi-annually during the operational phase of the proposed development.</p>	
Residual impacts:	<p>Prolonged health risks, challenges for remediation efforts, loss of access to clean and reliable water sources, the stigma associated with contaminated groundwater can lead to negative perceptions, reduced property values, and economic challenges for residents and businesses in affected areas.</p>	<p>Prolonged health risks, challenges for remediation efforts, loss of access to clean and reliable water sources, the stigma associated with contaminated groundwater can lead to negative perceptions, reduced property values, and economic challenges for</p>	N/A



	Preferred Alternative	Alternative 2	No-Go Option
		residents and businesses in affected areas.	
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Changes in the groundwater environment upon borehole users	Changes in the groundwater environment upon borehole users	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Local and Long term	Local and Long term	N/A
Consequence of impact or risk	Groundwater pollution	Groundwater pollution	N/A
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Cumulative impact prior to mitigation	High negative	High negative	No impact
Significance rating of impact prior to mitigation:	Low (1) if municipal service capacity and provision is confirmed	Low (1) if municipal service capacity and provision is confirmed	No impact
Degree to which the impact can be avoided	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation:	Wreckless and ignorant spillages or leakages from the mixed land users could contaminate the groundwater in the area. Good monitoring and management measurements must be set in place by facilities managers.	Wreckless and ignorant spillages or leakages from the mixed land users could contaminate the groundwater in the area. Good monitoring and management measurements must be set in place by facilities managers.	None required
Cumulative impact post mitigation:	Medium to low	Medium to low	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	Contamination of ground water resources	Drinking water supply, Health risks, Water treatment costs, Property devaluation, infrastructure modifications.
Indirect	<p>Contaminants in the groundwater can render it unsafe for consumption, and have indirect impacts on ecosystems that rely on groundwater as a source of water. The pollution of groundwater can alter the quality and availability of water for plants, animals, and microorganisms. This can disrupt ecological balance, affect biodiversity, and lead to the decline or loss of species that depend on groundwater habitats. Additionally, contaminated groundwater can seep into surface water bodies, affecting aquatic ecosystems downstream.</p> <p>Groundwater contamination can have significant economic implications. The need for remediation and water treatment to mitigate the impacts of groundwater contamination can be a financial burden for affected individuals, communities, and businesses.</p> <p>The knowledge or perception of groundwater contamination can result in the devaluation of land and property in the affected areas. Homeowners, landowners, and businesses may face difficulties in selling or renting properties due to concerns over water quality and potential health risks. This can lead to financial losses and challenges for individuals and communities relying on property values for equity and economic stability.</p> <p>Contaminants in groundwater, such as heavy metals, organic pollutants, or pathogens, can migrate through the groundwater system and eventually reach drinking water sources. Prolonged exposure to contaminated drinking water can result in various health issues, including gastrointestinal problems, developmental disorders, organ damage, and an increased risk of certain diseases.</p>	
Cumulative	<p>As groundwater contamination persists, it can spread laterally and vertically through the aquifer system. Contaminants can migrate from the original source and affect larger areas over time. This can lead to the expansion of the contaminated zone and the contamination of additional wells, water supply systems, and natural water bodies. The cumulative spread of contamination can result in a broader area being impacted and a higher number of people and ecosystems being exposed to polluted groundwater.</p> <p>Cumulative exposure to contaminated groundwater can increase the health risks for individuals and communities and can result in the long-term degradation of ecosystems. Aquatic organisms, vegetation, and soil health can suffer from continuous exposure to contaminants. This can lead to reduced biodiversity, loss of habitat, altered ecological processes, and imbalances in ecosystems. The cumulative impacts can disrupt food chains, impact sensitive species, and degrade overall ecosystem health and resilience.</p>	



	Construction	Operation
	<p>The costs associated with ongoing water treatment, alternative water supply systems, and health-related expenses can accumulate over time. Affected communities may experience reduced property values, limited economic opportunities, and social stress due to the prolonged effects of contamination.</p> <p>Ongoing contamination will require continuous monitoring, mitigation, and long-term remediation strategies.</p>	

J 3.7 Agricultural Potential

Project Life-cycle	Construction and Operational Phases		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Loss of potential arable land and agricultural production	Loss of potential arable land and agricultural production	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact
Extent and duration of impact:	Site and long term	Site and long term	N/A
Consequence of impact or risk	Loss of potential arable land and agricultural production	Loss of potential arable land and agricultural production	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Indirect impacts:	Food security and supply increased pressure on remaining agricultural areas intensify agricultural practices on the remaining land to maintain or increase production levels	Food security and supply increased pressure on remaining agricultural areas intensify agricultural practices on the remaining land to maintain or increase production levels	N/A
Cumulative impact prior to mitigation	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation:	Low negative (1)	Low negative (1)	No impact
Degree to which the impact can be avoided	Low	Low	N/A
Degree to which the impact can be managed:	Low	Low	N/A
Degree to which the impact can be mitigated:	Low	Low	N/A
Proposed mitigation:	Adopting land-use planning and policies that prioritize the protection of agricultural land.	Adopting land-use planning and policies that prioritize the	None required



	Preferred Alternative	Alternative 2	No-Go Option
<ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	Communicate the project schedule to community members to ensure that those individuals involved in subsistence agricultural practices on site understand the outcomes and the impact on their crop production.	<p>protection of agricultural land.</p> <p>Communicate the project schedule to community members to ensure that those individuals involved in subsistence agricultural practices on site understand the outcomes and the impact on their crop production.</p>	
Residual impacts:	<p>Loss of arable land reduces the potential for agricultural production.</p> <p>Depletion of soil and water resources</p>	<p>Loss of arable land reduces the potential for agricultural production.</p> <p>Depletion of soil and water resources</p>	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

The relative extent of the soils with arable agricultural potential identified within the investigated subject property is unlikely to justify the acquisition and maintenance of essential farm implements, and the extent of these soil is therefore considered unlikely to sustain viable crop production at a commercial scale. With the currently extensively urbanised surrounding area, the likelihood of larger tracts of land being combined into a viable agricultural land use unit is unlikely, and it is deemed more likely that the erven in the surrounding area will undergo further and increasing levels of subdivision in the future. The soils on site are therefore at best well suited to subsistence farming.

J 3.8 Visual Impacts

Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Alteration of the visual character of the site and the sense of place.	Alteration of the visual character of the site and the sense of place.	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and Long term	Local and Long term	N/A
Consequence of impact or risk	Increased availability of housing units, economic growth and improved	Increased availability of housing units, economic growth and improved	



	Preferred Alternative	Alternative 2	No-Go Option
	infrastructure to an area, changes to the character and identity of a neighbourhood, influx of new residents, demographic shifts, and changes in neighbourhood relationships.	infrastructure to an area, changes to the character and identity of a neighbourhood, influx of new residents, demographic shifts, and changes in neighbourhood relationships.	
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Indirect impacts:	<p>Changes to the overall landscape character of an area, Loss of open space can impact the visual quality of the area, sense of overcrowding or loss of natural beauty.</p> <p>The architectural choices made in the development can significantly impact the overall visual impression of the area.</p> <p>Perceived sense of visual clutter and a sense of congestion.</p> <p>Changes in skyline and views.</p>	<p>Changes to the overall landscape character of an area, Loss of open space can impact the visual quality of the area, sense of overcrowding or loss of natural beauty.</p> <p>The architectural choices made in the development can significantly impact the overall visual impression of the area.</p> <p>Perceived sense of visual clutter and a sense of congestion.</p> <p>Changes in skyline and views.</p>	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Medium negative (2)	Medium negative (2)	No impact
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	Moderate	Moderate	N/A
Degree to which the impact can be mitigated:	Moderate	Moderate	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	<p>Establish design guidelines and standards that ensure the architectural design of the buildings within the development is visually appealing and cohesive.</p>	<p>Establish design guidelines and standards that ensure the architectural design of the buildings within the development is visually appealing and cohesive.</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Variations in building heights can create visual interest and reduce the perceived bulkiness of high-density structures. Breaking up the visual monotony can help integrate the buildings more harmoniously into the surrounding environment.</p> <p>Incorporate extensive landscaping and green spaces within and around the development. Well-designed green areas, parks, gardens, and tree-lined streets can soften the visual impact of high-density buildings and create a more visually appealing environment. Greenery also provides visual relief and contributes to the overall livability and attractiveness of the development.</p> <p>Emphasize pedestrian-friendly design principles to enhance the visual experience at ground level. Wide sidewalks, attractive paving materials, street furniture, and landscaping along walkways. By creating an inviting and visually pleasing pedestrian environment, the perceived visual impacts of high-density development can be mitigated.</p> <p>Implement visual screening techniques to minimize the direct visual impact of high-density buildings on neighboring properties or public spaces. This can include the strategic placement of</p>	<p>Variations in building heights can create visual interest and reduce the perceived bulkiness of high-density structures. Breaking up the visual monotony can help integrate the buildings more harmoniously into the surrounding environment.</p> <p>Incorporate extensive landscaping and green spaces within and around the development. Well-designed green areas, parks, gardens, and tree-lined streets can soften the visual impact of high-density buildings and create a more visually appealing environment. Greenery also provides visual relief and contributes to the overall livability and attractiveness of the development.</p> <p>Emphasize pedestrian-friendly design principles to enhance the visual experience at ground level. Wide sidewalks, attractive paving materials, street furniture, and landscaping along walkways. By creating an inviting and visually pleasing pedestrian environment, the perceived visual impacts of high-density development can be mitigated.</p> <p>Implement visual screening techniques to minimize the direct visual impact of high-density buildings on neighboring properties or public spaces. This can include the strategic placement of trees, hedges, fences, or walls</p>	None required



	Preferred Alternative	Alternative 2	No-Go Option
	<p>trees, hedges, fences, or walls to create visual buffers and privacy for both residents and surrounding areas.</p> <p>Integrate public art installations, sculptures, murals, or other aesthetic enhancements within the development. These features can serve as focal points, create visual appeal, and contribute to a sense of community identity and pride.</p> <p>Lighting design within the development can ensure safe and visually appealing night time environments. Proper illumination of public spaces can contribute to the visual quality and ambiance of the development.</p> <p>Involve the community in the design process to understand their visual preferences and concerns. By incorporating community feedback and engaging stakeholders, the development can better address and mitigate any perceived visual impacts.</p>	<p>to create visual buffers and privacy for both residents and surrounding areas.</p> <p>Integrate public art installations, sculptures, murals, or other aesthetic enhancements within the development. These features can serve as focal points, create visual appeal, and contribute to a sense of community identity and pride.</p> <p>Lighting design within the development can ensure safe and visually appealing night time environments. Proper illumination of public spaces can contribute to the visual quality and ambiance of the development.</p> <p>Involve the community in the design process to understand their visual preferences and concerns. By incorporating community feedback and engaging stakeholders, the development can better address and mitigate any perceived visual impacts.</p>	
Residual impacts:	<p>Skyline and landscape changes</p> <p>Disruption of natural or rural vistas, Changes in neighbourhood character, Visual contrast and compatibility, Visual impact on nearby properties</p>	<p>Skyline and landscape changes</p> <p>Disruption of natural or rural vistas, Changes in neighbourhood character, Visual contrast and compatibility, Visual impact on nearby properties</p>	N/A
Cumulative impact post mitigation:	Moderate	Moderate	N/A
Significance rating of impact after mitigation:	Low negative (1) with the lapse of time	Low negative (1) with the lapse of time	N/A



Project Life-cycle	Operational Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Visual impact of buildings on surrounding residents, tourists and motorists.	Visual impact of buildings on surrounding residents, tourists and motorists.	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and Long term	Local and Long term	N/A
Consequence of impact or risk	<p>The proposed development will be highly visible from adjacent rural-residential, formal and informal houses and facilities in immediate proximity to the perimeter of the site, and may intrude on the visual character of the natural environment.</p> <p>Change in sense of place of the site, however appropriate and good design will result in an improved urban character and will positively enhance the site and surrounding urban context potentially raising economic value of surrounding areas</p>	<p>The proposed development will be highly visible from adjacent rural-residential, formal and informal houses and facilities in immediate proximity to the perimeter of the site, and may intrude on the visual character of the natural environment.</p> <p>Change in sense of place of the site, however appropriate and good design will result in an improved urban character and will positively enhance the site and surrounding urban context potentially raising economic value of surrounding areas</p>	
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant Loss	Significant Loss	N/A
Degree to which the impact can be reversed:	Fully reversible if all the buildings and infrastructure were removed from the site and the land rehabilitated. This is unlikely to occur.	Fully reversible if all the buildings and infrastructure were removed from the site and the land rehabilitated. This is unlikely to occur.	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Medium negative (2)	Medium negative (2)	No impact
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	Moderate	Moderate	N/A
Degree to which the impact can be mitigated:	Moderate	Moderate	N/A
Proposed mitigation:	<ul style="list-style-type: none"> Architectural guidelines (including 	<ul style="list-style-type: none"> Architectural guidelines (including 	



<ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	<p>aspects of roof and wall finishes, colors, heights of buildings, and lighting), as well as Landscape Architectural guidelines (screening, buffering, functioning, aesthetics etc.) for the development must be developed to promote the enhancement of this urban area and therefore creating new and valuable places with a modified and positive urban mixed-use sense of place that is vibrant and diverse.</p> <ul style="list-style-type: none"> Indigenous, water-wise vegetation must be used as far as possible. Low level, unobtrusive and contextually appropriate signage must be used. All areas disturbed or affected by construction activities, must be rehabilitated (including topsoil and re-vegetation) after construction. Internal roads and drainage for runoff should be appropriately stabilised to avoid erosion and visual scars. Sufficient funds must be allocated to ensure ongoing 	<p>aspects of roof and wall finishes, colors, heights of buildings, and lighting), as well as Landscape Architectural guidelines (screening, buffering, functioning, aesthetics etc.) for the development must be developed to promote the enhancement of this urban area and therefore creating new and valuable places with a modified and positive urban mixed-use sense of place that is vibrant and diverse.</p> <ul style="list-style-type: none"> Indigenous, water-wise vegetation must be used as far as possible. Low level, unobtrusive and contextually appropriate signage must be used. All areas disturbed or affected by construction activities, must be rehabilitated (including topsoil and re-vegetation) after construction. Internal roads and drainage for runoff should be appropriately stabilised to avoid erosion and visual scars. Sufficient funds must be allocated to ensure ongoing maintenance of communal landscaped areas. 	<p>None required</p>
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	maintenance of communal landscaped areas.		
Residual impacts:	Skyline and landscape changes Disruption of natural or rural vistas, Changes in neighbourhood character, Visual contrast and compatibility, Visual impact on nearby properties	Skyline and landscape changes Disruption of natural or rural vistas, Changes in neighbourhood character, Visual contrast and compatibility, Visual impact on nearby properties	N/A
Cumulative impact post mitigation:	Moderate	Moderate	N/A
Significance rating of impact after mitigation:	Low negative (1) with the lapse of time	Low negative (1) with the lapse of time	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	<p>The presence of construction equipment, such as cranes, excavators, bulldozers, and trucks, can significantly change the visual appearance of the vacant land. These large machines and vehicles can be visually dominant and may alter the scale and character of the site.</p> <p>Construction sites require the installation of temporary structures, including construction trailers, temporary offices, storage containers, and fencing. These structures may not blend harmoniously with the surrounding environment and can alter the visual aesthetics of the site.</p> <p>Dust and debris during excavation, grading, or demolition. Dust particles in the air can reduce visibility and create a hazy or dirty appearance in the vicinity of the construction site. Debris from demolition or construction materials can also contribute to a cluttered visual environment.</p> <p>Piles of construction materials such as bricks, concrete blocks, steel, lumber, and other building materials may be stored on-site during construction. These materials can create visual clutter and may not be aesthetically pleasing, especially when they are exposed and not organized.</p> <p>The grading and excavation required for construction can result in changes to the topography and landform of the vacant land. The</p>	<p>Changes to the overall landscape character of an area, Loss of open space can impact the visual quality of the area, sense of overcrowding or loss of natural beauty.</p> <p>The architectural choices made in the development can significantly impact the overall visual impression of the area.</p> <p>Perceived sense of visual clutter and a sense of congestion.</p> <p>Changes in skyline and views.</p>



	<p>removal or redistribution of soil, levelling of slopes can alter the natural contours and visual appearance of the site.</p>	
Indirect	<p>The transformation of vacant land into a residential development can alter the skyline and overall landscape of an area. The introduction of high-density structures can change the visual profile of the surroundings, potentially impacting scenic views, vistas, and the overall character of the skyline.</p> <p>Disruption of natural or rural vistas.</p> <p>The introduction of a residential development can alter the visual character of a neighbourhood. This may include changes in architectural styles, building heights, building materials, and overall urban design elements. The visual cohesion and continuity of the neighbourhood may be impacted, which can lead to changes in perceived identity and aesthetics.</p> <p>The new development may create visual contrast or clash with the existing architectural styles, land uses, or design patterns. This can affect the overall visual harmony and cohesiveness of the area.</p> <p>Construction of new roads, sidewalks, street lighting, and utility installations. These changes can impact the visual experience of the area, particularly in terms of visual clutter, traffic flow, and overall streetscape design.</p> <p>Vacant land characterized by open spaces and natural vegetation. When transformed into residential development, the loss of these green spaces and vegetation can impact the visual quality and ecological value of the area. The absence of natural elements may result in a more built-up environment with reduced visual relief.</p> <p>The visual impacts of a large residential development can extend to neighbouring properties. Existing residents may experience changes in their visual surroundings, such as loss of privacy, altered views, or changes in daylight and sunlight exposure. These impacts can affect the visual enjoyment and perceived value of neighbouring properties.</p>	



Cumulative	<p>The construction of a high density mixed land use development alters the visual character of the area by introducing new built structures, roads, and infrastructure. Over time, as more residential units are added and the development expands, the cumulative effect can lead to a significant transformation of the built environment. This will result in a denser, more urbanized, or suburbanized landscape.</p> <p>Loss of natural features and open space can impact the visual diversity, sense of natural beauty, and ecological balance of the surrounding environment.</p> <p>The addition of taller buildings or high-rise structures within the residential development can change the skyline and visual profile of the area. As the development grows, the cumulative effect of these vertical elements can alter the overall visual composition of the skyline and impact the visual experience from different vantage points.</p> <p>Building heights, landscaping, and overall urban design elements can affect the visual coherence, continuity, and aesthetics of the neighbourhood.</p>
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J 3.9 Noise Impacts

Project Life-cycle	Construction Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Elevated noise levels	Elevated noise levels	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Site and medium to long term	Site and medium to long term	N/A
Consequence of impact or risk	Physical and mental human health affecting adjacent residents quality of life	Physical and mental human health affecting adjacent residents quality of life	
Probability of occurrence:	Highly likely	Highly likely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	N/A	N/A	N/A
Indirect impacts:	High noise levels can interfere with social interactions and gatherings Health issues arising from prolonged exposure to noise pollution can lead to increased healthcare expenses for individuals and society as a whole.	High noise levels can interfere with social interactions and gatherings Health issues arising from prolonged exposure to noise pollution can lead to increased healthcare expenses for individuals and society as a whole.	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	Construction noise and urban development can fragment natural habitats, creating barriers for wildlife movement and reducing habitat connectivity.	Construction noise and urban development can fragment natural habitats, creating barriers for wildlife movement and reducing habitat connectivity.	
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation:	Low negative (1)	Low negative (1)	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMP must be implemented 	Noise regulations and mitigation measures, such as sound barriers, noise-reducing technologies, and urban planning strategies, can help minimize the extent and duration of the impact of elevated noise levels on both humans and the environment.	Noise regulations and mitigation measures, such as sound barriers, noise-reducing technologies, and urban planning strategies, can help minimize the extent and duration of the impact of elevated noise levels on both humans and the environment.	None required
Residual impacts:	Long-term exposure to elevated noise levels can make individuals more sensitive to even moderate levels of noise, leading to discomfort and reduced quality of life. Stress and Anxiety Sleep disruption Unmitigated noise pollution can influence social patterns within communities, affecting communication habits, recreational choices, and community dynamics.	Long-term exposure to elevated noise levels can make individuals more sensitive to even moderate levels of noise, leading to discomfort and reduced quality of life. Stress and Anxiety Sleep disruption Unmitigated noise pollution can influence social patterns within communities, affecting communication habits, recreational choices, and community dynamics.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A



Project Life-cycle	Operational Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Elevated noise levels	Elevated noise levels	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Site and medium to long term	Site and medium to long term	N/A
Consequence of impact or risk	As the site will be established no major impacts are expected, however, due to the phased nature of the project construction activities will continue for a lengthy period Increased traffic noise, mechanical ventilation and other sources of noise from the developments – HVAC system, retail extractor fans and back up generators. Increased noise level from operational school activities	As the site will be established no major impacts are expected, however, due to the phased nature of the project construction activities will continue for a lengthy period Increased traffic noise, mechanical ventilation and other sources of noise from the developments – HVAC system, retail extractor fans and back up generators. Increased noise level from operational school activities	
Probability of occurrence:	Highly likely	Highly likely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	N/A	N/A	N/A
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation:	Moderate (2)	Moderate (2)	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation:	Noise regulations and mitigation measures, such as sound barriers, noise-reducing technologies, and urban planning strategies, can help minimize the extent and duration of the impact of	Noise regulations and mitigation measures, such as sound barriers, noise-reducing technologies, and urban planning strategies, can help minimize the extent and duration of the impact of	None required



	Preferred Alternative	Alternative 2	No-Go Option
	elevated noise levels on both humans and the environment.	elevated noise levels on both humans and the environment.	
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	Elevated construction noise can cause significant disturbance to nearby residents, interfering with their daily routines, sleep patterns, and overall quality of life. Construction noise and urban development can fragment natural habitats, creating barriers for wildlife movement and reducing habitat connectivity.	High noise levels can interfere with social interactions and gatherings. Health issues arising from prolonged exposure to noise pollution can lead to increased healthcare expenses for individuals and society as a whole.
Indirect		
Cumulative	Compounded Stress and Health Risks: Cumulative exposure to elevated noise levels can intensify the physiological and psychological stress response, leading to an increased risk of stress-related health conditions such as cardiovascular issues, mental health disorders, and sleep disturbances. Cumulative negative impact on community well-being, including diminished social cohesion, reduced quality of life, and decreased satisfaction with the living environment.	

J 3.10 Air Quality

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Dust and air pollutants	Dust and air pollutants	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and medium to long term	Local and medium to long term	N/A
Consequence of impact or risk	Construction-related dust Diesel emissions	Construction-related dust Diesel emissions	



	Preferred Alternative	Alternative 2	No-Go Option
	Chemical contaminants that can release volatile organic compounds (VOCs) into the air.	Chemical contaminants that can release volatile organic compounds (VOCs) into the air.	
Probability of occurrence:	Highly Probable	Highly Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	Partly reversible	Partly reversible	N/A
Indirect impacts:	Poor air quality resulting from construction activities can affect the health of nearby residents, Construction-related air pollutants can have indirect impacts on ecosystems, including damage to vegetation, soil contamination, and disruption of ecological processes. Airborne pollutants can deposit onto nearby water bodies and soil, contributing to water pollution and affecting the quality of soil and vegetation in the surrounding area.	Poor air quality resulting from construction activities can affect the health of nearby residents, Construction-related air pollutants can have indirect impacts on ecosystems, including damage to vegetation, soil contamination, and disruption of ecological processes. Airborne pollutants can deposit onto nearby water bodies and soil, contributing to water pollution and affecting the quality of soil and vegetation in the surrounding area.	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Medium negative (2)	Medium negative (2)	No impact
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Medium	Medium	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMPr 	Water Suppression: Apply water to construction sites and areas prone to dust generation using water trucks, sprinklers, to suppress dust particles. Windbreaks and Barriers: Erect windbreaks or barriers, such as mesh fences or temporary walls, to reduce the spread of dust to surrounding areas.	Water Suppression: Apply water to construction sites and areas prone to dust generation using water trucks, sprinklers, to suppress dust particles. Windbreaks and Barriers: Erect windbreaks or barriers, such as mesh fences or temporary walls, to reduce the spread of dust to surrounding areas.	None required



	Preferred Alternative	Alternative 2	No-Go Option
must be implemented	<p>Ground Covering: Use mulch, gravel, or other ground covers to stabilize exposed soil and minimize dust generation.</p> <p>Vegetation Preservation: Protect and maintain existing vegetation on and around the construction site to act as a natural dust barrier.</p> <p>Use Low-Emission Equipment: Employ construction machinery and vehicles with low-emission engines, such as those compliant with the latest emission standards.</p> <p>Maintain construction equipment and vehicles properly to ensure optimal performance, including routine engine maintenance, filter replacements, and fuel system checks.</p> <p>Implement policies that discourage unnecessary idling of construction vehicles and equipment to minimize emissions.</p> <p>Properly cover and store construction materials, such as sand, soil, or aggregate, to prevent wind erosion and minimize dust generation.</p> <p>Provide training to construction workers on best practices for dust and emission control, including proper equipment operation, dust suppression techniques, and the importance of emission reduction.</p>	<p>Ground Covering: Use mulch, gravel, or other ground covers to stabilize exposed soil and minimize dust generation.</p> <p>Vegetation Preservation: Protect and maintain existing vegetation on and around the construction site to act as a natural dust barrier.</p> <p>Use Low-Emission Equipment: Employ construction machinery and vehicles with low-emission engines, such as those compliant with the latest emission standards.</p> <p>Maintain construction equipment and vehicles properly to ensure optimal performance, including routine engine maintenance, filter replacements, and fuel system checks.</p> <p>Implement policies that discourage unnecessary idling of construction vehicles and equipment to minimize emissions.</p> <p>Properly cover and store construction materials, such as sand, soil, or aggregate, to prevent wind erosion and minimize dust generation.</p> <p>Provide training to construction workers on best practices for dust and emission control, including proper equipment operation, dust suppression techniques, and the importance of emission reduction.</p>	
Residual impacts:	<p>Prolonged exposure to poor air quality can lead to the development or worsening of respiratory conditions such as asthma, bronchitis,</p> <p>Persistent air pollution can disrupt ecosystems, impacting</p>	<p>Prolonged exposure to poor air quality can lead to the development or worsening of respiratory conditions such as asthma, bronchitis,</p> <p>Persistent air pollution can disrupt ecosystems, impacting</p>	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	<p>plant and animal life, biodiversity, and the overall ecological balance.</p> <p>Soil and Water Contamination: Air pollutants can deposit onto land and water bodies, contaminating soil, water sources, and aquatic ecosystems.</p> <p>Acidification: Certain air pollutants, such as sulfur dioxide (SO₂) and nitrogen oxides (NO_x), can contribute to acid rain, which can damage vegetation, harm aquatic life, and degrade buildings and infrastructure.</p> <p>Lingering effects of poor air quality can negatively impact the overall quality of life for individuals and communities, causing discomfort, reduced outdoor activities, and limited access to clean and healthy environments.</p> <p>Residual impacts of poor air quality may disproportionately affect vulnerable populations, including low-income communities and marginalized groups, exacerbating existing social inequities.</p>	<p>plant and animal life, biodiversity, and the overall ecological balance.</p> <p>Soil and Water Contamination: Air pollutants can deposit onto land and water bodies, contaminating soil, water sources, and aquatic ecosystems.</p> <p>Acidification: Certain air pollutants, such as sulfur dioxide (SO₂) and nitrogen oxides (NO_x), can contribute to acid rain, which can damage vegetation, harm aquatic life, and degrade buildings and infrastructure.</p> <p>Lingering effects of poor air quality can negatively impact the overall quality of life for individuals and communities, causing discomfort, reduced outdoor activities, and limited access to clean and healthy environments.</p> <p>Residual impacts of poor air quality may disproportionately affect vulnerable populations, including low-income communities and marginalized groups, exacerbating existing social inequities.</p>	
Cumulative impact post mitigation:	Medium	Medium	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Dust and air pollutants	Dust and air pollutants	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and medium to long term	Local and medium to long term	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Consequence of impact or risk	Due to the phased nature of the project, construction activities and vehicles on site will be continued during the operational phases of the greater development	Due to the phased nature of the project, construction activities and vehicles on site will be continued during the operational phases of the greater development	
Probability of occurrence:	Highly Probable	Highly Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	Partly reversible	Partly reversible	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Low negative (1)	Low negative (1)	No impact
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Medium	Medium	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the EMPr must be implemented 	The final built township will have asphalt roads which will be paved, and dust will thus be eliminated.	The final built township will have asphalt roads which will be paved, and dust will thus be eliminated.	None required
Cumulative impact post mitigation:	Medium	Medium	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	Construction-related dust Diesel emissions Chemical contaminants that can release volatile organic compounds (VOCs) into the air	Poor air quality can lead to discomfort and irritation for adjacent residents. Certain forms of renewable energy, such as solar power, can be affected by poor air quality when high levels of air pollution reduce the amount of sunlight reaching solar panels.



	Construction	Operation
Indirect	<p>Poor air quality can lead to a higher incidence of respiratory illnesses, cardiovascular diseases, and other health conditions. This results in increased healthcare expenditures, including medical treatments, hospitalizations, and medication.</p> <p>Impact on Vulnerable Populations: Certain groups, such as children, the elderly, and individuals with pre-existing health conditions, are more susceptible to the indirect impacts of poor air quality, leading to greater health risks and healthcare needs.</p> <p>Decreased Property Values: Poor air quality can lead to decreased property values in affected areas, as potential buyers may be deterred by health concerns and the perceived lower quality of living.</p> <p>Poor air quality can harm ecosystems by damaging vegetation, and disrupting the balance of species.</p> <p>Air pollutants can deposit onto soil and water bodies, leading to contamination and degradation of these vital resources. This can impact water quality, and aquatic ecosystems.</p> <p>The indirect impact of poor air quality on the global climate can result in long-term environmental consequences, including altered weather patterns and rising temperatures.</p>	
Cumulative	As above	

J 3.11 Heritage

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Loss of sites, features, or objects of cultural heritage significance	Loss of sites, features, or objects of cultural heritage significance	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Site and permanent	Site and permanent	N/A
Consequence of impact or risk	Loss of sites, features, or objects of cultural heritage significance	Loss of sites, features, or objects of cultural heritage significance	
Probability of occurrence:	Unlikely	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Irreplaceable	Irreplaceable	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Indirect impacts:	Loss of sites, features, or objects of cultural heritage significance	Loss of sites, features, or objects of cultural heritage significance	N/A
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation:	Low negative	Low negative	No impact
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation:	Mitigation measures stated in the EMPr for chance finds must be implemented	Mitigation measures stated in the EMPr for chance finds must be implemented	None required
Residual impacts:	No residual impacts anticipated.	No residual impacts anticipated.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation:	Low	Low	N/A

Project Life-cycle	Operational Phase
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Although highly doubtful, should any potentially culturally significant artefacts or graves, etc. be found during the operational phase, the development management is to be informed and a Cultural Heritage practitioner is to be contacted to decide on a way forward

Direct, Indirect and Cumulative Impact discussion:

The site visit undertaken by the heritage specialist confirms that the largest extent of the proposed project site is found to be of very low heritage sensitivity. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

J 3.12 Social Impacts

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	<ul style="list-style-type: none"> Investment and the contribution to the national, regional and local economy; 	<ul style="list-style-type: none"> Investment and the contribution to the national, regional and local economy; 	Status quo remains. No development will be undertaken.



	Preferred Alternative	Alternative 2	No-Go Option
	<ul style="list-style-type: none"> • Creation of employment, income and skills; • Pressures on community fabric and resources due to an influx of jobseekers; • Accommodating workforce on site • Impact on adjacent property values • Impact on Daily Living and Movement Patterns, Impact on Social Networks • Impact on subsistence Agricultural Practices • Health Safety and Security Risks 	<ul style="list-style-type: none"> • Creation of employment, income and skills; • Pressures on community fabric and resources due to an influx of jobseekers; • Accommodating workforce on site • Impact on adjacent property values • Impact on Daily Living and Movement Patterns, Impact on Social Networks • Impact on subsistence Agricultural Practices • Health Safety and Security Risks 	
Nature of impact:	Positive and Negative	Positive and Negative	No impact.
Extent and duration of impact:	Regional and Long term	Regional and Long term	N/A
Consequence of impact or risk	<p>High-density residential development can help meet the growing demand for housing in densely populated areas. High-density developments can put a strain on existing infrastructure, including transportation networks, utilities (water, electricity, sewage), and public services (schools, healthcare facilities). This can result in overcrowding, increased congestion, and inadequate access to essential services, impacting the quality of life for residents. The introduction of high-density developments can alter the character and social dynamics of existing neighbourhoods. This can lead to changes in community cohesion, social interactions, and a sense of place, potentially impacting social relationships and community well-being. High-density residential developments can create</p>	<p>High-density residential development can help meet the growing demand for housing in densely populated areas. High-density developments can put a strain on existing infrastructure, including transportation networks, utilities (water, electricity, sewage), and public services (schools, healthcare facilities). This can result in overcrowding, increased congestion, and inadequate access to essential services, impacting the quality of life for residents. The introduction of high-density developments can alter the character and social dynamics of existing neighbourhoods. This can lead to changes in community cohesion, social interactions, and a sense of place, potentially impacting social relationships and community well-being.</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	economic opportunities through increased demand for local businesses, job creation in construction and related sectors, and improved urban vitality. However, there can also be challenges in ensuring that economic benefits are inclusive and accessible to all residents.	balance. High-density residential developments can create economic opportunities through increased demand for local businesses, job creation in construction and related sectors, and improved urban vitality. However, there can also be challenges in ensuring that economic benefits are inclusive and accessible to all residents.	
Probability of occurrence:	Highly Probable	Highly Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	N/A	N/A	N/A
Indirect impacts:	High-density residential development can place indirect pressure on infrastructure such as roads, public transportation systems, water and sewage systems, and utilities. This may require additional investments in infrastructure to accommodate the increased population density and meet the demand for services. The influx of residents in high-density developments can lead to increased demand for public services, including schools, healthcare facilities, police, and emergency services. Adequate provision of these services may require additional resources and planning. High-density residential developments can create opportunities for local businesses, such as retail stores, restaurants, and services, by generating increased customer demand and foot traffic. This	High-density residential development can place indirect pressure on infrastructure such as roads, public transportation systems, water and sewage systems, and utilities. This may require additional investments in infrastructure to accommodate the increased population density and meet the demand for services. The influx of residents in high-density developments can lead to increased demand for public services, including schools, healthcare facilities, police, and emergency services. Adequate provision of these services may require additional resources and planning. High-density residential developments can create opportunities for local businesses, such as retail stores, restaurants, and services, by generating increased customer demand and foot traffic. This can	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	<p>can contribute to economic growth and job creation.</p> <p>The presence of high-density developments can potentially impact property values in the surrounding area. Depending on factors such as location, design, and desirability, property values may rise or decline, which can have implications for existing homeowners and renters.</p> <p>Community Dynamics: High-density residential development can influence the dynamics of community interactions. The proximity of residents in densely populated areas may foster social connections, promote community engagement, and enhance neighbourhood cohesion. Conversely, it may also present challenges in terms of privacy, noise levels, and conflicting interests among residents.</p> <p>High-density developments can provide opportunities for diverse populations to live in close proximity, fostering cultural exchange and inclusivity. However, it is important to ensure that housing remains affordable and accessible to all income groups to prevent exclusion and social stratification.</p> <p>High-density residential development can encourage more efficient land use, reduce urban sprawl, and promote sustainable practices. However, it is crucial to address the indirect impacts on the environment, such as increased energy consumption, waste generation, and potential strain on local ecosystems.</p>	<p>contribute to economic growth and job creation.</p> <p>The presence of high-density developments can potentially impact property values in the surrounding area. Depending on factors such as location, design, and desirability, property values may rise or decline, which can have implications for existing homeowners and renters.</p> <p>Community Dynamics: High-density residential development can influence the dynamics of community interactions. The proximity of residents in densely populated areas may foster social connections, promote community engagement, and enhance neighbourhood cohesion. Conversely, it may also present challenges in terms of privacy, noise levels, and conflicting interests among residents.</p> <p>High-density developments can provide opportunities for diverse populations to live in close proximity, fostering cultural exchange and inclusivity. However, it is important to ensure that housing remains affordable and accessible to all income groups to prevent exclusion and social stratification.</p> <p>High-density residential development can encourage more efficient land use, reduce urban sprawl, and promote sustainable practices. However, it is crucial to address the indirect impacts on the environment, such as increased energy consumption, waste generation, and</p>	



	Preferred Alternative	Alternative 2	No-Go Option
	High-density residential developments often lead to increased transportation demand, requiring efficient and sustainable transportation options. This may include improvements in public transportation infrastructure, pedestrian and cycling facilities, and transportation demand management strategies to minimize congestion and reduce reliance on private vehicles.	potential strain on local ecosystems. High-density residential developments often lead to increased transportation demand, requiring efficient and sustainable transportation options. This may include improvements in public transportation infrastructure, pedestrian and cycling facilities, and transportation demand management strategies to minimize congestion and reduce reliance on private vehicles.	
Cumulative impact prior to mitigation:	High negative and high positive	High negative and high positive	No impact
Significance rating of impact prior to mitigation:	High negative (3) and high positive ++	High negative (3) and high positive ++	No impact
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	N/A
Degree to which the impact can be managed:	Partly	Partly	N/A
Degree to which the impact can be mitigated:	Partly	Partly	N/A
Proposed mitigation: <ul style="list-style-type: none"> Mitigation measures stated in the SIA, appendix 21, must be implemented 	Addressing the potential consequences requires careful urban planning, community engagement, and policy interventions. This includes ensuring affordable housing options, providing adequate infrastructure and services, promoting sustainable development practices, fostering social inclusion, and implementing strategies to minimize negative impacts on existing communities. Effective collaboration among stakeholders, including government agencies, developers, community organizations, and residents, is essential to mitigate potential socio-economic risks and maximize the positive impacts	Addressing the potential consequences requires careful urban planning, community engagement, and policy interventions. This includes ensuring affordable housing options, providing adequate infrastructure and services, promoting sustainable development practices, fostering social inclusion, and implementing strategies to minimize negative impacts on existing communities. Effective collaboration among stakeholders, including government agencies, developers, community organizations, and residents, is essential to mitigate potential socio-economic risks and maximize the positive impacts of	None required



	Preferred Alternative	Alternative 2	No-Go Option
	of high-density residential development.	high-density residential development.	
Residual impacts:	<p>High-density residential development can contribute to rising housing costs, making it less affordable for lower-income individuals and exacerbating socio-economic inequalities.</p> <p>As property values increase in high-density areas, existing residents, particularly those with lower incomes, may face challenges in affording housing and may be at risk of displacement, potentially leading to social and economic disruption.</p> <p>High-density residential development can result in changes to the character and identity of a neighbourhood. This may include alterations to architectural styles, the mix of housing types, and the demographics of the community, which can impact social relationships and community cohesion.</p> <p>Rapid urbanization and high-density development can lead to the loss of cultural heritage and the erosion of local identity as communities and traditional structures are replaced by newer developments.</p> <p>Over time, high-density residential developments can place additional strain on existing infrastructure, leading to the deterioration of roads, utilities, and public facilities. This requires ongoing maintenance and investment to ensure that infrastructure keeps pace with the needs of the community.</p>	<p>High-density residential development can contribute to rising housing costs, making it less affordable for lower-income individuals and exacerbating socio-economic inequalities.</p> <p>As property values increase in high-density areas, existing residents, particularly those with lower incomes, may face challenges in affording housing and may be at risk of displacement, potentially leading to social and economic disruption.</p> <p>High-density residential development can result in changes to the character and identity of a neighbourhood. This may include alterations to architectural styles, the mix of housing types, and the demographics of the community, which can impact social relationships and community cohesion.</p> <p>Rapid urbanization and high-density development can lead to the loss of cultural heritage and the erosion of local identity as communities and traditional structures are replaced by newer developments.</p> <p>Over time, high-density residential developments can place additional strain on existing infrastructure, leading to the deterioration of roads, utilities, and public facilities. This requires ongoing maintenance and investment to ensure that infrastructure keeps pace with the needs of the community.</p>	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	<p>As high-density residential areas continue to develop and expand, the need for infrastructure upgrades and expansion may arise, requiring significant investments and potentially straining public resources.</p> <p>High-density residential development can increase the demand for natural resources, such as water and energy. This may place additional strain on already limited resources and require sustainable management strategies to mitigate environmental impacts.</p> <p>densification of residential areas can lead to reduced availability of green spaces, such as parks and gardens, impacting the quality of life and access to recreational areas for residents.</p> <p>High-density residential development can exacerbate existing socio-economic disparities by creating unequal access to essential services, such as education, healthcare, and public transportation. Lower-income residents may face challenges in accessing these services and opportunities.</p>	<p>As high-density residential areas continue to develop and expand, the need for infrastructure upgrades and expansion may arise, requiring significant investments and potentially straining public resources.</p> <p>High-density residential development can increase the demand for natural resources, such as water and energy. This may place additional strain on already limited resources and require sustainable management strategies to mitigate environmental impacts.</p> <p>densification of residential areas can lead to reduced availability of green spaces, such as parks and gardens, impacting the quality of life and access to recreational areas for residents.</p> <p>High-density residential development can exacerbate existing socio-economic disparities by creating unequal access to essential services, such as education, healthcare, and public transportation. Lower-income residents may face challenges in accessing these services and opportunities.</p>	
Cumulative impact post mitigation:	High positive	High positive	N/A
Significance rating of impact after mitigation:	High positive ++	High positive ++	N/A



Project Life-cycle	Operational Phase		
	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	<ul style="list-style-type: none"> Decrease in unemployment and crimes related to unemployment BEE development opportunities Decrease in unemployment and empowerment of local trade and industry Increase in taxes raised on property 	<ul style="list-style-type: none"> Decrease in unemployment and crimes related to unemployment BEE development opportunities Decrease in unemployment and empowerment of local trade and industry Increase in taxes raised on property 	Status quo remains. No development will be undertaken.
Nature of impact:	Positive and Negative	Positive and Negative	No impact.
Extent and duration of impact:	Regional and Long term	Regional and Long term	N/A
Consequence of impact or risk	<ul style="list-style-type: none"> Employment of workers during the operational phase – business sector, landscaping and maintenance, cleaning, medical staff, etc. Local demand for goods and services Increase in service delivery and number of erven 	<ul style="list-style-type: none"> Employment of workers during the operational phase – business sector, landscaping and maintenance, cleaning, medical staff, etc. Local demand for goods and services Increase in service delivery and number of erven 	N/A
Probability of occurrence:	Highly Probable	Highly Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	N/A
Degree to which the impact can be reversed:	N/A	N/A	N/A
Cumulative impact prior to mitigation:	High positive	High positive	No impact
Significance rating of impact prior to mitigation:	High positive	High positive	No impact
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	N/A
Degree to which the impact can be managed:	Partly	Partly	N/A
Degree to which the impact can be mitigated:	Partly	Partly	N/A



	Preferred Alternative	Alternative 2	No-Go Option
<p>Proposed mitigation:</p> <ul style="list-style-type: none"> Mitigation measures stated in the SIA, appendix 21, must be implemented 	<ul style="list-style-type: none"> Local labour and employees to be made use of as far as possible for all aspects of the operational phase Local training and capacity building programmes BEE companies to be trained and involved in during the operational phase of the development – e.g. Management of retail facilities, maintenance, landscaping, etc. Local products, goods and services to be utilised as far as possible during the operational phase – shops, craft centre, etc. Local training and capacity building programmes 	<ul style="list-style-type: none"> Local labour and employees to be made use of as far as possible for all aspects of the operational phase Local training and capacity building programmes BEE companies to be trained and involved in during the operational phase of the development – e.g. Management of retail facilities, maintenance, landscaping, etc. Local products, goods and services to be utilised as far as possible during the operational phase – shops, craft centre, etc. Local training and capacity building programmes 	None required
Cumulative impact post mitigation:	High positive	High positive	N/A
Significance rating of impact after mitigation:	High positive	High positive	N/A

Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Cumulative	From a socio-economic perspective, the proposed development is not envisioned to result in unacceptable cumulative impacts.	

J 3.13 Traffic

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk: Construction and operation	Additional traffic resulting from the construction vehicles accessing the site. Potential impact on traffic flow in the areaduring operation.	Additional traffic resulting from the construction vehicles accessing the site. Potential impact on traffic flow in the areaduring operation.	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and short term	Local and short term	N/A
Consequence of impact or risk	Potential safety risks for road users during the construction phase.	Potential safety risks for road users during the construction phase.	
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Indirect impacts:	None	None	N/A
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation:	Moderate negative (2)	Moderate negative (2)	No impact
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Partly mitigate	Partly mitigate	N/A
Proposed mitigation:	Developing and implementing long-term transportation plans that consider the projected growth in the area and prioritize sustainable modes of transportation. Investing in infrastructure improvements, such as expanding road capacity, enhancing public transit systems, and improving pedestrian and cycling infrastructure. Promoting alternative transportation options to reduce the reliance on single-occupancy vehicles.	Developing and implementing long-term transportation plans that consider the projected growth in the area and prioritize sustainable modes of transportation. Investing in infrastructure improvements, such as expanding road capacity, enhancing public transit systems, and improving pedestrian and cycling infrastructure. Promoting alternative transportation options to reduce the reliance on single-occupancy vehicles.	None required



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Encouraging smart growth principles that promote mixed land use, compact development, and the creation of walkable neighborhoods to reduce the need for long-distance travel.</p> <p>Implementing traffic management techniques, including traffic signal optimization, intelligent transportation systems, and congestion pricing, to improve traffic flow and reduce congestion.</p> <p>Constructing the intersection upgrades and accesses, as per the Traffic Impact Assessment, Appendix 6</p>	<p>Encouraging smart growth principles that promote mixed land use, compact development, and the creation of walkable neighborhoods to reduce the need for long-distance travel.</p> <p>Implementing traffic management techniques, including traffic signal optimization, intelligent transportation systems, and congestion pricing, to improve traffic flow and reduce congestion.</p> <p>Constructing the intersection upgrades and accesses, as per the Traffic Impact Assessment, Appendix 6</p>	
Residual impacts:	<p>The residual impacts of traffic include ongoing costs associated with infrastructure maintenance and repairs. High traffic volumes can lead to accelerated deterioration of roads, bridges, and other transportation infrastructure, requiring continuous investment in repairs and upgrades to ensure their proper functioning.</p> <p>Vehicle emissions, such as greenhouse gases, particulate matter, and pollutants, continue to affect air quality, contributing to climate change and negative health effects for residents.</p> <p>Properties located in areas with high traffic volumes, noise pollution, and safety concerns may experience reduced demand and lower market values, impacting property owners' investments..</p>	<p>The residual impacts of traffic include ongoing costs associated with infrastructure maintenance and repairs. High traffic volumes can lead to accelerated deterioration of roads, bridges, and other transportation infrastructure, requiring continuous investment in repairs and upgrades to ensure their proper functioning.</p> <p>Vehicle emissions, such as greenhouse gases, particulate matter, and pollutants, continue to affect air quality, contributing to climate change and negative health effects for residents.</p> <p>Properties located in areas with high traffic volumes, noise pollution, and safety concerns may experience reduced demand and lower market values, impacting property owners' investments..</p>	N/A
Cumulative impact post mitigation:	Moderate to low	Moderate to low	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Significance rating of impact after mitigation:	Moderate (2)	Moderate (2)	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk: Construction and operation	Increase of residents and users of the area	Increase of residents and users of the area	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Local and short term	Local and short term	N/A
Consequence of impact or risk	Additional vehicles on road	Additional vehicles on road	
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	N/A
Cumulative impact prior to mitigation:	No impact.	No impact.	No impact
Significance rating of impact prior to mitigation:	Low negative	Low negative	No impact
Degree to which the impact can be avoided:	Unavoidable	Unavoidable	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Partly mitigate	Partly mitigate	N/A
Proposed mitigation:	<ul style="list-style-type: none"> All requirements of local municipality to be adhered to All improvements to road infrastructure as recommended by traffic engineer to be adhered to 	<ul style="list-style-type: none"> All requirements of local municipality to be adhered to All improvements to road infrastructure as recommended by traffic engineer to be adhered to 	None required
Cumulative impact post mitigation:	Moderate to low	Moderate to low	N/A
Significance rating of impact after mitigation:	Low (1)	Low (1)	N/A



Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	<p>Traffic Congestion: Construction activities often require the movement of construction vehicles, delivery trucks, and equipment, which can contribute to increased traffic congestion in and around the construction site. Lane closures, road diversions, or reduced road capacity due to construction activities can disrupt the normal flow of traffic and result in delays for commuters and other road users.</p> <p>Increased Travel Time: Construction-related traffic can lead to longer travel times for motorists due to congestion and delays caused by construction activities. This can result in inconvenience and potential productivity losses for commuters and businesses.</p> <p>Safety Hazards: Construction-related traffic can create safety hazards for both drivers and construction workers. The presence of construction vehicles, equipment, and temporary traffic control measures can increase the risk of accidents, especially if proper safety precautions are not in place. Lane closures, temporary detours, and changes in road conditions can also confuse drivers and increase the likelihood of collisions or other traffic incidents.</p> <p>Construction-related traffic can impact access to businesses, residences, and public facilities in the vicinity of the construction site. Temporary road closures, restricted access, or limited parking availability can affect the mobility and convenience of local residents, visitors, and businesses.</p> <p>Construction projects may require the implementation of detours or route changes to redirect traffic around the construction site. This can lead to confusion, longer travel distances, and increased travel times for drivers, as well as potential inconvenience</p>	<p>Traffic Congestion: High-density residential developments typically have a higher concentration of residents and vehicles within a limited space. This can lead to increased traffic congestion, especially during peak travel times. Congestion can result in slower traffic flow, longer travel times, and increased frustration for residents and commuters.</p> <p>Limited Parking Availability: High-density residential developments often have limited parking spaces relative to the number of residents and vehicles. This can result in parking shortages, difficulty finding parking spaces, and increased competition for limited parking spots. Insufficient parking availability can lead to congestion, inconvenience, and conflicts among residents.</p> <p>Safety Hazards: Higher traffic volumes in a high-density residential development can increase the risk of accidents and safety hazards. The presence of more vehicles and pedestrians in close proximity can lead to a higher likelihood of collisions, especially if there are inadequate traffic control measures, pedestrian crossings, or signage.</p> <p>Pedestrian and Cyclist Safety: Higher traffic volumes and congestion can pose risks to pedestrians and cyclists within a high-density residential development. Insufficient infrastructure for pedestrians and cyclists, such as sidewalks, crosswalks, or bike lanes, can make it more challenging and unsafe for them to navigate the area.</p> <p>Access and Mobility: The high density of residents and vehicles can impact access and mobility within the development. Narrow roads, limited entry and exit points, and congestion can make it more difficult for residents to enter or leave the</p>



	Construction	Operation
	<p>for local residents and businesses along the detour routes.</p> <p>Impact on Public Transportation: Construction-related traffic can disrupt public transportation services, including buses, trams, or trains, which may need to modify their routes or schedules to accommodate the construction activities. This can affect the accessibility and reliability of public transportation for commuters and passengers.</p>	<p>development, as well as hinder the movement of emergency vehicles.</p> <p>Impact on Public Transportation: Increased traffic within a high-density residential development can affect the efficiency and reliability of public transportation services. Congestion and delays can result in longer travel times for buses or trams, affecting the accessibility and attractiveness of public transit for residents.</p>
Indirect	<p>Environmental Pollution: Construction-related traffic contributes to increased emissions of air pollutants, including particulate matter, nitrogen oxides (NOx), and volatile organic compounds (VOCs). These pollutants can have detrimental effects on air quality, and negative impacts on ecosystems.</p> <p>Noise Pollution: Construction-related traffic, including the movement of vehicles and equipment, can generate significant noise levels. Prolonged exposure to construction-related noise can lead to annoyance, sleep disturbances, stress, and potential health impacts for nearby residents and workers.</p> <p>Indirectly, construction-related traffic can result in economic costs. Delays and disruptions caused by traffic congestion can impact businesses, productivity, and supply chains. Increased travel times and fuel consumption for commuters and transporters can also lead to higher transportation costs.</p> <p>Disruption to Local Businesses: Construction-related traffic can create challenges for local businesses located near construction sites. Reduced accessibility, limited parking options, and decreased foot traffic due to congestion or detours can result in a decline in customer visits and revenue for businesses.</p>	<p>Air Pollution and Health Effects: Increased traffic in a high-density residential development can contribute to higher levels of air pollution, including emissions of particulate matter, nitrogen oxides (NOx), and volatile organic compounds (VOCs).</p> <p>Noise Pollution and Disturbance: Higher traffic volumes in a high-density residential development can lead to increased noise levels, which can disturb residents and affect their well-being. Noise pollution from vehicles, horns, engines, and traffic-related activities can impact the overall quality of life, sleep patterns, and mental health of residents.</p> <p>Reduced Walkability and Active Transportation: High traffic volumes and congestion can negatively affect the walkability and attractiveness of a high-density residential development. The presence of heavy traffic, lack of pedestrian-friendly infrastructure, and safety concerns may discourage residents from walking or cycling, leading to reduced physical activity levels and increased reliance on vehicles.</p> <p>Community Fragmentation: Excessive traffic within a high-density residential development can lead to a sense of community fragmentation. Increased noise, congestion, and perceived safety risks can discourage social interactions among</p>



	Construction	Operation
	<p>Social Impacts: Construction-related traffic can cause social disruptions and inconvenience for residents and communities. Increased congestion, road closures, detours, and changes in traffic patterns can affect daily routines, access to amenities, and overall mobility. This can lead to frustration, stress, and a decreased sense of well-being among residents.</p> <p>Environmental Degradation: Construction-related traffic can contribute to environmental degradation through the destruction of natural habitats, soil erosion, and disturbance to remaining ecosystems. The expansion of road networks to accommodate increased traffic can result in the loss of green spaces and fragmentation of ecosystems.</p> <p>Climate Change: The increased emissions from construction-related traffic contribute to greenhouse gas emissions, contributing to climate change. These emissions can result from the burning of fossil fuels by construction vehicles and equipment, as well as the increased energy consumption associated with longer travel times due to congestion.</p>	<p>residents, hinder community cohesion, and reduce the livability of the neighborhood.</p> <p>Decreased Property Values: Heavy traffic and congestion can negatively impact property values in a high-density residential development. The presence of excessive traffic noise, pollution, and safety concerns can make properties less desirable, potentially leading to decreased property values and investment attractiveness.</p> <p>Economic Costs and Productivity: Traffic congestion and delays can result in economic costs and productivity losses for residents and businesses in a high-density residential development. Increased travel times, reduced accessibility, and limited mobility can lead to inefficiencies, missed appointments, and decreased productivity for individuals and companies operating within the area.</p> <p>Environmental Impacts: Increased traffic in a high-density residential development can have indirect environmental impacts. The emission of greenhouse gases from vehicles contributes to climate change, while the expansion of road networks and infrastructure can lead to habitat loss and fragmentation of ecosystems.</p>
Cumulative	<p>Increased Traffic Congestion, Declining Air Quality, Noise Pollution, accelerated wear and tear on roads, bridges, and other transportation infrastructure. The cumulative effects of higher traffic volumes, limited road capacity, and potential conflicts between vehicles, pedestrians, and cyclists can contribute to an increased risk of accidents and injuries.</p> <p>Congestion and delays can result in lost productivity, increased fuel consumption, higher transportation costs, and inefficiencies in supply chains. These factors can negatively impact local businesses, reduce economic activity, and affect the overall economic vitality of the area.</p>	

J 3.14 Infrastructure and Services

Project Life-cycle	Construction Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Added pressure on basic services and social and economic infrastructure	Added pressure on basic services and social and economic infrastructure	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Regional and long term	Regional and long term	N/A
Consequence of impact or risk	Negative impact on water, sewer and power services and social and economic infrastructure	Negative impact on water, sewer and power services and social and economic infrastructure	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A if alternative energy solutions are provided in the development	N/A if alternative energy solutions are provided in the development	N/A
Degree to which the impact can be reversed:	Reversible	Reversible	N/A
Indirect impacts:	Investment into improving economic infrastructure	Investment into improving economic infrastructure	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Low to medium negative	Low to medium negative	No impact
Degree to which the impact can be avoided:	Partly	Partly	N/A
Degree to which the impact can be managed:	Partly	Partly	N/A
Degree to which the impact can be mitigated:	Partly	Partly	N/A
Proposed mitigation: Mitigation measures stated in the EMPr must be implemented	Comprehensive urban planning that considers the projected population growth and aligns infrastructure development with the anticipated needs of the community. Collaboration between developers, local authorities, and utility providers to ensure infrastructure capacity matches the demands of the high-density residential development. Investment in upgrading and expanding existing infrastructure, such as water supply systems, power grids, transportation networks, and public service facilities.	Comprehensive urban planning that considers the projected population growth and aligns infrastructure development with the anticipated needs of the community. Collaboration between developers, local authorities, and utility providers to ensure infrastructure capacity matches the demands of the high-density residential development. Investment in upgrading and expanding existing infrastructure, such as water supply systems, power grids, transportation networks, and public service facilities.	None required



	Preferred Alternative	Alternative 2	No-Go Option
	Implementation of smart city technologies and innovative solutions to optimize the use of resources and improve the efficiency of basic services.	Implementation of smart city technologies and innovative solutions to optimize the use of resources and improve the efficiency of basic services.	
Residual impacts:	<p>The increased demand for water, electricity, and other utilities in a high-density residential development can strain the capacity of existing infrastructure. Water supply systems may require upgrades to meet the increased demand, and power grids may face challenges in ensuring a stable and reliable electricity supply.</p> <p>A high-density residential development can lead to increased pressure on transportation systems, including roads, public transit, and parking facilities.</p> <p>The influx of residents in a high-density residential development can strain public services, such as healthcare, education, and public safety. Increased demand for healthcare facilities and schools may result in overcrowding, longer wait times, and decreased service quality. Similarly, public safety services may face challenges in effectively responding to emergencies and maintaining adequate levels of service.</p> <p>The pressure on basic services and infrastructure can impact housing affordability and availability in a high-density residential development. Increased demand for housing may lead to rising prices, making it more challenging for some residents to afford suitable housing options.</p>	<p>The increased demand for water, electricity, and other utilities in a high-density residential development can strain the capacity of existing infrastructure. Water supply systems may require upgrades to meet the increased demand, and power grids may face challenges in ensuring a stable and reliable electricity supply.</p> <p>A high-density residential development can lead to increased pressure on transportation systems, including roads, public transit, and parking facilities.</p> <p>The influx of residents in a high-density residential development can strain public services, such as healthcare, education, and public safety. Increased demand for healthcare facilities and schools may result in overcrowding, longer wait times, and decreased service quality. Similarly, public safety services may face challenges in effectively responding to emergencies and maintaining adequate levels of service.</p> <p>The pressure on basic services and infrastructure can impact housing affordability and availability in a high-density residential development. Increased demand for housing may lead to rising prices, making it more challenging for some residents to afford suitable housing options.</p>	N/A



	Preferred Alternative	Alternative 2	No-Go Option
	<p>Additionally, limited availability of housing units may result in housing shortages or increased competition for housing resources.</p> <p>The added pressure on basic services and infrastructure can have economic impacts on local businesses. If the existing infrastructure cannot support the increased population, businesses may face challenges in meeting the needs of customers and may struggle to expand their operations. This can affect employment opportunities, economic growth, and overall business vitality in the area.</p> <p>The added pressure on basic services and infrastructure can lead to social strain within the high-density residential development. Insufficient access to public amenities, overcrowded facilities, and limited community resources may impact residents' quality of life, social cohesion, and overall satisfaction with the neighbourhood.</p>	<p>Additionally, limited availability of housing units may result in housing shortages or increased competition for housing resources.</p> <p>The added pressure on basic services and infrastructure can have economic impacts on local businesses. If the existing infrastructure cannot support the increased population, businesses may face challenges in meeting the needs of customers and may struggle to expand their operations. This can affect employment opportunities, economic growth, and overall business vitality in the area.</p> <p>The added pressure on basic services and infrastructure can lead to social strain within the high-density residential development. Insufficient access to public amenities, overcrowded facilities, and limited community resources may impact residents' quality of life, social cohesion, and overall satisfaction with the neighbourhood.</p>	
Cumulative impact post mitigation:	Presently High negative	Presently High negative	N/A
Significance rating of impact after mitigation:	Presently High negative	Presently High negative	N/A

Project Life-cycle	Operational Phase
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	Preferred Alternative	Alternative 2	No-Go Option
Potential impact and risk:	Added pressure on basic services and social and economic infrastructure	Added pressure on basic services and social and economic infrastructure	Status quo remains. No development will be undertaken.
Nature of impact:	Negative	Negative	No impact.
Extent and duration of impact:	Regional and long term	Regional and long term	N/A



	Preferred Alternative	Alternative 2	No-Go Option
Consequence of impact or risk	Operational activities not to influence the availability of services to surrounding landowners	Operational activities not to influence the availability of services to surrounding landowners	N/A
Probability of occurrence:	Unlikely if municipal provision and capacity is proven and confirmed	Unlikely if municipal provision and capacity is proven and confirmed	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A if alternative energy solutions are provided in the development	N/A if alternative energy solutions are provided in the development	N/A
Degree to which the impact can be reversed:	Reversible	Reversible	N/A
Cumulative impact prior to mitigation:	Medium negative	Medium negative	No impact
Significance rating of impact prior to mitigation:	Low to medium negative if municipal provision and capacity is proven and confirmed	Low to medium negative if municipal provision and capacity is proven and confirmed	No impact
Degree to which the impact can be avoided:	Partly	Partly	N/A
Degree to which the impact can be managed:	Partly	Partly	N/A
Degree to which the impact can be mitigated:	Partly	Partly	N/A
Proposed mitigation: Mitigation measures stated in the EMPr must be implemented	<ul style="list-style-type: none"> The engineers compiling the services report and designing services are to ensure that adequate measures are in place to ensure adequate service delivery that does not negatively affect surrounding areas All requirements by local municipality to be adhered to regarding service reticulation and delivery 	<ul style="list-style-type: none"> The engineers compiling the services report and designing services are to ensure that adequate measures are in place to ensure adequate service delivery that does not negatively affect surrounding areas All requirements by local municipality to be adhered to regarding service reticulation and delivery 	None required
Cumulative impact post mitigation:	Low negative if municipal provision and capacity is proven and confirmed	Low negative if municipal provision and capacity is proven and confirmed	N/A
Significance rating of impact after mitigation:	Low negative if municipal provision and capacity is proven and confirmed	Low negative if municipal provision and capacity is proven and confirmed	N/A



Direct, Indirect and Cumulative Impact discussion:

	Construction	Operation
Direct	See Table above	
Indirect	See Table above	
Cumulative	<p>Overburdened Infrastructure: The cumulative impacts of added pressure on basic services and infrastructure can result in the overburdening of existing systems. Over time, the strain on water supply networks, electricity grids, transportation systems, and other infrastructure may exceed their design capacity, leading to reduced efficiency, increased maintenance requirements, and potential system failures.</p> <p>Inadequate Service Delivery: The cumulative impacts can result in inadequate service delivery, as the increased demand outpaces the capacity of public services and infrastructure. This can manifest as longer wait times, reduced service quality, overcrowded facilities, and limited access to essential services like healthcare, education, public safety, and recreational amenities.</p> <p>Declining Environmental Quality: The cumulative impacts of added pressure on basic services and infrastructure can have adverse effects on the environment. Increased energy consumption, waste generation, and resource depletion may lead to environmental degradation, including higher emissions, pollution, and depletion of natural resources, which can negatively impact air and water quality, biodiversity, and overall ecological health.</p> <p>Rising Costs: Cumulative impacts can result in rising costs for residents, businesses, and local authorities. The need for infrastructure upgrades, expanded services, and maintenance can require significant financial investments. Additionally, residents may face increased costs for utilities, housing, and other essential services as demand grows and supply struggles to keep up.</p> <p>Inequitable Distribution of Impacts: The cumulative impacts may exacerbate existing social inequalities, with certain groups or neighborhoods experiencing a disproportionate burden of inadequate infrastructure and services. This can lead to disparities in access to essential resources, exacerbating social divisions and perpetuating inequities within the community.</p>	

Conclusion and recommendations from the Impact Assessment

The mitigation measures that are proposed must be implemented and monitored, both during the construction and operational phases.

- The civil service-related critical flaw for the project is the present **lack of available City Power**. Alternative renewable energy sources are presently being investigated, which could be an environmental positive for the development in the long run.
- Risks and potential impacts related to the construction and operational phases have been thoroughly addressed. **Only once municipal services and renewable energy solutions have been confirmed in writing for this township, may development proceed**. The Environmental Management Program (EMPr) should be strictly adhered to during construction activities, thereby mitigating impacts as far as possible.



SECTION K: ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

This section provides a description of assumptions, uncertainties and gaps in knowledge that relate to the assessment and mitigation measures proposed.

1. Identified by the EAP

No impact assessment can be completely certain of the exact nature and extent of the identified impacts, that would result from a given development activity, over an extended period of time. However, the assessment conducted for Rabie Ridge X 7 has tried to limit any uncertainties by optimising the collection of base data, using historical data as a comparative reference to any changes on site, and by following a credible and detailed impact assessment methodology. Consequently, the EAP assumes that the uncertainty in this study would be limited to changes in the development circumstances at a scale that is beyond this locally focussed impact assessment exercise. Such would include major environmental issues not recorded or observable and/or drastic changes to the economic climate that alters the viability of the proposal. In addition to the above, the specialists have included relevant assumptions and limitations in their reports.

For this report it is assumed that:

- All information provided by the applicant and the appointed specialists is correct and valid at the time it was provided;
- The scope of this investigation was accurate and has assessed the potential environmental and socio-economic impacts which would be reasonably associated with the proposed activity.
- The methodology of the assessment and the findings presented in this report are valid and present sufficient detail and information that allows for the objective assessment and decision on the application.
- The EAP does not accept any responsibility if additional information comes to light at a later stage of the process, which has a major bearing on the outcome of the impact assessment.

All mitigation, management, and monitoring measures prescribed in this EIA Report and the accompanying EMPr will be implemented by the developer. Management of the site is essential, and the mitigation measures recommended by the specialists must be implemented. This has a major bearing on the reliability of the predictions of significance of impact.

The construction and management of this proposed activity will be in line with the recommendations in this report, which will be enforced by the implementation of the detailed EMPr. The long-term success of the project lies in the effective implementation of the measures prescribed in the EMPr. Uncertainties result when mitigation measures are proposed and must be implemented. The management and implementation of these mitigation measures must be monitored and managed correctly to ensure that all mitigation measures identified are brought to fruition.



2. Identified in the Terrestrial biodiversity Assessment

Flora:

The floral assessment is confined to the Study Area. The entire Study Area and immediate surroundings were, however, included in the desktop analysis;

- Sampling by its nature means that not all individuals are assessed and identified. With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. The field assessment took place in April 2022 (mid-autumn season). The site assessments followed adequate summer rains, and seasonality thus posed limited constraints on vegetation identification for most plant species. However, it is acknowledged that species within groups such as the Orchidaceae family and various bulbous geophytes could have been missed due to the assessment occurring outside of their specific (and often short-lived) flowering season. A more comprehensive assessment would require that more than one assessment take place and that these assessments occur across all seasons of the year, but ideally from the beginning of November to the end of April, as recommended in the Gauteng Department of Agriculture and Rural Development (GDARD) Biodiversity Directorate's minimum requirements for vegetation assessments of March 2014. To account for seasonal limitations and frequency of assessments, on-site data were augmented with all available desktop data, together with project experience in the area; and
- One section of the Study Area could not be accessed during the site visit on the 26th April 2022, due to access constraints by means of a security gate and barbed wire fence surrounding that part of the property. Approximately 26 ha of the Study Area could not be accessed (22% of the Study Area).

Fauna:

The following assumptions and limitations are applicable to this report:

- The faunal assessment is confined to the study area and does not include the neighboring and adjacent properties, these were however considered as part of the desktop assessment;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal communities have been accurately assessed and as such the information provided herein is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;
- Due to the nature and habits of most faunal taxa, the high level of surrounding anthropogenic activities, it is unlikely that all species would have been observed during a field assessment of limited duration (during the summer season). Therefore, site observations were compared with literature studies where necessary;



- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the footprint area may therefore have been missed during the assessment; and
- As part of the assessment, a field investigation was undertaken on the 26th April 2022 to determine the ecological status of the study area and to “ground-truth” the results of the desktop assessment (as presented in Part A). On-site data was significantly augmented with all available desktop data and specialist experience in the area, and the findings of this assessment are considered to be an accurate reflection of the ecological characteristics associated with the locality of the study area.

3. Identified in the SEF Wetland Assessment

To obtain definitive data regarding the biodiversity, hydrology and functioning of particular wetlands, studies should ideally be conducted over a number of seasons and over a number of years. The current study relied on information gained during four days of field surveying conducted during a single season, desktop information for the area, information obtained from previous studies, as well as professional judgement and experience. Delineations of wetlands were therefore dependent on the extrapolation of data obtained during field surveys and to a limited extent from interpretation of orthophotos and other imagery. Despite the intensive augering program, the potential for errors in delineating boundaries exists, due to the cryptic nature of wetlands associated with Halfway House Granite geology and anthropogenic activities. It is also possible that, small seepage wetlands could have been overseen during the field survey as a result of their cryptic nature, small extent of some isolated seeps and anthropogenic activities in the area.

4. Identified in the SAS Freshwater Ecosystem Assessment

It is worth noting that a finalised construction method statement was not available at the time of the compilation of this report and thus, the DWS Risk Assessment Matrix was applied based on a conceptual layout plan of the study area footprint for the proposed development and information as provided by the client, with various assumptions made by the freshwater ecologist. This includes application of the DWS Risk Assessment Matrix which will assume that the footprints of the delineated UCVB and Seep wetlands and associated 30 m GDARD setback buffers will be maintained and excluded as part of the proposed development on the study area.

5. Identified in the Terrasoil High Level Hydropedology and wetland soil context report

None provided.

6. Identified in the Wetland Impact Assessment, Rehabilitation and Management Plan (WIARMP)

None provided.

7. Identified in the Agricultural Potential Assessment



- The Agricultural Potential within the subject property was primarily based on the previously mapped distribution of soil types within the subject property (SEF Report, 2013 - Report Ref: 505436), with limited in-situ verification;
- Agricultural potential was classified on the basis of rain-fed (dryland) agriculture, according to current restrictions on site;
- Soil fertility status was not considered as a limitation, since inherent nutrient deficiencies and/or toxicities would be rectified by appropriate liming and/or fertilization prior to cultivation for arable agriculture; and
- Soils classified as suitable to arable agriculture are concurrently suited to other less intensive land uses, for instance pasture, natural grazing, and wildlife.

8. Identified in the Groundwater Assessment

The findings of this study were largely based on a single sampling run undertaken during the late stages of an extended summer drought. A more reliable assessment towards the derivation of a robust groundwater baseline signature in this area would have adopted seasonal assessments to understand the multivariate nature of groundwater abstraction and recharge (rainfall) and pollution patterns on groundwater quality. This is especially considering the spatio-temporal variance in point and diffuse discharges into the groundwater environment. It is therefore recommended that further seasonal assessments be conducted during the construction and operational phase of the proposed development.

Several boreholes were not ground-truthed due to access constraints, for which specific water uses (domestic, recreational, irrigation etc) could not reliably be assigned. Two of the four focus boreholes contained siphon pumps which create artificial water levels, therefore accurate groundwater levels could not be determined.

Some degree of error (overestimation) of dissolved oxygen measurements is inherent due to the necessity of laboratory analyses of a water sample rather than *in situ* quantification from source.

9. Identified in the Social Impact Assessment

A SIA aims to identify possible social impacts that could occur in future. These impacts are based on existing baseline information. There is thus always an uncertainty with regards to the anticipated impact actually occurring, as well as the intensity thereof. Impact predictions have been made as accurately as possible based on the information available at the time of the study.

- The SIA relied on the information received during the public participation process undertaken as part of the EIA process. Additional data gathering and research were undertaken. Sources consulted are not exhaustive and additional information can still come to the fore to influence the contents, findings, ratings and conclusions made.
- No project specific consultation sessions were conducted. The lack of project specific consultation as part of the SIA, is however not anticipated to influence the outcome of the report and the findings of the study.



- Demographic information was dependent on statistics from StatsSA, as well as municipal documentation. The ward-based information was still based on 2011 statistics, although the information from the 2016 Community Survey were noted where available e.g. at municipal level. The demographic changes that took place since then which could have possible impacts on the intensity of the anticipated social impacts should thus be kept into consideration. The lack of more recent demographic data is therefore seen as a limiting factor, although it is not anticipated to influence the outcome of the report.
- Additional information may become known or available during a later stage, which could not have been allowed for at the time of the study.
- Technical and other information provided by the client is assumed to be correct.
- Individuals view possible social impacts differently due to their association with the anticipated impact. Impacts could therefore be perceived and rated differently than those contained in the SIA Report.

10. Identified in the Heritage Impact Assessment

- Impact analysis of cultural heritage resources under threat of the proposed development, are based on the present understanding of the development
- Overall archaeological visibility was good as the grass cover is still down after the winter season. In addition, large section of the site has also been cleared of vegetation for construction purposes as well as by people preparing informal gardens for planting maize and vegetables.

11. Identified in the Traffic Impact Assessment

None provided.

SECTION L: ENVIRONMENTAL IMPACT STATEMENT

The impact assessments undertaken have indicated that the significance of the negative impacts associated with the construction phase would largely be of a Medium to Low significance, assuming full mitigation measures are implemented. These impacts are readily and practically mitigable.

The impact on infrastructure and services has a high negative significance. Only once bulk municipal services and renewable energy solutions have been confirmed for this township, may development proceed.

Impacts on the bio-physical environment remain within the acceptable limits of moderate to low impact significance, based on multiple specialist studies conducted over a 10-year period. The proposed development will have several social and economic benefits during the construction and operational phases.



L 1. Summary of Potential Impacts and Risks

The following tables summarise all the potential impacts anticipated during the planning, design and construction phases, as well as the operational phase of the proposed development.

L 1.1 Planning, Design and Construction Phases

All potential impacts anticipated during the planning, design and construction phase of the proposed development are provided in the following table.

Environmental Impacts identified for the Rabie Ridge X 7 mixed land use township	Impact significance Rating			
	PREFERRED ALTERNATIVE		NO-GO OPTION	
	Without Mitigation	With Mitigation <i>and monitoring</i>	Without Mitigation	With Mitigation
Geotechnical and Soil stability impacts	Low negative	Low negative	No impact	N/A
Soil Erosion and Contamination	Moderate to Low negative	Low negative	No impact	N/A
Water Quality and Quantity	Moderate to Low negative	Low negative	No impact	N/A
Terrestrial Biodiversity	Moderate to Low negative	Low negative	Low negative	N/A
Wetland and Aquatic biodiversity	High negative	Moderate negative	Low negative	N/A
Hydrocensus, Groundwater quality and quantity	Moderate to low negative	Low negative	No impact	N/A
Agricultural Potential	Low negative	Low negative	No impact	N/A
Visual Impacts	Moderate to low negative	Moderate to low negative	No impact	N/A
Noise Impacts	Low negative	Low negative	No impact	N/A
Air Quality	Low negative	Low negative	No impact	N/A
Heritage	Low negative	Low negative	No impact	N/A
Social impacts	High to Low positive impacts	High to Low positive impacts	No impact	N/A
Traffic Impacts	High to Moderate negative	Moderate negative	No impact	N/A
Infrastructure and Services	High negative	Low negative ** if municipal bulk services are available and alternative	No impact	N/A



Environmental Impacts identified for the Rabie Ridge X 7 mixed land use township	Impact significance Rating			
	PREFERRED ALTERNATIVE		NO-GO OPTION	
	Without Mitigation	With Mitigation <i>and monitoring</i>	Without Mitigation	With Mitigation
		renewable energy programmes are incorporated into the phased development		

L 1.2 Operational Phase

Environmental Impacts identified for the Rabie Ridge X 7 mixed land use township	Impact significance Rating			
	PREFERRED ALTERNATIVE		NO-GO OPTION	
	Without Mitigation	With Mitigation <i>and monitoring</i>	Without Mitigation	With Mitigation
Wetland and Aquatic biodiversity	High negative if not maintained properly	Moderate negative if management efforts to conserve the wetland properly are in place	Low negative	N/A
Visual Impacts	Moderate to low negative	Low negative	No impact	N/A
Noise Impacts	Low negative	Low negative	No impact	N/A
Air Quality	Low negative	Low negative	No impact	N/A
Social impacts	High to Low positive impacts	High to Low positive impacts	No impact	N/A
Traffic Impacts	High to Moderate negative	Moderate to Low negative	No impact	N/A
Infrastructure and Services	High negative if council approves the development, but bulk	Low negative ** if municipal bulk services are available and alternative	No impact	N/A



Environmental Impacts identified for the Rabie Ridge X 7 mixed land use township	Impact significance Rating			
	PREFERRED ALTERNATIVE		NO-GO OPTION	
	Without Mitigation	With Mitigation <i>and</i> <i>monitoring</i>	Without Mitigation	With Mitigation
	services are not adequate for the development	renewable energy programmes are incorporated into the phased development		

SECTION M: CONDITIONS OF AUTHORISATION

It is recommended that the following items be included as conditions of authorisation:

- The impact of the development on bulk municipal infrastructure and services has a high negative significance. Only once bulk municipal services and feasible renewable energy solutions have been confirmed by the local authority, for this township, may development proceed.**
- All the recommended mitigation and monitoring measures provided in Section J of this report must be adhered to.
- A suitably experienced ECO must be appointed to oversee the construction phase of the proposed development as well as the implementation of the EMPr and any applicable conditions of the environmental authorisation (if granted).
- Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must immediately be stopped in the immediate area of the discovery, SAHRA must be notified the same day of discovery.
- The implementation of the EMPr is essential in managing the negative environmental and social impacts in the implementation of the project.
- The 30m wetland buffer zone of HGM unit 1 and 2 must be pegged and demarcated by a wetland specialist, prior to the commencement of any construction activities.
- All construction related impacts (including service roads, site camp, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity), save for installation of services and related infrastructure, must be excluded from the wetland area.
- All foundations for buildings and structures or infrastructure services must be designed according to site specific Geotechnical findings and recommendations.
- A Water Use Authorisation must be obtained from the Department of Water and Sanitation for all activities affecting the wetlands on site, crossings or structures



within the 1: 100 year floodline and any other activities that trigger a requirement for a water use licence.

10. The design of buildings and structures must incorporate the green building standards that promote optimal resource efficiency.
11. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate avoidance, reduction, recycling, re-use and disposal where appropriate. The contractor may not place, dump or store refuse or builders rubble generated on the construction site, on adjacent properties or public open space during or after construction.
12. A suitably qualified and experienced (independent) Environmental Control Officer (ECO) must be appointed to monitor compliance with environmental laws as well as to ensure that the mitigation /rehabilitation measures and recommendations in the EMPr are implemented during the construction phase of the development.

M1. Validity of the EA

Due to the size of the development, the current unavailability of power to the site, the required bulk infrastructure upgrades, and government project funding, the construction phase is anticipated to continue for at least 5 – 10 years, maybe longer. The applicant intends to develop the shopping centre immediately, with the remaining land uses being built in phases, as services and funding become available.

Given the size, financial commitments, and requirement from the applicant to be self-sufficient in terms of energy resources, SEC recommends that the EA (if granted) be valid for ten (10) years from the date of issue.

M2. Compliance Monitoring

The Developer and Contractor(s) will be responsible for monitoring all construction activities on a day-to- day basis to ensure compliance with the EMPr, EA (if granted) and other applicable environmental related approvals and/or permits, throughout the construction phase of the development.

A suitably experienced ECO must be appointed to oversee the construction phase of the proposed development as well as the implementation of the EMPr and any applicable conditions of the environmental authorisation. ECO monitoring (site visits) must be undertaken at least once a week, until such time that the construction phase is completed.

SECTION N: CONCLUSION

The Environmental Impact Assessment (EIA) process has been undertaken in accordance with the EIA Regulations, 2014 (as amended) published in terms of Section 24 (5) of the National Environmental Management Act (Act No 107 of 1998) (as amended). To ensure that this application considers relevant laws, all applicable legislation has been considered. Specialist studies, input from stakeholders and historical data of the site has informed the identification and development of appropriate options and management measures that should be, if the



activity is authorised, implemented. This report aims to ensure that the project is environmentally and socially acceptable, and that the township is feasible and sustainable in terms of long term service provision to the site.

The conclusions of this draft EIAR, including comments and concerns from Interested and Affected Parties (I&APs), are the result of a comprehensive Scoping and EIA study, including multiple specialists' assessments. These studies were informed by the past and present site characteristics, and issues identified in the Environmental Scoping Study as well as the Scoping Phase public participation process.

This draft EIAR provides both potential benefits and the negative impacts likely to result from the implementation of the project. From a socio-economic perspective, positive impacts that include creation of employment opportunities, increased economic activities, provision of upgraded infrastructure and services, increase in municipal taxes, alignment with municipal and provincial spatial planning frameworks, as well as support of integrated development, were identified.

The RRX7 proposal aims to establish a well-balanced and socially viable mixed land use township. The development proposal is focused primarily on serving the needs of the urgent residential sector in the region, whilst providing supportive land uses in an integrated and sensitively planned mixed land use product, which will be beneficial to the local region and the greater COJ as well.

An iterative process has been followed by the project team to avoid significant environmental impacts by using authority comments and the specialists' constraints analyses, to inform the preferred development layout. Where impacts could not be avoided, measures were recommended to minimise the potential impacts.

After considering and assessing the potential environmental impacts associated with the proposed development, it can be concluded that **the present lack of capacity of municipal electrical power supply to the site, and the absence of confirmed municipal water and sewer services to the township, is a critical, and potentially fatal flaw for the project. These issues are to be resolved for the Final EIA report.**

There are no biophysical constraints / significant negative impacts on the biophysical environment, that could result in fatal flaws for the project. The UCVB wetland system has been largely modified throughout its extent, but is still deemed important for hydrological functioning (such as flood attenuation and nutrient/toxicant assimilation). In accordance with the wetland and hydro pedological specialist reports, and the COJ comments, the majority of the HGM wetland units 1 & 2, including the 30m buffer, have been conserved on site.

The preferred alternative assessed in this report is feasible and reasonable, provided municipal services, bulk infrastructure upgrades and alternative energy resources can be secured for the long term. The mixed land use proposal is in line with the planning policies and guidelines for the area. All the mitigation, management and monitoring measures



provided under Section J of this report must be implemented, should the proposed development be approved.

Due to the size of the development, the current unavailability of power to the site, the required bulk infrastructure upgrades and confirmation of available municipal sewer and water, and the availability of government project funding, the construction phase is anticipated to continue for at least 5 – 10 years, probably longer. The applicant intends to develop the shopping centre immediately, with the remaining land uses being built in phases, as services and funding become available.

Only once the service provision flaws have been addressed in the Final EIA report, can the project be supported for authorisation. On such basis, SEC could recommend that the application be authorised, subject to the recommendations of this Environmental Impact Assessment Report, The Environmental Management Program (EMPr), and all specialist studies. Applicable legislation must be followed, and applicable licences obtained prior to any construction occurring on site.



SECTION O APPENDICES

<i>Appendix 1</i>	<i>EAP Declaration and CV</i>
<i>Appendix 2:</i>	<i>Screening Report</i>
<i>Appendix 3:</i>	<i>WSP Group Africa (Pty) Ltd Water and Sewer Report</i>
<i>Appendix 4:</i>	<i>WSP Electrical Services Report.</i>
<i>Appendix 5:</i>	<i>WSP Group Africa (Pty) Ltd Storm water Management Report for</i>
<i>Appendix 6:</i>	<i>WSP Traffic Impact Assessment (TIA)</i>
<i>Appendix 7</i>	<i>Agricultural Potential Assessment</i>
<i>Appendix 8</i>	<i>Heritage Impact Assessment</i>
<i>Appendix 9:</i>	<i>The Gauteng Provincial Environmental Management Framework maps</i>
<i>Appendix 10</i>	<i>2016 Social Impact Assessment</i>
<i>Appendix 11</i>	<i>Geotechnical Report</i>
<i>Appendix 12</i>	<i>2013 Wetland delineation study, Strategic Environmental Focus (SEF)</i>
<i>Appendix 13</i>	<i>Wetland Impact Assessment, Rehabilitation and Management Plan for the wetland resources on site, Scientific Aquatic services (SAS), 2016</i>
<i>Appendix 14:</i>	<i>Scientific Aquatic Services (SAS) freshwater ecosystem assessment report</i>
<i>Appendix 15:</i>	<i>Terra Soil High-level hydrogeology of the site.</i>
<i>Appendix 16</i>	<i>The comments received from COJ, Environmental Impact Management Department</i>
<i>Appendix 17</i>	<i>2016 Hydro census and groundwater quality baseline study for the study area</i>
<i>Appendix 18</i>	<i>2023 Hydro census and groundwater quality baseline study for the study area</i>
<i>Appendix 19</i>	<i>Galago Environmental: vegetation survey, 2013 Mammal habitat scan, Herpetofaunal (reptile and amphibian) habitat scan, avifaunal habitat scan</i>
<i>Appendix 20:</i>	<i>Scientific Terrestrial Services CC Terrestrial Biodiversity and Species Impact Assessment</i>
<i>Appendix 21:</i>	<i>2022/2023 Social Impact Assessment</i>
<i>Appendix 22:</i>	<i>Heritage Impact Assessment (HIA)</i>
<i>Appendix 23</i>	<i>Public Participation Process: Background Information Document</i>
<i>Appendix 24:</i>	<i>IAP database</i>
<i>Appendix 25:</i>	<i>Comments and Response Report</i>



EAP DECLARATION AND CV

EAP DECLARATION AND AFFIRMATION

I, Stephanie Cliff, declare that:

- I act as the independent environmental practitioner in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- I will provide the competent authority any information that is 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;



- The information provided in this scoping report has been sourced from relevant literature, legislation, previous studies and specialist input and is therefore believed to be correct;
- I will perform all other obligations as expected from a registered environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Furthermore, I, Stephanie Cliff, herewith confirm, under oath, affirmation in relation to-

- the correctness of the information provided in the reports;
- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- 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.

Signed

Date

Place

Commissioner Stamp:

Designation:

Date:



APPENDIX 2: SCREENING REPORT



APPENDIX 3: WSP GROUP AFRICA (PTY) LTD WATER AND SEWER REPORT



APPENDIX 4: WSP ELECTRICAL SERVICES REPORT.



**APPENDIX 5: WSP GROUP AFRICA (PTY) LTD STORM WATER MANAGEMENT
REPORT**



APPENDIX 6: WSP TRAFFIC IMPACT ASSESSMENT (TIA)



APPENDIX 7 AGRICULTURAL POTENTIAL ASSESSMENT



APPENDIX 8 HERITAGE IMPACT ASSESSMENT



**APPENDIX 9: THE GAUTENG PROVINCIAL ENVIRONMENTAL MANAGEMENT
FRAMEWORK MAPS**



APPENDIX 10 2016 SOCIAL IMPACT ASSESSMENT



APPENDIX 11 GEOTECHNICAL REPORT



**APPENDIX 12 2013 WETLAND DELINEATION STUDY, STRATEGIC ENVIRONMENTAL
FOCUS (SEF)**



**APPENDIX 13 WETLAND IMPACT ASSESSMENT, REHABILITATION AND
MANAGEMENT PLAN FOR THE WETLAND RESOURCES ON SITE,
SCIENTIFIC AQUATIC SERVICES (SAS), 2016**



**APPENDIX 14: SCIENTIFIC AQUATIC SERVICES (SAS) FRESHWATER ECOSYSTEM
ASSESSMENT REPORT**



APPENDIX 15: TERRA SOIL HIGH-LEVEL HYDROPEDOLOGY OF THE SITE.



**APPENDIX 16 THE COMMENTS RECEIVED FROM COJ, ENVIRONMENTAL IMPACT
MANAGEMENT DEPARTMENT**



**APPENDIX 17 2016 HYDRO CENSUS AND GROUNDWATER QUALITY BASELINE
STUDY FOR THE STUDY AREA**



**APPENDIX 18 203 HYDRO CENSUS AND GROUNDWATER QUALITY BASELINE STUDY
FOR THE STUDY AREA**



**APPENDIX 19 GALAGO ENVIRONMENTAL: VEGETATION SURVEY, 2013 MAMMAL
HABITAT SCAN, HERPETOFAUNAL (REPTILE AND AMPHIBIAN)
HABITAT SCAN, AVIFAUNAL HABITAT SCAN**



**APPENDIX 20: SCIENTIFIC TERRESTRIAL SERVICES CC TERRESTRIAL BIODIVERSITY
AND SPECIES IMPACT ASSESSMENT**



APPENDIX 21: 2022/2023 SOCIAL IMPACT ASSESSMENT



APPENDIX 22: HERITAGE IMPACT ASSESSMENT (HIA)



APPENDIX 23 EIA PUBLIC PARTICIPATION PROCESS

Proof of Notices and Advertising will be included in the Final EIA Report



APPENDIX 24: IAP DATABASE**ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION FOR THE PROPOSED TOWNSHIP ESTABLISHMENT TO BE SITUATED ON THE REMAINDER OF ALLANDALE 10 IR, KNOWN AS RABIE RIDGE EXT 7, CITY OF JOHANNESBURG MUNICIPALITY, MIDRAND, GAUTENG****I&APS DATABASE**

Group	Name	Surname	Physical address	Contact No:
Commenting Authorities				
Gauteng: Department of Water and Sanitation.	Themba		Bothongo Plaza East Building 285 Francis Baard Street Pretoria	012 336 8582 / 8212
Provincial Heritage Resources Authority Gauteng (PHRAG)	Tebogo	Molokomme	Surrey House 35 Rissik Street Johannesburg 2001	Tebogo.Molokomme@gauteng.gov.za noluthando.cembi@gauteng.gov.za
Gauteng: Department of Agriculture and Rural Development (GDARD): Environment	Tendani	Rambuda	56 Eloff Street, UMnotho House, Marshalltown	011 240 2500
Gauteng Department of Rural Development and Land Reform (DRDLR): Land claims commissioner	Ilze	Hayward	266 Pretorius Street Centre Walk Building (West Block) Pretoria	012 312 8911 queries@drdlr.gov.za
City of Joburg Municipality - Development and Planning	Etienne	Allers	Traduna House 6th Floor 118 Jorissen Street Braamfontein	011 587 4230 EtienneA@joburg.org.za



Group	Name	Surname	Physical address	Contact No:
Sasol Gas Limited	Bruce	Van den Heuvel		wayleaves@sasol.com
Civil Aviation Authority (CAA)	Lizell	Stohl		infrastructure@caa.co.za
Civil Aviation Authority (CAA) Stakeholder Management, Regional and International Co -operations	Pappie	Maja		MajaP@caa.co.za
Ward Councillors				
Councilor Ward 80	Sebenzile	Hlatshwayo	Rabie Ridge Community Centre 1074 Rietduiker Street, Rabie Ridge	T) 010 223 7088 C) 076 337 3501 C) 073 123 5396 C) 072 282 0361
Councilor Ward 92	Charmaine	Ngoepe	Yarona Shopping Complex 3115 Cnr Angelfish & Archerfish D Kaalfontein	T) 011 204 0092 C) 081 561 8839
Interested and affected Party				
Interested and affected Party	████	████████		████████████████
Interested and affected Party	████	████		████████████████



**APPENDIX 25: COMMENTS AND RESPONSE REPORT: COMMENTS RECEIVED FROM
THE SCOPING PHASE**



ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
<p>Our discussion of this morning, 28 February 2014, refers. I have gone through your draft scoping report and have the following comments and requirements: When I registered I indicated that a full geo-hydrological assessment will be required as part of the EIA phase. The reason being that lots of properties in the President Park area utilizes bore holes for the daily water use, a right granted within the constitution of South Africa. This request have been ignored and after my conversation with you this morning I now insist that such a study form part of the EIA specialist studies. It is clear from the desktop services report that the engineers are only concerned with the site specific details and not, as required within NEMA looking at the regional impacts. The wetland report clearly indicates that there is a wetland towards the north of the proposed development site and it is this water that feeds into President Park. This is evident this time of the year after rains as the water flows across Republic road for days after the rain has stopped. There is a clear water divide and the indicated intention, by the services report of redirecting the flow towards the south west is what will have a detrimental impact on ground water recharged. Water recharge is indicated in your</p>	<p>Email 28 Feb <u>2014</u></p>	<p>Registered IAP</p>	<p>A previous Scoping & EIA application for the <i>exact same development proposal</i>, but for a <i>different applicant</i>, was initiated with the public and the approving authorities in 2014. This application lapsed in 2017, and the file was closed. No Environmental Authorisation was received. Therefore, a new application, for the <u>very same development</u> is being re-initiated by <i>Ninфу Allandale Dev PTY LTD</i>, in this Scoping & EIA application.</p> <p>The 2022/2023 S&EIR application has included a Geo-hydrological assessment, See Appendices 17 and 18 of this EIA report.</p> <p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>



ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
<p>wetland report as one of the functions of the wetlands and the services report is looking at moving this recharge factor away from President Park. I have a siphon bore hole that depends on water flow within the soil layer above the bed rock. My bore hole is only 22m deep and the intention of the engineers will mean that my recharge will be directly impacted. Only a specialist study will be able to determine the impact and, if any, the mitigation that will be required. With all respect to the engineers they are not geo hydrologists and cannot give a definitive answer on the impacts that the development could have on adjacent properties.</p>			
<p>It is a requirement within NEMA that the competent authority be given all relevant information to make an informed decision on the requested authorization. Without a geo hydrological assessment done by a qualified specialist the department will not be able to make such a decision and this could lead to the ROD being appealed.</p>	<p>Email 28 Feb 2014</p>	<p>Registered IAP</p>	



ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
<p>Going through the EIR report I do not see a geo-hydrological assessment as requested as well as no explanation as to why such an assessment was not done. Various of your specialist studies indicate that the wetland on site (HGM3) is a feeder to the recharge of the water table and bore holes in the President Park area. You have decided, without proper scientific studies or proof, to destroy this wetland and others on site. Can you please explain how this decision was made and how it is in line with the following?</p> <ul style="list-style-type: none"> • The Preamble of the National Environmental Management Act, 1998 (Act No. 107 of 1998) • Points 2, 3 and 4 of the principles of the National Environmental Management Act, 1998 (Act No. 107 of 1998) • Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) • The Preamble of the National Water Act, 1998 (Act No. 36 of 1998) • Chapter 3 of the National Water Act, 1998 (Act No. 36 of 1998) 			



ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
As the public was not given an opportunity to participate in the Water Use License application (WULA) it is important to understand how the EAP came to reject the request that will affect hundreds of properties in the surrounding areas?			



<p>Comments on the <u>2016 DEIAR</u>:</p> <p>SECTION A: INTRODUCTION</p> <p>A4 EIA PHASE</p> <p>The report states:</p> <p>“As in the scoping phase, there is a detailed public participation process that ensures all interested and affected parties (I&APs) are informed of the proposed activity and, provided an opportunity to comment.”</p> <p>The availability of the DEIR was not published in any newspaper. Only registered I&AP’s were notified yet due to the time delay since this project started many new people have moved into the area that are not aware of the project and the possible impact on them. In Republic road alone there are up to 5 new property occupants. The integrated Environmental Management Guidelines series 7 on Public Participation (PP) states the importance of everybody be given the opportunity to participate, Section 2, yet due to the time delay in this process this right is not granted to new residence in the surrounding areas. The least that should have been done is a newspaper ad in the local news paper. Chapter 6 of NEMA indicates that all relevant guidelines must be taken</p>	<p>Email</p> <p>22 April</p> <p>2016</p>		<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>
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ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
into account during the PP process, this in my opinion was not done.			



ISSUE RAISED	DATE	COMMENTATOR	RESPONSE
<p style="text-align: center;">SECTION B: LEGISLATIVE FRAMEWORK AND GUIDLINE DOCUMENTS</p> <p>The development impact spans over two of the CJMM regions being Region A, Sub Area 10, Est of Modderfontein road which include (Ebony Park, Ivory Park, Rabie Ridge) and Region E West of Modderfontein road, including the Austen View and President Park AH areas. The report states that the development is in line with the SDF for region A but eludes to the fact that the SDF for Region E, which states that area is for the development of RURAL RESIDENCE, will not support the infrastructure developments required and that the DIER assumed will be put in place by CJMM.</p>			<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>



<p>SECTION C: DESCRIPTION OF PROPOSED ACTIVITY</p> <p>C1 PROJECT LOCALITY AND EXTENT</p> <p>C2 SITE DESCRIPTION AND SURROUNDING LAND USES</p> <p>Austin view ext. 1 is West to South West of the proposed site and not North as indicated in the table on page 36 and is small holdings or as referred to in the SDF Rural Residential.</p> <p>C3 PROJECT DESCRIPTION</p> <p>C5 MUNICIPAL SERVICES REQUIRED</p> <p>The proposed development is highly dependent on infrastructure to be supplied by CJMM. The report however does not mention whether the proposed infrastructure that CJMM must supply falls within the CJMM master plans. NEMA states that the contestant authority must be given all the information to make informed decisions. This is not possible as the EIR does not indicate if the proposed connection to the CJMM infrastructure, that does not exist, is possible. There is no indication from CJMM whether they agree with the proposed bulk service connection and placement of the bulk service which CJMM will have to install. As indicated above the SDF for region A does not indicate high</p>			<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>
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<p>residential development, for Austin View Ext. 1, but rather Rural Residence, which utilizes septic tanks. Therefore it is doubtful if there even is a plan for bulk sewage services within this area as assumed by the EIR. NEMA requires the competent authority to make decisions on facts not assumptions. The EIR needs to obtain better information pertaining to the future planning from CJMM.</p>			



<p>SECTION D: NEED AND DESIRABILITY</p> <p>There is no clear viability study done to indicate if the proposed development is viable or not. Attached is a article that questions the viability of smaller shopping centers in South Africa. Also the EIA does not take into account thesmall Spaza shops in the area and the impact the proposal will have on these Spaza's. The EIA also does not take into account the viability of putting the onus on CJMM to provide infrastructure in and area that the SDF does not cater for high density development.</p> <p>Alternatives.</p> <p>The report does not give the competent authorities or the public any clear indication of alternatives and the proposal is being put forward as the only alternative which is not in line with NEMA section 31 2 g :</p> <p>(2) An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include-</p> <p>(g) a description of identified potential</p>		Registered IAP	<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>
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<p>alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;</p> <p>The DEIR gives no other possible alternatives and is therefore in contravention of the act. The EAP does not consider any other type of as indicated in the definition set out in the act:</p> <p>"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to-</p> <ul style="list-style-type: none"> ○ (a) the property on which or location where it is proposed to undertake the activity; ○ (b) the type of activity to be undertaken; ○ (c) the design or layout of the activity; ○ (d) the technology to be used in the activity; ○ (e) the operational aspects of the activity; <p>and</p>			



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<ul style="list-style-type: none"> ○ (f) the option of not implementing the activity. <p>This DEIR blatantly forces only one alternative onto the public and the competent authorities. The report can investigate high rise buildings instead of single dwellings, there is no layout alternative just the proposed layout.</p> <p>Point F2.3. The EAP does not understand the NO-GO alternative. The NO_GO does not just mean no development as indicated, but can also mean that the current proposal is a NO-GO, which it is in this case.</p> <p>Although the report indicates that the proposed development is within the development framework of the IDP it conveniently leaves out the fact that the development borders an area with a SDF for Rural Agricultural (see attached) development, which means that the required infrastructure development, which the proposal will rely on is in question therefore the NO-GO option must apply. Taking into consideration the weak social impact report and the Traffic impact report which must guide the alternatives investigated the NO-GO of</p>			



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the current proposal as indicated must implement and the development be re designed to take into account the impacts indicated in the traffic report. This alternative as proposed in a NO-GO due to the impacts that has not been sufficiently mitigated.			



<p style="text-align: center;">SECTION E: THE RECEIVING ENVIRONMENT</p> <p>In discussions with the specialist dealing with the WULA application, they indicated that the WULA has not yet been applied for and the EIA indicates that the application has been submitted. This is misleading and must be rectified to indicate the real status of the WULA. The WULA specialist has indicated that the layout is in the process of being changed. This is not consistent with the EIA and in the email from the specialist, see attached, they have indicated that the Final EIA is discussed with CJMM, which is also confusing. The public needs to be given the proper and correct information pertaining to the status of this EIR.</p> <p>South Africa as a predominantly dry country must protect its wetlands at all cost and the EIR does not even consider protecting some of the wetlands on site. The excuse that they are small and in bad condition does not warrant the outright destruction of these wetlands. By law the property owners has the responsibility to protect wetlands and this EIR does not even take this responsibility into account or tried to suggest other alternatives. The specialist reports indicate that the hydrology of the wetlands</p>		Registered IAP	<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>
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<p>do add to the recharge of the water table that feeds the borehole in President Park. This is one of the main concerns for the President Park areas as most of the small holdings utilize boreholes. This fact is just ignored within the EIR and no mitigation measures are considered in the current proposal.</p> <p>The social report is of very poor standard and there has been no communication between the communities in the area and the specialist who performed the Social Impacts assessment. No attempt was made to contact I&AP's or any for the local community bodies such as the President Park Residence Community or the Local Community Police Forums. The impact of the proposed development of the local communities on a social level cannot be determined by reading books and I&AP registration documents only. There are various SMME in the area which has not been consulted to determine the possible impacts on and therefore the mitigation does not exist for these impacts. The social impact report does not take in account doe does not know the real current status of social issues such as:</p> <ul style="list-style-type: none"> • Safety and security, murders and rape are a 			



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<p>constant with the area and will only increase during construction if there are no proper mitigation in place;</p> <ul style="list-style-type: none"> • Traffic on the roads and the impact on pedestrians and cyclists; • RDP housing very soon doubles the number of residence due to “Back Yard dwellers” that is common in the area where there has been RDP housing in the past which places even more strain on infrastructure; • Infrastructure shortages of the area such as sewage lines, telecommunication etc. and the fact the SDF for region E do not enhance the rapid development in the area. <p>The Social impact report cannot indicate proper mitigation measures if the report is not up to standard and there has been no communication with the local communities.</p> <p>The traffic impact report paints a very high increase in expected traffic for the area, but what it does not clearly indicate is the roads within the surrounding</p>			



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<p>area can not cater for this traffic increase. Most of the roads in the area have a 5ton load capacity which means no vehicle with a load of more than 5ton is allowed on these roads. The EIA therefore does not make any mitigation, as to controlling heavy trucks during the construction of the proposed development. The roads, as is are in a very bad condition and will only deteriorate if there is no proper control set out in the EMPr. No construction vehicles with a load of more than what the roads allow for must be allowed. The applicant must be held responsible for this with in the EMPr, but this can not be done due to the lack of information in the Traffic Impact report.</p> <p>The report also only indicates mitigation measures for intersections, but nothing between these intersections. The number of new cars or trips, that the report indicates that will be introduced to the surrounding roads will mean that there will be more than 5km of new cars on the roads if these cars are placed in front of each other. This in reality means that there will be another lane of cars from the proposed development site down Republic Road and Up West</p>			



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<p>Road to the K101 or along Modderfontein Road and hallway down Dale road. Yet the report does not indicate this fact and that road upgrades and not just intersection upgrades will be required. Currently in peak hour traffic Republic road, Two lane only, becomes a three to four lane road endangering the lives of not only motorists but also pedestrians and cyclist. The Traffic Impact report does not make any mitigation for this increase on the roads them self. The increase in traffic volumes indicated in the report must be seen to indicate that, under current road infrastructure, the proposal is a NO-GO alternative. Once again the SDF for the region does not suggest that the roadinfrastructure will be upgraded soon due the are being seen as rural residential with low density residential area and therefore low traffic volumes. The EIR does not indicate that the JRA will upgrade the roads any time soon.</p>			



<p style="text-align: center;">CONCLUSION</p> <p>The DEIR need to be amended to take into account, correct and then again be submitted to the public and stakeholders for review due to the following:</p> <ul style="list-style-type: none"> • The current DEIR makes various statements that seem to not be correct i.e. WULA being submitted, omitting that region E’s SDF does not cater for this high density development and this is misleading, • There are no proper alternatives in layout or the utilization of the wetlands within the DEIR, • The Social impact cannot be properly measured and mitigated with the poor quality report and no communication with the communities in the area, • The traffic impact report outlines that the NO-GO alternative must be better evaluated for the current layout and due to the current lack of road infrastructure • The destruction of wetlands without proper alternative proposal when these wetland are shown to benefit the surrounding community needs to be reinvestigated, and 		<p>Registered IAP</p>	<p>These comments have been included in this CRR for historical reference, and as per the request of the registered IAP who delivered these comments. These comments will not be addressed in detail in this CRR as they are not specific to the 2022/2023 S&EIR process. These comments are out-dated, and/or have been adequately and thoroughly addressed in the Scoping and EIA reports produced for the 2022/2023 S&EIR process, which the same commentator has reviewed and delivered comment on.</p>
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<ul style="list-style-type: none"> • The lack of proper public consultation in such a long running project, when new people have moved into the area and are not given an opportunity to give their input as they don't know about the proposed development, and • The fact that the layout is in the process of being changed and therefore could lead to new impacts and will require public review. <p>It will be prudent of the EAP and the Social specialist to have public meetings regarding this proposed development to be able to understand the surrounding communities and their needs.</p> <p>The current proposal will have a very big impact on the surrounding communities and if not properly mitigated these impacts will have devastating effects. Just one such an effect can be seen by the road traffic accidents that happens on the surrounding roads daily (more than once a day) and the rap and murder rates within the area. The development and the EIR needs to take this into</p>			



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<p>account before the competent authorities can with certainty make informed decisions.</p> <p>Thank you for the opportunity to review and give feedback.</p> <p>Regards</p>			
<p>I refer to my previous communication on the proposed development date 22 April 2016. My feedback at that date stands and will be re-evaluated once the updated EIA reports are available, which I take will be done due to the time lapse since the previous reports were Available for public review.</p> <p>I have one comment currently to add to your comments and response, and that pertains to the current sewage layout plan and design for the development. I foresee a risk of sewage contamination due to the single site evacuation point. The site will drain its sewage via a single sewage pipe line. This is a risk to the receiving environment and communities in the area as well as to the development it self. If this single sewage pipe line is damaged or blocked there is no other evacuation line available to the evacuate all or some of the sewage. We</p>	6 July 2022	Registered IAP	<p>The 2023 Draft EIA report has been provided to the IAP for review. Comments received will be included in the Final EIA Report.</p> <p>WSP have indicated that there are two (2) bulk connections for the township. Please see Appendix 3 of the DEIAR.</p>



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<p>all know that maintenance is not a priority and that the possibility of blocked sewage pipe lines in South Africa is real as can be seen in most Metros and Municipalities.</p> <p>I suggest that the developer takes this risk into consideration and makes provision for a second main sewage line that could be utilized by the proposed development. Although I understand the cost factor, I look at the contamination factor to not only the community but also the vast number of wetlands in the receiving environment. I feel the risk needs to be mitigated within the EIA process to a level that is acceptable and a single "outlet" sewage pipe line will remain a HIGH risk factor.</p> <p>I will respond once again when the DRAFT EIA report is available for comment.</p> <p>Regards</p>			
<p>Hi Stephanie, I am a resident of President Park AH and an interested party to this project. Could you kindly send to a copy of the proposed project via email, Best regards</p>	<p>May 2022</p> <p>Via EAP Website</p>	<p>Registered IAP</p>	<p>Information was sent to the IAP.</p>



Authority Comments

ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<p>Reference is made to the Scoping Report dated June 2022.</p> <p>Description of the project:</p> <p>The proposed project entails the establishment of a mixed land use development, to be known as Rabie Ridge Ext 7. The site measures 129,6391 hectares in extent and is currently said to be vacant. The southern part of the site is said to be illegally occupied. The proposed township will consist of 442 erven to be zoned “Residential 1”, 53 erven to be zoned “Residential 3”, 1 “Institutional” erf, 1 “Business 1” erf, 1 “Educational” erf, 5 “Public Open Space” erven and “Roads”.</p>	<p>7 July 2022, Email comments on the DSR</p>	<p>Katlego Kale CoJ Region: A CoJ Impact Management and Compliance Unit</p>	<p>This information is correct.</p>
<p>Guidelines, by-laws and policies:</p> <p>The Report considers relevant policies, by-laws, and strategies. The site falls within Region A, Sub Area 10 whose objective is to ensure the socio-economic integration, consolidation and long-term sustainability. The area falls within a</p>			<p>This information is correct.</p>



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<p>marginalized area and high priority areas of the Growth Management Strategy. The proposed development is also in line with the SDF 2040 as it promotes secure sustainable inclusionary, affordable human settlements and reduce the issues of fragmentation and spatial disconnection.</p>			
<p>Description of alternatives: The report considers two land use options: a mixed use and a single use development with the former being the Preferred due to social integration. The report does not consider alternative layout plans and states that the attached plan was informed by previously conducted Specialist studies. An alternative layout will be developed and presented in the EIA Phase.</p>			<p>This information is correct.</p>
<p>Information from the land use application and other input Provision for Open Space The approved CoJ Open Space Framework's standard for the provision of open space is 2,4</p>			<p>The departments requirement for sufficient public open space has been addressed by the appointed Town Planner, The Town Planning Hub. The June 2023 township layout plan</p>



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<p>ha of socio-economic space to be provided for every 1000 people. This open space includes parks, sports fields, and hard open spaces but excludes traffic islands and parking areas as well as ecological and undeveloped natural open spaces such as protected areas, high sensitivity vegetation, ridges and wetlands. Although the OSF considered international and national standards for the provision of socio-economic spaces, this set ratio of 2.4 ha per 1000 population has proven to be difficult to implement, as the standard is applied differently and EISD has settled for a much-reduced standard and parkland at a ratio below the policy standard. Therefore, consideration for may be given for the provision of open space at 1 ha per 1000 population as a minimum standard non-negotiable.</p> <p>Provision has been made within the proposed layout for social open space which can be developed as useable recreational parks for the community. However, the current provision of</p>			<p>has been amended to decrease the density of the development to the following public open space provisioning:</p> <div style="border: 1px solid black; padding: 10px;"> <p><u>PUBLIC OPEN SPACE PROVISIONING:</u></p> <ul style="list-style-type: none"> • Area affected by wetland: 18.1644ha • Public Open Space provided (excl wetland area): 3.5551ha • Public Open Space required: 0.8ha/1000 people = 3.5000ha <p><u>Calculations:</u></p> <p>Number of units: Residential 3 stands - 1618 Residential 1 stands - 432 Total: 2050</p> <p>- Estimated number of people per unit @ 2.5. - 500 bachelor Residential 3 units. - Total number of people:</p> <p style="text-align: center;">$1550 \text{ units} \times 2.5 = 3875 + 500 = 4375 \text{ people}$</p> </div>



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<p>three smaller public open spaces, measuring approximately 2.9943 ha is insufficient in relation to the adjusted CoJ Open Space Framework's standard of 1 ha of socio-economic space to be provided for every 1000 people. The Social Impact Assessment indicates that 6129 residential units are proposed in the township, this could translate into approximately 15 322 people that would require recreational open space.</p> <p>The Department notes approximately 17,9154ha in the centre of the development which was also set aside as open space. It is important to note that this open space is regarded as open space for wetland conservation and riparian zone protection and cannot be used for recreational purposes as it cannot fulfil the needs of the future residents for active recreation or play areas for children etc. The proposed township therefore has a shortfall of functional recreational open space/ parkland</p>			



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and cannot be supported. The township layout in the DEIR must show recreational open space.			
<p>Stormwater management plan</p> <p>The updated stormwater plan should be undertaken in line with the City's Stormwater Bylaw and Stormwater Design Manual. Particularly Clause 44 of the City of Johannesburg Stormwater Bylaw which state that the following requirements must, in addition to the requirements of section 38, be complied with if stormwater from any development site discharges directly, or indirectly across any intervening property, into a watercourse:</p> <p>(a) The quantity and velocity of any stormwater discharge must be controlled and treated to the extent that such discharge attains a quality in compliance with the requirements of the National Water Act, 1998, the National Environmental Management Act, 1998 and any other.</p> <p>The stormwater Management plan developed to address the following:</p>			Please see Appendix 5 for the updated WSP stormwater management plan.



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Peak discharge - no increase in discharge for any event of any duration up to the 25 year RI event Volume of runoff - no increase up to the annual 10-year rainfall Runoff frequency - no surface runoff for the 1 yr RI event of any duration The stormwater measures must mimic the natural hydrology and ensure that the discharge point does not impact the watercourse.			



<p>Land use application (Amendment scheme number 07-14324) and EISD 2016 comments on the DEIR with reference Gaut 002/13-14/E0135</p> <p>The Town Application System shown there is a township application which was submitted to the City in 2014 (reflected as pended) with reference 07-14324 and another one from 2015 with reference 07-15399 (reflected as cancelled).</p> <ul style="list-style-type: none"> • The Johannesburg Roads Agency on comments dated April 2016 requested for the Traffic Impact Assessment and Stormwater management plan to be done. They also mentioned that permission is required from GAUTRANS to discharge stormwater into the Provincial Road reserve. • The Johannesburg Water, on comments dated August 2016, said that they had received the outline scheme report, objected to the application, and confirmed that sewer and water upgrades are required. • Please find attached as Annexure A the Departments comments dated March 2016 on the previous DEIR. Note most of the comments made are still relevant for the current development. 			<p>Please see Appendix 6 for the updated Traffic Impact Assessment compiled by WSP.</p> <p>Please see Appendix 3 for the updated Water and Sewer Report compiled by WSP. Councils comments on these reports are still to be received.</p> <p>Noted and included in this CRR.</p>
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<p>It is noted that the Scoping report confirms that the previous DEIR file was close prior to issuing of the environmental authorization and that a land use application will be submitted. The updated outline scheme report must be included in the DEIR.</p>			
<p>Description and assessment of the identified environmental issues:</p> <p>The CoJ Bioregional Plan shows the proposed development site mapped an Ecological Support Area (ESA). Ecological Support Areas (ESAs) are split based on land cover- ESA 1 being in a largely natural state and ESA 2 which generally includes areas with no natural habitat which retain potential importance for supporting ecological processes. These may include urban and cultivated landscapes on floodplains, in buffers around wetlands, in bottlenecks, and in key climate change corridors. Inappropriate management or intensification of land use in these areas could result in additional impacts on ecological processes. The Department advocates for implementing the land</p>			<p>Please see Section G, and Appendices 14 – 20 of this DEIAR which address the Ecological and wetland aspects of this application.</p>



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<p>management objective of such areas, which is to avoid additional impacts on ecological processes and the land management recommendation is to avoid intensification of land use, which may result in additional impact on ecological processes.</p> <p>2013-2016 Specialist studies which include the following are included in the report. Refer to EISD commends dated March 2016 for comments made on the previous DEIAR.</p> <p>It is important to note that most of the Specialist studies were undertaken between 2013 and 2016. The report confirms that updated versions will be included in the Draft EIR. The Department has also noted that the Scoping report confirms that the layout in the report will be updated in line with the updated studies.</p>			
<p>Wetland Assessment</p> <p>The report identifies 5 wetland areas on site of hillslope seep and valley bottom characteristics. The wetland areas were assigned a low Ecological Importance and Sensitivity Score, due to disturbances such as residential development</p>			<p>See this authorities comments regarding the wetland, dated July 2022 hereunder.</p>



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<p>and roads, cultivation of maize within the wetlands, dumping of rubble, the removal of almost all-natural wetland vegetation and the dominance of alien invasive species on site. The wetlands are also assigned Present Ecological State classification ranging from Class D (largely modified) to Class F (critically modified), because of various anthropogenic activities which has led to degradation of these wetlands and consequently, loss/ changes to the hydrological functioning of the wetlands. The 2013 and 2016 studies made various recommendations. The layout seems to have taken part of wetland HGM 1 and HDM 2 into consideration. While this could apply to some of the identified wetlands due the existing impacts, it the Department's reasoned opinion that some the Hillslopes Wetland could still be serving its hydrological function such as the recharging/seep into to the unchanneled valley bottom wetland and the associated watercourse. As such, the Department requires that a Hydropedological Study be undertaken</p>			



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<p>for the affected wetlands to determine the hydrological interaction of water with soils and the flow paths within the hillslope wetland to the wetland and/or the stream itself.</p>			
<p>Water Use Authorization The report confirms that an application for water use authorization will be submitted. The application/proof of submission must be included in the DEIR.</p>			Noted. The WULA is underway.
<p>Agricultural Potential Impact Assessment The report states that the extent of agricultural potential identified within the site is unlikely to justify the acquisition and maintenance of essential and sustain viable crop production at a commercial scale. The surroundings are also urbanized, making viable agricultural land use unlikely. It is therefore of the Specialist's opinion that the proposed mixed land use can be supported subject to mitigation measures being implemented to prevent impact on adjacent soils. Maize is ploughed on the property on an 'informal' basis.</p>			This information is correct.



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<p>Heritage Impact Assessment</p> <p>The study area has no heritage resources situated within the proposed development boundaries. The study recommends the project continue subject to mitigation measures.</p>			This information is correct.
<p>Groundwater Hydrocensus Report</p> <p>The location and use of 23 boreholes within a 2 km radius of site were quantified, and water samples were extracted for analysis from selected boreholes. The current condition and sensitivity of the groundwater system must be defined to inform future management. The report recommends that the development continue subject to the undertaking of a stormwater master plan and that groundwater be monitored quarterly during the construction phase.</p>			This information is correct. See Appendix 18 for the 2022/2023 updated report.
<p>Traffic Impact Assessment</p> <p>The study states that the proposed mixed development area will have a significant impact on the surrounding road network, intersections, and at properties access points, Traffic upgrades</p>			This information is correct. See Appendix 6 for the 2022/2023 updated report.



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<p>will be required within proximity of the site. The planned K111 and its future planning will be affected by the application, therefore approximately 0.2925ha should be given off for the implementation of the K111 road reserve. In addition, the development does not affect the planning of the K50 and K60, however a 16.0m building line from the centreline of planned K56 and K60 will apply as stated in conditions of township approval (Ref: 1/13/1/3 – 21805). It is proposed that the development be served by two full accesses off the planned future K56 alignment. A partial access (intersection A) is also proposed off the planned future K111. This access is not part of the K111 planning and will be required to be approved by GDRT. The report further proposes that a full access be gained off Boshoff Road/90th Avenue intersection (intersection B). With the recommended traffic upgrades, the study endorses the development.</p>			
<p>Floral Assessment The area consists of vegetation that has been degraded by informal agriculture. Connectivity</p>			<p>This information is correct.</p>

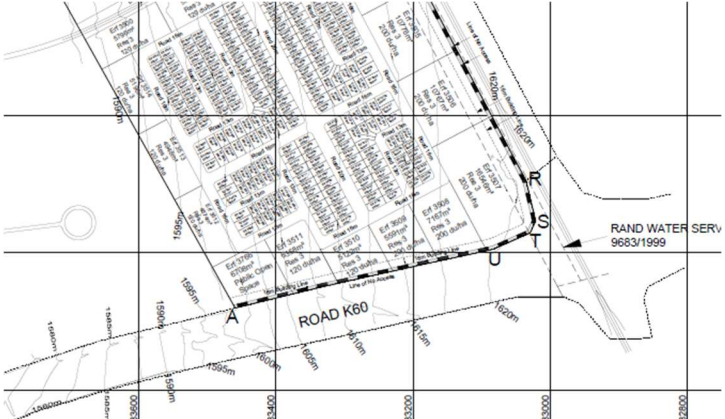


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<p>with natural grassland does not exist. The study states that the development be considered favorably, provided that the mitigation measures as set out in the report are implemented.</p>			
<p>Mammal, Herpetofauna and Avifauna Habitat Scan</p> <p>The report reiterates that the site has been degraded due to anthropogenic activities. This had detrimental effect on mammal numbers and diversity. The report does state however that there is a possibility that Red Data shrews, bats and the Southern African hedgehog can occur on site. In terms of herpetofauna, except for a few vagrant giant bullfrogs which may use the site for feeding and aestivation, no Red Data herpetofauna species should occur on the study site. Similarly, the development will have no negative effect on any Red Data avifaunal species since these species are highly unlikely to occur within the study area due to a lack of suitable breeding, roosting and foraging habitat.</p>			<p>This information is correct. See Appendix 20 for the 2022/2023 updated report.</p>



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The studies propose mitigation measures for the development.			
<p>Social Impact Assessment</p> <p>The proposed project will result in a well-managed housing development which will result in an improvement to the neighborhoods and remove possible negative perceptions with the undeveloped and unmaintained area. The development will also be providing a range of different housing types for different economic needs while adding to the revitalization of the area. The report endorses the proposed development and states that it can be accommodated without severely negatively compromising the day-to-day life of the communities near the site.</p>			This information is correct. See Appendix 21 for the 2022/2023 updated report.
<p>Evaluation and presentation of mitigation measures:</p> <p>Mitigation measures are proposed for each identified environmental impact, however, contain scoping level assessments. The proposed mitigation measures will be further</p>			This information is correct.



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<p>detailed during the EIA Phase when updated studies will be undertaken. The draft EMPr will also be included as part of the Draft EIAR.</p>			
<p>Public Participation: The Public Participation (PP) is still taking place and must be in line with the requirements as specified in the EIA Regulations, 2014 (as amended).</p>			<p>Noted.</p>
<p>Having noted the above, the Department notes the 2013/2016 Specialist studies and study updates layout. The Department requires that the following be addressed in the Draft EIR:</p> <ul style="list-style-type: none"> • Confirm whether the site is vacant or if there is encroachment. If there is encroachment, confirm the land use and location. 			<p>The site is vacant. The informal settlements are located within the provincial K60-route.</p> 



<ul style="list-style-type: none"> • In addition to the studies confirmed in the report for update, a Hydropedological Study must be compiled for the affected wetlands to determine the hydrological interaction of water with soils and the flow paths within the hillslope wetland to the wetland and/or the stream itself. • Design alternatives must be considered. • The updated outline scheme report must be included in the DEIR. • A comparison of the outcome of the 2013/2016 studies must be made with the studies being compiled/updated. Reasons for changes, if any, must be provided including how the property owners exercised Duty of care. • Sensitivity mapping must be done. • The layout must be amended based on the findings of the updated studies and must show the proposed development overlaid with the sensitivities on site. The Department also requests that a clear legible map be submitted. • The layout must make provision for adequate recreational open space as outlined above in line with the Open Space Framework. 			<p>See Appendix 15 of this DEAIR.</p> <p>Noted and included in Section F, alternatives.</p> <p>See Appendices 3 and 4 for the updated outline scheme reports. Councils comments on these reports are still to be received.</p> <p>Please see section G of this report.</p> <p>Please see Figures 3 and 9 of this report.</p> <p>Previously addressed herein.</p>
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ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<ul style="list-style-type: none"> The developer must submit the stormwater management plan that should be in line with the City's Stormwater Bylaw (2010) as well as the Draft Design Manual (2020). The plan will need to adopt principles of Water Sensitive Urban Designs (WSUDS) and Sustainable Urban Drainage Systems (SUDS) which provide options such as bio-retention ponds, swales, grass lined channels, stone filled infiltration ditches and permeable paving in order to minimize surface runoff and maintain water quality. 			See Appendix 5 for the updated WSP 2022/2023 Storm water management plan.
<p>PROPOSED RABIE RIDGE EXT.7 Your email with attachments dated 1 September 2022 refers.</p> <p>The Catchment Management & Water Quality Directorate has perused the information provided and evaluated against the COJ Wetland Management Plan and Catchment Management Policy.</p>	<p>Authority Comments on the different wetland reports produced for the site, dated 9 Sept 2022</p>	<p>Mr E Allers CoJ Impact Management and Compliance Unit</p>	
<p>CoJ Wetland Protection and Management Plan:</p>			



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<p>Following from the previous comments made by EISD, the Directorate acknowledges the receipt of the High-Level Hydropedology (by Terrasoil) together with the Freshwater Ecosystem Assessment by Scientific Aquatic Services. The above-mentioned site is within Wetland Management Zone 1 as identified in the draft COJ Wetland Protection and Management Plan 2009. The plan identifies this as a priority zone for stormwater management as it is vulnerable to erosion. In terms of key management concerns for Wetland Management Zone 1, management of sediments and water quality are both identified as key, while pre-emptive engineering is advocated whereby sufficient space is maintained for the systems to adjust with little active intervention to the changes in hydrology or that active engineering is applied to ensure that wetland management objectives are met.</p>			
<p>The Department has noted the analysis and findings of the high level hydrogeological and the wetland context determination with specific</p>			



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<p>reference to the results of the two wetland assessments conducted by other consultants historically. For which the key comparison details are noted as follows:</p> <ul style="list-style-type: none"> • The “isolated seeps” flagged in the SEF report are not recorded in the SAS report. The TWI indicates potential surface flow in that area but more expressed indicators of seeps are not evident. • The “HGM3” seep identified in the SEF report is also indicated in the SAS report. The TWI indicates a potential accumulation of surface flow in that area but the vegetation signatures have been muddled by surface alteration for two decades now. 			
<ul style="list-style-type: none"> • The “HGM1” and “HGM2” wetland areas identified in the SEF report are confirmed in the SAS report. The TWI is very clear in this case and this wetland / watercourse area is therefore confirmed as a wetland zone. 			



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
<ul style="list-style-type: none"> • The broader wetland areas on the SAS map do not correspond to water flow signatures on the TWI map. The exception is a stormwater signature identified as “Desktop delineated channelled valley bottom” that feeds into an altered watercourse flowing to the north-east. • Most importantly, the conclusion drawn from the assessment and the subsequent recommendations “it is recommended that the SEF delineation outcome be accepted as accurate with the omission of small wetland areas on Westleigh soils in the northern section of the site. This is mainly due to their isolation and current complete degradation due to detrimental land activities (dumping of rubble and surface alteration)” is noted. 			
<p>After a thorough review of the above findings, the Department has come to the following conclusions:</p> <ol style="list-style-type: none"> 1. The Department accepts the Wetland Delineation by SEF (HGM 1 & 2) and would concede on the remaining HGM’s based on the 			<p>Comments noted and adopted in the 2022/2023 EIA Process for this application.</p>



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
findings, and the fact that the systems are isolated and have been severely degraded.			
2. As per the City's Catchment Management Policy, no development would be permitted within the wetland or riparian zone, or within a buffer of 30 metre from the outer edge of such wetland or riparian zone or riverbank where this is clearly identifiable, or within the 1:100-year floodlines, whichever is the greatest. In this case (HGM 1 & 2).			Noted. The preferred layout alternative accommodates the 30m buffer zone.
3. Due to the presence of an existing road (Dane Road) which would have potentially isolated the wetland system, this road could serve as southern buffer of HGM 1 & HGM 2 wetland units, in a case where the 30m buffer extend beyond the road.			Comments noted and adopted in the 2022/2023 EIA Process for this application. The preferred layout alternative accommodates Dane Road as the southern buffer.
4. All other comments made previously relating to Stormwater Management Plan, Johannesburg Open Space Framework and any other applicable bylaws still apply for the above proposed development.			Noted.



ISSUE RAISED	DATE AND HOW ISSUE WAS RAISED	COMMENTATOR	RESPONSE
5. The Department will await the updated detailed layout plans which comply with all the comments or conditions listed above, together with the previously submitted comments relating to the CoJ Stormwater Management Plan and Johannesburg Open Space Framework.			



APPENDIX 26: SPECIFIC INFORMATION REQUIRED BY THE AUTHORITIES:**GADR CONDITIONS OF APPROVAL OF THE FINAL SCOPING REPORT**

Reference: Gaut 002/22-23/E3421
 Enquiries: Tendani Rambuda
 Telephone: 011 240 3386
 E-mail: Tendani.Rambuda@gauteng.gov.za

Seedcracker Environmental Consulting CC
 228 Ashwood Drive
 Zwartkop Golf Estate
 CENTURION
 0157

E-mail: stephweb@mweb.co.za

Dear Stephanie Cliff,

FINAL SCOPING REPORT AND PLAN OF STUDY ACCEPTED: THE PROPOSED MIXED-USE DEVELOPMENT ON THE REMAINDER OF THE FARM ALLANDALE 10 IR TO BE KNOWN AS RABIE RIDGE EXT 7, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY

The Scoping Report and Plan of Study for Environmental Impact Assessment which was submitted in respect of the above-mentioned application and received by the Department on 14 February 2023 has been accepted. You may accordingly proceed with undertaking the Environmental Impact Assessment in accordance with the tasks that are outlined in the Plan of Study for Environmental Impact Assessment.

Notwithstanding the above, your attention is drawn to the following requirements that must be addressed in the Environmental Impact Assessment Report (EIAR).

1. The Environmental Impact Assessment Report (EIAR) must comply with Regulation 23 of the EIA Regulations, 2014.
2. All the activities to be undertaken on site must be described with details and the impacts that they will have on the physical, biological, social, economic and cultural aspects of the environment must be adequately assessed.
3. The public participation process must be undertaken in accordance with the EIA Regulations, 2014. Comments from all relevant stakeholders such as National Department of Water and Sanitation (unless a Water Use Licence will be applied for), City of Johannesburg Metropolitan Municipality: Department of Integrated Environmental Management which has jurisdiction over the area be sought and form part of the report. All comments must adequately be addressed and submitted to the Department with the Draft EIAR.
4. Wetland study must be undertaken by suitably qualified specialists registered in accordance with the Natural Scientific Professional Act (2003) as Professional Natural Scientists within the field of Ecological or Aquatic science, have specific post-graduate qualifications relating to wetlands.
5. Heritage Impact Assessment must be undertaken by suitably qualified specialists.
6. Vegetation assessment must be undertaken by suitably qualified specialists registered as Professional Natural Scientists in accordance with the Natural Scientific Professions Act, (Act No 27 of 2003) within the field of Botanical Science. The survey must take place during summer season (beginning of November to the end of April).
7. Geotechnical investigation must be undertaken by suitably qualified specialist registered as professions in engineering science and must be submitted to council for geoscience for comments.
8. Traffic Impact Study must be undertaken by suitably qualified specialist registered as professions in engineering science and submitted to City of Johannesburg Metropolitan Municipality Department of Road and Transport for Approval.



9. An overall sensitivity map overlaid on the layout plan, indicating all the relevant buffer zones related to existing wetland, perennial river and sites that have been excluded from the development due to their sensitivity in nature must form part of the EIAR. The layout plan, printed on A1 paper size, must be to scale, clear, legible and indicate legend which corresponds with activity components.
10. All maps must be in colour and to correct scale.
11. The layout must be amended to accommodate wetlands and its protective 30m buffer (from the outer edge of the temporary zone).
12. All attenuation ponds must be located outside the wetlands and its protective 30m buffer.
13. A confirmation from the local authority with regards to provision of bulk services (e.g., water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructures is required. This must include a description of the infrastructure, specifications, layout, capacity, and the planned routes.
14. Should installation of services and roads infrastructure cross sensitive areas including wetlands, impacts associated with such crossing must be thoroughly assessed, discussed and reported on the EIAR.
15. A detailed storm water management plan (which complies with sustainable drainage systems, SuDs) for this development must be compiled and approved by the local authority before incorporating such plan into the EIAR.
16. A site-specific Environmental Management Programme (EMPr) must be compiled and attached to the EIR

If you have any queries regarding the contents of this letter, please contact the official of the Department at the number indicated above.

Yours faithfully



Mr. T. Rambuda

Control Environmental Officer Grade B – Environmental Impact Management

Date: 24/03/2023



COJ COMMENTS ON THE DRAFT SCOPING REPORT



a world class African city

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Environment and Infrastructure Services Department

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UNIT: IMPACT MANAGEMENT & COMPLIANCE MONITORING

Our Reference: **EIM 02/06/2022**
GAUT 002/20-21/E2981
Contact: **Katlego Kale**
CoJ Region: **A**
Tel: **(011) 084 9189**

Seedcracker Environmental Consulting
228 Ashwood Drive
Centurion
0167
Stephweb@mweb.co.za

Attention: Stephanie Cliff

DRAFT SCOPING REPORT AND PLAN OF STUDY FOR THE EIA FOR A MIXED LAND USE DEVELOPMENT, LOCATED ON THE REMAINDER OF THE FARM ALLANDALE 10 IR, TO BE KNOWN AS RABIE RIDGE EXT 7, MIDRAND, GAUTENG PROVINCE.

Reference is made to the Scoping Report dated June 2022.

Description of the project:

The proposed project entails the establishment of a mixed land use development, to be known as Rabie Ridge Ext 7. The site measures 129,6391 hectares in extent and is currently said to be vacant. The southern part of the site is said to be illegally occupied. The proposed township will consist of 442 erven to be zoned "Residential 1", 53 erven to be zoned "Residential 3", 1 "Institutional" erf, 1 "Business 1" erf, 1 "Educational" erf, 5 "Public Open Space" erven and "Roads".

Guidelines, by-laws and policies:

The Report considers relevant policies, by-laws, and strategies. The site falls within Region A, Sub Area 10 whose objective is to ensure the socio-economic integration, consolidation and long-term sustainability. The area falls within a marginalized area and high priority areas of the Growth Management Strategy. The proposed development is also in line with the SDF 2040 as it promotes secure sustainable inclusionary, affordable human settlements and reduce the issues of fragmentation and spatial disconnection.

Description of alternatives:

The report considers two land use options: a mixed use and a single use development with the former being the Preferred due to social integration. The report does not consider alternative layout plans and states that the attached plan was informed by previously conducted Specialist studies. An alternative layout will be developed and presented in the EIA Phase.



Information from the land use application and other input

Provision for Open Space

The approved CoJ Open Space Framework's standard for the provision of open space is 2,4 ha of socio-economic space to be provided for every 1000 people. This open space includes parks, sports fields, and hard open spaces but excludes traffic islands and parking areas as well as ecological and undeveloped natural open spaces such as protected areas, high sensitivity vegetation, ridges and wetlands. Although the OSF considered international and national standards for the provision of socio-economic spaces, this set ratio of 2.4 ha per 1000 population has proven to be difficult to implement, as the standard is applied differently and EISD has settled for a much-reduced standard and parkland at a ratio below the policy standard. Therefore, consideration may be given for the provision of open space at 1 ha per 1000 population as a minimum standard non-negotiable.

Provision has been made within the proposed layout for social open space which can be developed as useable recreational parks for the community. However, the current provision of three smaller public open spaces, measuring approximately 2.9943 ha is insufficient in relation to the adjusted CoJ Open Space Framework's standard of 1 ha of socio-economic space to be provided for every 1000 people. The Social Impact Assessment indicates that 6129 residential units are proposed in the township, this could translate into approximately 15 322 people that would require recreational open space.

The Department notes approximately 17,9154ha in the centre of the development which was also set aside as open space. It is important to note that this open space is regarded as open space for wetland conservation and riparian zone protection and cannot be used for recreational purposes as it cannot fulfill the needs of the future residents for active recreation or play areas for children etc. The proposed township therefore has shortfall of functional recreational open space/ parkland and cannot be supported. The township layout in the DEIR must show recreational open space.

Stormwater management plan

The updated stormwater plan should be undertaken in line with the City's Stormwater Bylaw and Stormwater Design Manual. Particularly Clause 44 of the City of Johannesburg Stormwater Bylaw which state that the following requirements must, in addition to the requirements of section 38, be complied with if stormwater from any development site discharges directly, or indirectly across any intervening property, into a watercourse:

(a) The quantity and velocity of any stormwater discharge must be controlled and treated to the extent that such discharge attains a quality in compliance with the requirements of the National Water Act, 1998, the National Environmental Management Act, 1998 and any other.

The stormwater Management plan developed to address the following:

- Peak discharge - no increase in discharge for any event of any duration up to the 25 year RI event
- Volume of runoff - no increase up to the annual 10-year rainfall
- Runoff frequency - no surface runoff for the 1 yr RI event of any duration

The stormwater measures must mimic the natural hydrology and ensure that the discharge point does not impact the watercourse.



Land use application (Amendment scheme number 07-14324) and EISD 2016 comments on the DEIR with reference Gaut 002/13-14/E0135

The Town Application System shown there is a township application which was submitted to the City in 2014 (reflected as pending) with reference 07-14324 and another one from 2015 with reference 07-15399 (reflected as cancelled).

- The Johannesburg Roads Agency on comments dated April 2016 requested for the Traffic Impact Assessment and Stormwater management plan to be done. They also mentioned that permission is required from GAUTRANS to discharge stormwater into the Provincial Road reserve.
- The Johannesburg Water, on comments dated August 2016, said that they had received the outline scheme report, objected to the application, and confirmed that sewer and water upgrades are required.
- Please find attached as Annexure A the Departments comments dated March 2016 on the previous DEIR. Note most of the comments made are still relevant for the current development.

It is noted that the Scoping report confirms that the previous DEIR file was close prior to issuing of the environmental authorization and that a land use application will be submitted. The updated outline scheme report must be included in the DEIR.

Description and assessment of the identified environmental issues:

The CoJ Bioregional Plan shows the proposed development site mapped an Ecological Support Area (ESA). Ecological Support Areas (ESAs) are split based on land cover- ESA 1 being in a largely natural state and ESA 2 which generally includes areas with no natural habitat which retain potential importance for supporting ecological processes. These may include urban and cultivated landscapes on floodplains, in buffers around wetlands, in bottlenecks, and in key climate change corridors. Inappropriate management or intensification of land use in these areas could result in additional impacts on ecological processes. The Department advocates for implementing the land management objective of such areas, which is to avoid additional impacts on ecological processes and the land management recommendation is to avoid intensification of land use, which may result in additional impact on ecological processes.

2013-2016 Specialist studies which include the following are included in the report. Refer to to EISD commends dated March 2016 for comments made on the previous DEIR.

It is important to note that most of the Specialist studies were undertaken between 2013 and 2016. The report confirms that updated versions will be included in the Draft EIR. The Department has also noted that the Scoping report confirms that the layout in the report will be updated in line with the updated studies.

Wetland Assessment

The report identifies 5 wetland area on site of hillslope seep and valley bottom characteristics. The wetland areas were assigned a low Ecological Importance and Sensitivity Score, due to disturbances such as residential development and roads, cultivation of maize within the wetlands, dumping of rubble, the removal of almost all-natural wetland vegetation and the dominance of alien invasive species on site. The wetlands are also assigned Present Ecological State classification ranging from Class D (largely modified) to Class F (critically modified), because of various anthropogenic activities which has led to degradation of these wetlands and consequently, loss/ changes to the hydrological functioning of the wetlands. The 2013 and 2016 studies made various recommendations. The layout seems to have taken part of wetland HGM 1 and HDM 2 into consideration.



While this could apply to some of the identified wetlands due the existing impacts, it the Department's reasoned opinion that some the Hillslopes Wetland could still be serving its hydrological function such as the recharging/seep into the unchanneled valley bottom wetland and the associated watercourse. As such, the Department requires that a Hydropedological Study be undertaken for the affected wetlands to determine the hydrological interaction of water with soils and the flow paths within the hillslope wetland to the wetland and/or the stream itself.

Water Use Authorization

The report confirms that an application for water use authorization will be submitted. The application/proof of submission must be included in the DEIR.

Agricultural Potential Impact Assessment

The report states that the extent of agricultural potential identified within the site is unlikely to justify the acquisition and maintenance of essential and sustain viable crop production at a commercial scale. The surroundings are also urbanized, making viable agricultural land use unlikely. It is therefore of the Specialist's opinion that the proposed mixed land use can be supported subject to mitigation measures being implemented to prevent impact on adjacent soils. Maize is ploughed on the property on an 'informal' basis.

Heritage Impact Assessment

The study area has no heritage resources situated within the proposed development boundaries. The study recommends the project continue subject to mitigation measures.

Groundwater Hydrocensus Report

The location and use of 23 boreholes within a 2 km radius of site were quantified, and water samples were extracted for analysis from selected boreholes. The current condition and sensitivity of the groundwater system must be defined to inform future management. The report recommends that the development continue subject to the undertaking of a stormwater master plan and that groundwater be monitored quarterly during the construction phase.

Traffic Impact Assessment

The study states that the proposed mixed development area will have a significant impact on the surrounding road network, intersections, and at properties access points. Traffic upgrades will be required within proximity of the site. The planned K111 and its future planning will be affected by the application, therefore approximately 0.2925ha should be given off for the implementation of the K111 road reserve. In addition, the development does not affect the planning of the K50 and K80, however a 16.0m building line from the centreline of planned K56 and K80 will apply as stated in conditions of township approval (Ref: 1/13/1/3 – 21805).

It is proposed that the development be served by two full accesses off the planned future K56 alignment. A partial access (intersection A) is also proposed off the planned future K111. This access is not part of the K111 planning and will be required to be approved by GDRT. The report further proposes that a full access be gained off Boshoff Road/90th Avenue intersection (intersection B). With the recommended traffic upgrades, the study endorses the development.



Floral Assessment

The area consists of vegetation that has been degraded by informal agriculture. Connectivity with natural grassland does not exist. The study states that the development be considered favorably, provided that the mitigation measures as set out in the report are implemented.

Mammal, Herpetofauna and Avifauna Habitat Scan

The report reiterates that the site has been degraded due to anthropogenic activities. This had detrimental effect on mammal numbers and diversity. The report does state however that there is a possibility that Red Data shrews, bats and the Southern African hedgehog can occur on site. In terms of herpetofauna, except for a few vagrant giant bullfrogs which may use the site for feeding and aestivation, no Red Data herpetofauna species should occur on the study site. Similarly, the development will have no negative effect on any Red Data avifaunal species since these species are highly unlikely to occur within the study area due to a lack of suitable breeding, roosting and foraging habitat. The studies propose mitigation measures for the development.

Social Impact Assessment

The proposed project will result in a well-managed housing development which will result in an improvement to the neighborhoods and remove possible negative perceptions with the undeveloped and unmaintained area. The development will also be providing a range of different housing types for different economic needs while adding to the revitalization of the area. The report endorses the proposed development and states that it can be accommodated without severely negatively compromising the day-to-day life of the communities near the site.

Evaluation and presentation of mitigation measures:

Mitigation measures are proposed for each identified environmental impact, however, contain scoping level assessments. The proposed mitigation measures will be further detailed during the EIA Phase when updated studies will be undertaken. The draft EMPr will also be included as part of the Draft EIAR.

Public Participation:

The Public Participation (PP) is still taking place and must be in line with the requirements as specified in the EIA Regulations, 2014(as amended).

Recommendations:

Having noted the above, the Department notes the 2013/2018 Specialist studies and study updates layout. The Department requires that the following be addressed in the Draft EIR:

- Confirm whether the site is vacant or if there is encroachment. If there is encroachment, confirm the land use and location.
- In addition to the studies confirmed in the report for update, a Hydropedological Study must be compiled for the affected wetlands to determine the hydrological interaction of water with soils and the flow paths within the hillslope wetland to the wetland and/or the stream itself.
- Design alternatives must be considered.
- The updated outline scheme report must be included in the DEIR.



- A comparison of the outcome of the 2013/2016 studies must be made with the studies being compiled/updated. Reasons for changes, if any, must be provided including how the property owners exercised Duty of care.
- Sensitivity mapping must be done.
- The layout must be amended based on the findings of the updated studies and must show the proposed development overlaid with the sensitivities on site. The Department also requests that a clear legible map be submitted.
- The layout must make provision for adequate recreational open space as outlined above in line with the Open Space Framework.
- The developer must submit the stormwater management plan that should be in line with the City's Stormwater Bylaw (2010) as well as the Draft Design Manual (2020). The plan will need to adopt principles of Water Sensitive Urban Designs (WSUDS) and Sustainable Urban Drainage Systems (SUDS) which provide options such as bio-retention ponds, swales, grass lined channels, stone filled infiltration ditches and permeable paving in order to minimize surface runoff and maintain water quality.

Should you have any queries or require any further information, please do not hesitate to contact the Department.

Regards,



Nozipho Maduse
Head: Environmental Impact Management
Tel: 011 082 7943
Email: NoziphoM@joburg.org.za
Date: 2022/07/07



APPENDIX 27: EMPR

