



GAUTENG PROVINCE

AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.**
4. **A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.**
5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.
6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
8. An incomplete report may lead to an application for environmental authorisation being refused.
9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**
10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.
11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.
12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the of the Environmental Affairs Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the of the Environmental Affairs Branch
Ground floor Diamond Building
11 Diagonal Street, Johannesburg
Administrative Unit telephone number: (011) 240 3377
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:

File Reference Number:

Application Number:

Date Received:

GAUT 002/21-22/E3049					

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

Not Applicable

Is a closure plan applicable for this application and has it been included in this report?

No

if not, state reasons for not including the closure plan.

Not Applicable

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity?

Yes

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person?

Yes

Refer to the Public Participation Report attached hereto under Annexure E for the Interested and Affected list.
--

If no, state reasons for not attaching the list.

Not Applicable

Have State Departments including the competent authority commented?

No

If no, why?

This document will be circulated to the relevant authorities, they will be given a 30-day review and commenting period in which they may provide comments on the proposed project. All comments received during the public review period will be submitted as part of the final submission of the BAR to GDARD.

Contents

- SECTION A: ACTIVITY INFORMATION 3**
 - 1. PROPOSAL OR DEVELOPMENT DESCRIPTION 3
 - 2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES 17
 - 1. ALTERNATIVES 20
 - Proposal - Infill development location (preferred) 21
 - Proposed Sewer Pipeline route 22
 - 5. SITE ACCESS 24
 - 6. LAYOUT OR ROUTE PLAN 26
 - 7. SITE PHOTOGRAPHS 27
 - 8. FACILITY ILLUSTRATION 27
- SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT 28**
 - 1. PROPERTY DESCRIPTION 28
 - 2. ACTIVITY POSITION 29
 - 3. GRADIENT OF THE SITE 30
 - 4. LOCATION IN LANDSCAPE 30
 - 5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE 30
 - 6. AGRICULTURE 31
 - 7. GROUND COVER 31
 - 8. LAND USE CHARACTER OF SURROUNDING AREA 61
 - 9. SOCIO-ECONOMIC CONTEXT 62
 - 10. CULTURAL/HISTORICAL FEATURES 63
- SECTION C: PUBLIC PARTICIPATION (SECTION 41) 71**
 - 1. LOCAL AUTHORITY PARTICIPATION 71
 - 2. CONSULTATION WITH OTHER STAKEHOLDERS 72
 - 3. GENERAL PUBLIC PARTICIPATION REQUIREMENTS 72
 - 4. APPENDICES FOR PUBLIC PARTICIPATION 72
- SECTION D: RESOURCE USE AND PROCESS DETAILS 74**
 - 1. WASTE, EFFLUENT & EMISSION MANAGEMENT 74
 - 2. WATER USE 77
 - 3. POWER SUPPLY 77
 - 4. ENERGY EFFICIENCY 77
- SECTION E: IMPACT ASSESSMENT 78**
 - 1. ISSUES RAISED BY INTERESTED & AFFECTED PARTIES 78

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION & OPERATIONAL PHASE.....	78
3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING & CLOSURE PHASE – NOT APPLICABLE.....	102
4. CUMULATIVE IMPACTS	102
5. ENVIRONMENTAL IMPACT STATEMENT	104
3. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE.....	104
7. SPATIAL DEVELOPMENT TOOLS.....	106
8. RECOMMENDATION OF THE PRACTITIONER.....	106
9. THE NEEDS AND DESIRABILITY OF THE PROPOSED DEVELOPMENT.....	107
10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED	109
11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)	109
SECTION F: APPENDIXES	110

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

1.1 Project Title (must be the same name as per application form):

Project Title: Proposed Shopping Centre and Associated Services on the Remainder and Erf 1 1, 2, 3, 4, 5 and 6 of Portion 22, and Portion 26 of the Farm Ekangala 610 J.R., within the City of Tshwane Metropolitan Municipality.

The proposed development of the Ekangala Shopping Centre is located at the corner of the R460 and the R568. The site is currently vacant and is not being put to any productive use. There is evidence of pedestrian walking routes across the site and above ground electrical cables along with natural veld grass and isolated clumps of trees.

The site is approximately 5.64 hectares in extent and the sewer line is 1.6km.



Figure 1: Location Map of the proposed Ekangala Shopping Centre and associated services

1.2 Proposed development

Proposal

It is the intention of Litshaba Investments (Pty) Ltd (the Applicant) to develop and operate a new community Shopping Centre, which will include associated services on the Remainder and Erf 1, 2, 3, 4, 5 and 6 of Portion 22 and Portion 26. The Shopping Centre will sponsor anchor tenants and several line stores of which large percentage will be national franchise-type business concerns.

The proposed Shopping Centre will ultimately extend to a total maximum of approximately 13 764m² gross floor area, which will be implemented in phases. The present application is to follow for a maximum gross floor area of 14 112m² to be developed.

The development controls contained in the zoning certificate are indicated in the table below:

Density	Not applicable
Height	10 metres (2 storeys)
Floor Area Ratio (FAR)	Not applicable
Coverage	50%
Building-lines	
Streets	10 meters
Other	5 meters along rear and side boundaries as well as ground floor along southern boundary, for double volume or storeys above ground level along south boundary.

In order to connect to the existing sewerage system in Ekangala A, north-east of the proposed Shopping Centre, a sewerage line will be constructed as part of the Shopping Centre development.

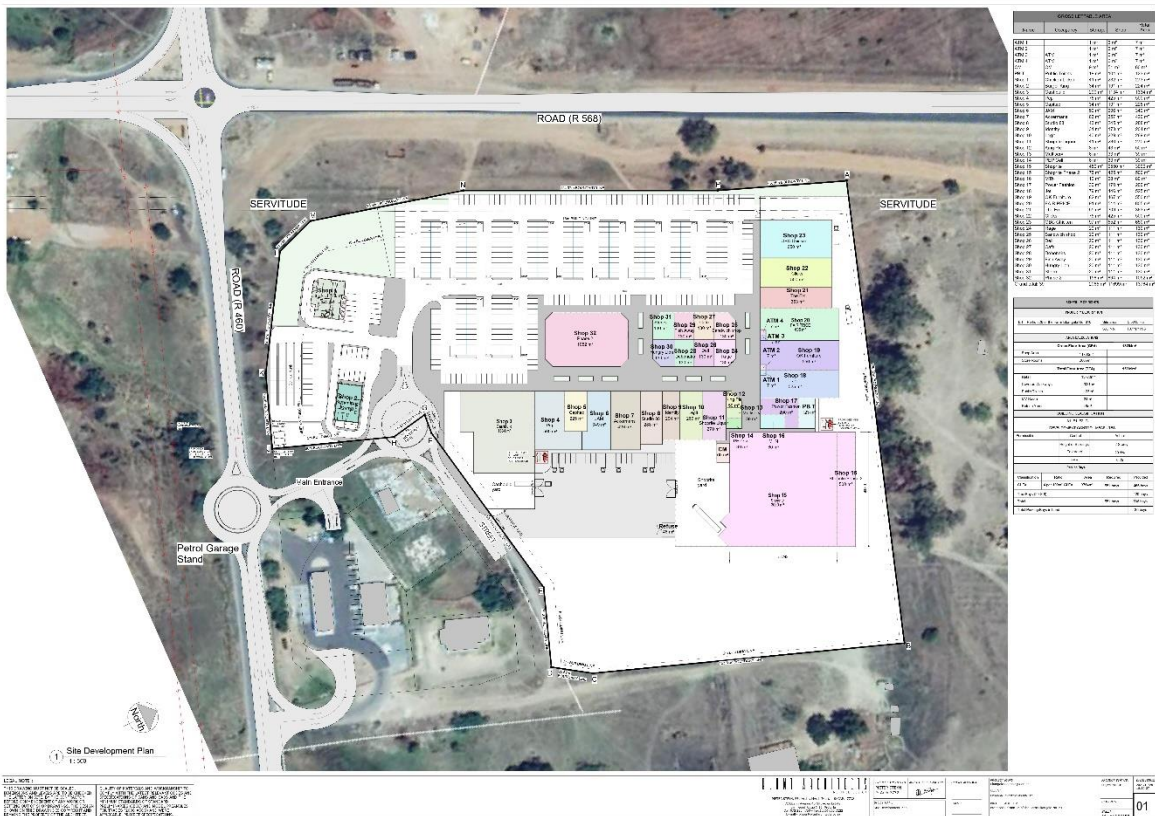


Figure 2: Site development plan

Provision of Services

Water Reticulation

There is a bulk waterline on the western side of the site next to the K175 road. A water reticulation pipe runs on the western side of the site next to the K175 road and on the southern side of the site next to the D460 road that feeds Ekangala. There is also a complete network southwest of the K175/D460 road of Ekandustria. Most of the factories in Ekandustria has been abandoned and is not used at the moment.

There is a tender out to upgrade the pumps at the Bronkhorstspuit waterworks. The developers of the shopping center has meanwhile entered into an agreement with the Mpumalanga Economical Growth Agency (MEGA) to obtain water from the Ekandustria Industrial township whom has an adequate quota of water and who will not utilize their full quota within the next ten years. See **Figure 3** and **Annexure J2b**. MEGA will provide Litshaba Investments 55 kL AADD per day for the Ekangala Shopping Mall. The developer of the townships will be responsible to store fire flow on site and to store 48 hours domestic water on site.



Figure 3: Water reticulation system layout

Reservoir capacities

The reticulation is served by the Ekangala reservoirs. It is however proposed to store fire water on site in two reservoirs that will provide fire flow water as required by the rational fire design. A further 114 kl will be stored on site as domestic water to provide reservoir storage capacity for 48 hours.

Materials

The materials for the proposed water reticulation will comply with the requirements of the Tshwane Metropolitan Municipality. The water pipelines will be constructed with class 12 (SABS 1283), uPVC material with cast iron fittings as required. Fire hydrants must comply with the latest requirements of SANS 10090 for the risk areas as defined.

All construction work will be done according to SANS 1200 and the requirements of Tshwane Metropolitan Municipality. Testing and inspection of the pipelines will be done to the standards as required by council.

The minimum cover to pipelines in road reserves will be 1000mm.

Bulk Capacities

The area is serviced by Rand Water as well as the Bronkhorstspuit water purification works. At the moment the Bronkhorstspuit works operate at 50% capacity due to operational issues.

Water Flow Calculations

The water demand for Phase 2 of the development can be summarized as follows:

Land Use	Unit	Qty	Unit Demand (kl/day)	Total (kl/day)
Commercial	100m ²	143.04	0.34	48.6
Sub - Total				48.6
Plus, UAW (15% of Total AADD)				8.6
Total Average Demand				57.2
Average Flow l/s				0.7
Peak flow Excl Fire Flow l/s				2.6
Fire Flow Hydrant (X1) – Moderate Risk 1				25.0

The peak flow excluding fire flow for the development with a peak factor of 4 of 2.6 l/s. The average flow is 0.7 l/s over a period of 24 hours. To reduce the risk that the proposed shopping centre has an influence on the performance of the existing water network in Ekangala, the water for the shopping centre can be stored on site. Then reservoirs on site can be filled in off-peak periods by installation of a time switched control valve on supply line.

It is proposed that the storage capacity on site must make provision for fire and for 48 hours domestic water usage.

Internal Water Reticulation and Connection Points

The recommended operating pressures of the booster pump in the development must be as follows:

Scenario	Pressure (m)	Criteria
Peak flow	24m	24m minimum
Fire flow	15m	5m minimum
Static	49m	90 maximum

Sanitation Reticulation

Existing services

The proposed development drains towards Ekangala A to the northeast of the development. The existing township is serviced with a waterborne sewerage system that drains towards a sewerage pumpstation.

Sewage pump station capacities

The sewerage from Ekangala is pumped in a southern direction to the existing town of Rethabiseng. The flow from the proposed development is low and will not have an influence on the capacity of the existing pumpstation.

Materials

The materials for the proposed sewerage reticulation will comply with the requirements of Tshwane Metropolitan Municipality. The sewerage pipelines will be constructed with heavy duty Class 34 (SABS 791), uPVC material. All benching in the manholes will be constructed with vitrified clay channels or epoxy coated dolomite aggregate for the benching.

All construction work will be done according to SANS 1200 and the requirements of Tshwane Metropolitan Municipality. Testing and inspection of the pipelines will be done to the standards as required by SANS 1200.

The minimum cover to pipelines.

Sewerage Calculations:

A summary of these flows can be as follows:

Land Use	Unit	Qty	Unit Demand (kl/day)	Total (
Commercial	100m ²	143.04	0.34	48.6
Sub-Total				48.6
Plus UAW (15% of total AADD)				8.6
Total Average Demand (AADD)				57.2
Peak Daily Dry Weather Flow (l/s)				1.3

The minimum pipe diameter will be 160uPVC with a minimum slope of 1:200.

The flows from the proposed development is small and will not have an effect on the capacity of the existing system. Tshwane indicated that 690m of 350mm pipe just before the purification works is at more than 67% of its capacity and the line must be upgraded to a 825mm diameter line. The cost of such a line is estimated at R3.9 million rand. The capacity of the 350mm line is approximately 84.65l/s and the maximum flow is 71.03 l/s. It is therefore clear that the flow from the shopping centre will increase the flow in the pipe from 83.9% to 85.4% of the pipe's capacity. This should not have a negative effect on the existing capacity and flows in the pipe.

Proposed system

The sewerage must cross a wetland area to the northeast of the proposed development to connect to the existing sewerage system in Ekangala A. It is proposed to cross the wetland as indicated **Figure 13** the proposed crossing has been selected as it will have a minimal effect on the wetland. Manholes will be constructed with raised lids to make sure the manhole covers are above 100-year flood line levels.

If Tshwane does not want the shopping centre to discharge in peak hours to the existing outfall sewer line that is close to capacity, then a lift storage pumpstation can be constructed in the north eastern corner of the shopping centre property, as indicated in **Figure 4**. The pumpstation has the function to store the sewerage in peak hours and then discharge the sewerage to the sewerage system after peak hours. The pump station is 'safe' in the sense that if a blockage occurs, then the pump station overflow will be directly into the gravitational sewerage system and no overflow to the wetland area is expected. City of Tshwane indicated that the outfall will have sufficient capacity

The owners of the shopping centre can maintain the pumpstation and an emergency overflow can be constructed to discharge into gravity line if there is a power failure.

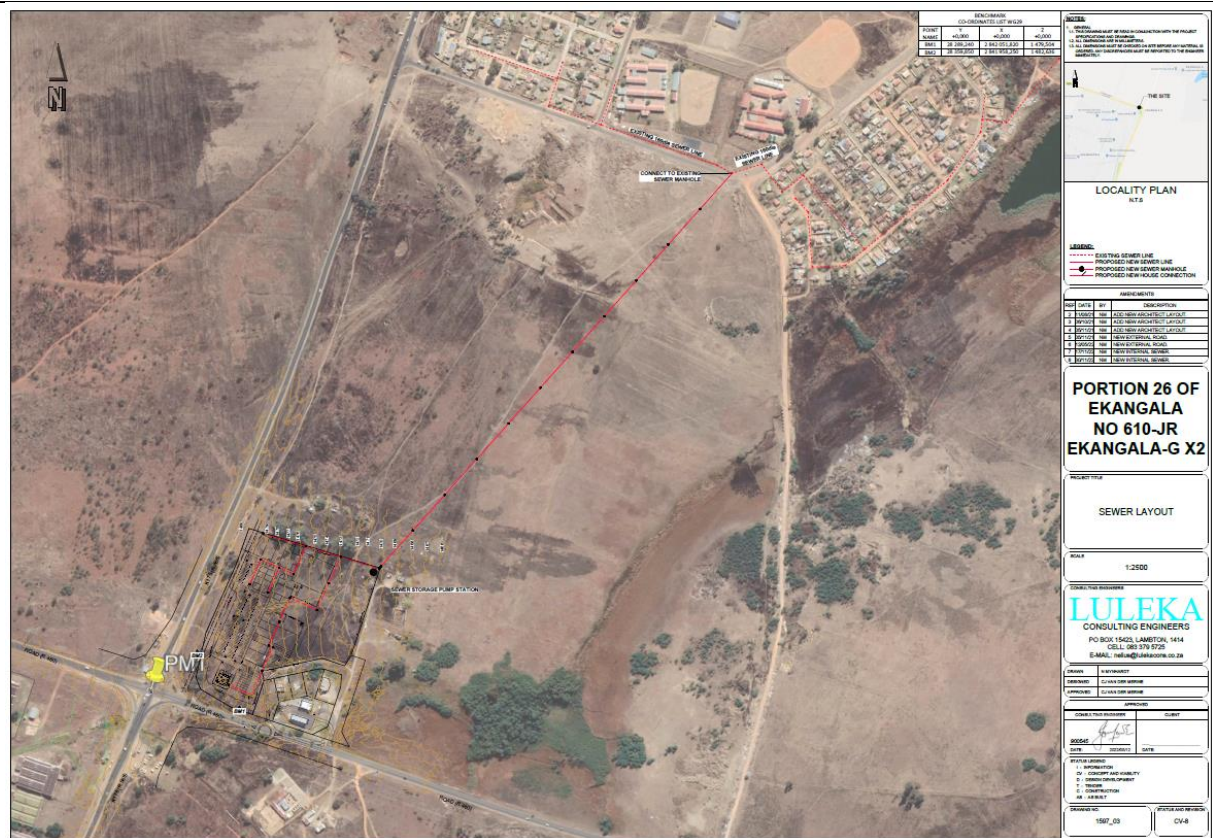


Figure 4: Proposed sewer system

Stormwater Management

Rainfall parameters

The following rainfall parameters were used to simulate the design storm:

Mean Annual Precipitation:	720mm
Time to Peak ratio:	0.38
Depression Storage:	Not provided
Paved Areas:	3mm
Grassed Areas:	5mm
Horton's Infiltration parameters:	Not provided
Initial Infiltration:	14.4mm/h
Decay constant:	5/h

Design Principles

Minor system

The internal stormwater network will be designed using a storm with a recurrence interval of 5 years.

Major System

The internal roads and paved area will be designed in combination with the minor system to handle a storm with a recurrence interval of 50 years. The 505-year storm will be discharged through the piped system and on the road surface that leads to the external stormwater system.

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

Stormwater Infrastructure

Existing Infrastructure

There is an existing culvert crossing the K175 and D460 intersection that discharge stormwater directly towards the site in an open trench on the southwestern corner. There is also a 825mm diameter culvert crossing the K175 that directs water directly towards the site. Various other culvert crossings cross the K175 and D460 roads.

Stormwater is concentrated through a set of three culverts, 1.8m x 1.8m, that cross the D460 between Ekanagla and the filling station at the spruit area. This spruit area is outside the boundary of the proposed township for the shopping centre.

There is no 1:100 year floodline on the proposed development site.

New Stormwater System

The stormwater from Ekandustria that discharge on the southwestern corner of the site will be directed in an open grassed channel next to the existing Isitjaba Road towards the spruit area. The flows from the 900 x 450mm culverts is calculated as 1.9m³/s.

Water from the Ekandustria township is discharged through two 1050mm pipes and two 900 x 450mm culverts onto the land south of the D460 (Isitjaba Road). The capacity of two 1050mm pipe crossings is 3.1m³/s and the capacity of the two culverts is 1.9m³/s.

This water flows in a poor defined channel towards the spruit area east of the development. It crosses the Isitjaba Road through a 1.8m x 1.2m culvert at the filling station entrance and further through three 1.8 x 1.8m culverts as part of the spruit. The capacity of the 1.8 x 1.2m culvert is 5.6m³/s and that the three 1.8m x 1.8m culverts is 35.5m³/s.

The capacity of the 825mm diameter pipe crossing under the K175 is calculated as 1.105m³/s. this water will be directed by an open grassed channel towards the low-lying area north of the proposed site and parallel to the K175 road.

Water on site will be handled on the surface and in a pipes system that will discharge towards the spruit and wetland area on the eastern sider of the site. the stormwater from the proposed development will not influence the flood line of the existing spruit.

The flows from the site for a 1:5 year and 1:50 year storm can be summarized as follows:

Description	Flood	Stormwater flow (m ³ /s)
OUT_4	5 year developed	0.186
OUT_4	50 year developed	0.517
OUT_7	5 year developed	0.068
OUT_7	50 year developed	0.306

A water use license will be necessary to discharge water directly into a watercourse.

The storm water in the parking areas will be collected by heavy duty Mentis grids at low points. The capacity of the grid is calculated with a blockage factor of 50%. The grid sized can be summarised as follows:

Name	L	B	Capacity	Actual 50 year flow
GI_1	4000	300	0.353	0.3251
GI_2	3000	300	0.2650	0.1921
GI_3	2000	300	0.177	0.1299
GI_4	2000	300	0.177	0.0981
GI_5	2000	300	0.177	0.0781

The water will discharge at two points behind the proposed buildings on the eastern side of the proposed shopping centre. The water will discharge into a stilling dish constructed of stone pitching with energy dissipaters to the spread the water into the wetland area.

Management of Stormwater During Construction

Stormwater will accumulate at low points during construction. It is therefore essential to apply the following precautionary measures during the construction phase:

- Place excavation material on stream-upside of all trenches that will be excavated.
- Before stormwater trenches are excavated, the stormwater settlement pond areas must first be prepared to accept stormwater during construction. This will then act as a stilling chamber in which any silts and waste will settle before the water can enter the road area.
- Roads can also concentrate stormwater towards the wetland areas. Before road construction, that leads to low lying areas can be constructed, the wetland must be protected by construction of the retention pond areas to settle stormwater from construction.
- The settlement pond areas must be maintained and cleaned during construction and kept in a working order. after construction the pond area will be rehabilitated.
- Stormwater and sewerage lines must be constructed from the low point towards the high point to prevent accumulation of stormwater in the trenches.
- Care must be taken to prevent spillage of oils and fuel, especially around the onsite filling storage of diesel. Preventative measures must be in place if spillages should occur to prevent the spillages to enter trenches or road construction areas. The top layer of soil around the storage tanks must be stabilized with cement to establish an impermeable layer of soil. This must be removed after the construction.
- The construction management of the site should be done to prevent environmental damage to the area during construction according to the environmental management plan.

Waste disposal

Waste generated by the proposed development can be summarised as follows:

Zoning	GLA (m ²)	Volume Waste (m ³ /week)
Commercial Phase 1	13 764	59

The collection of solid waste from the proposed development is a function of the local municipality and arrangements will be made in the service agreement to remove solid waste.

Electrical Supply

The calculated maximum demand for the proposed shopping centre development is approximately 1200 kVA. Eskom was engaged by the Electrical Engineers to confirm availability of capacity on their network infrastructure, for the required bulk electrical connection. Eskom has verbally confirmed the availability of capacity shall be made available from an existing overhead medium voltage line adjacent to the development site. An application to Eskom for the supply of the bulk electrical connection has been submitted. The final cost of making the bulk supply

available shall be determined by Eskom when the project is ready to proceed, and the developer pays the cost estimate fee.

Traffic Impact Assessment

Traffic volumes

Peak hour traffic volume surveys were conducted at the intersection of Road D670 and Isitjiba Street for a 12-hour and Saturday peak period on 23/24 July 2021 with the purpose to determine the street peak hour volumes and relevant traffic information. A follow-up survey had to be done at the intersection after the initial surveyed data was approximate 40% lower than the previous counts done by Gautrans in 2019. This difference was due to COVID restrictions since March 2020.

A follow-up survey was conducted on 22/23 October 2022 and it was found that the average increase in traffic on especially the north-south traffic at the intersection was 12% compared to the July traffic survey. This is due to relaxation of COVID regulations from Level 4 in June to Level 1 after 30 September 2021 and the increase in traffic as a result thereof.

The increase in traffic may take quite a while to be at the same level, if ever, than before March 2022 as many employees in the private sector now works from home or have relocated.

The following information on the peak hour traffic was deducted from the surveys:

Peak hour occurrences

- AM peak hour: 07h00 – 08h00
- PM peak hour: 15h45 – 16h45
- SA peak hour: 09h30 – 10h30

Peak hour factors

- AM peak hour: 0.74
- PM peak hour: 0.89

The traffic pattern is not similar to that experience in typical urban or CBD areas where there is a definite peak occurrence with a steep drop in traffic after the peak hour. The Saturday traffic also shows a high 15-min peak and then from there traffic volumes appear to be the same with a drop in volumes after 12.

Road Access Provision

Provincial Roads

It has been indicated in Section 2 that the site is located in a region where two routes as planned and protected in terms of the Gauteng Infrastructure Act are located adjacent to the site. Route K175 being the north-south route has been planned and accepted by the authorities involved. The road reserve for the K175 has been determined and has been excluded from the proposed township development site.

The route determination for route K202 has been done in January 1988 but no further planning has been done with regard to the detail design of the route. There seems to be confusion with regard to the ownership of the K202 route east of the K175. It is often referred to as provincial road D460. However, this section of the route is known as Isitjiba Street that falls under the jurisdiction of the City of Tshwane Metropolitan Municipality.

The K202 route west of the K175 has been planned along the D460 provincial road that was formed after the deviation of the existing D460 route to join with the D670 road (now K175) as shown in the Administrator's Notice below. Road D460 was never extended further east of Road D670.

Existing Isitjiaba Street

Isitjiaba Street was originally developed as access road towards Ekangala B, C, D and E and does not form part of the Gauteng roads network. This route is also not included in the Tshwane RMP and it is recommended that this should be rectified.

Traffic flow conditions

The current traffic flow conditions at the intersections have been analysed by the application of the SIDRA analysis tool.

The traffic flow conditions, as determined by the SIDRA program show unacceptable levels of service conditions. These conditions were however not observed during the surveys as the all-way stop control signs were ignored by the majority of the road users who used the intersection as an all-way yield intersection. Vehicles only stopped for short periods during the survey periods.

It would therefore appear that a traffic circle or traffic signal-controlled intersection will ensure safer traffic flow conditions.

Traffic Demand Capacity Analyses

Sidra Analyses

The demand traffic flow at the intersections as shown on the previous figures has been evaluated by the application of the SIDRA-analysis tool. These were the only intersections that were evaluated as the additional traffic added to the traffic movements at the other intersections is of such nature that it will not have any significant impact on the traffic flow at those intersections – chiefly through movements and located outside the study area.

The all-way stop control conditions have not been assessed for the traffic demand as it was found that the SIDRA-analyses already indicated that the stop control measures do not provide sufficient capacity for the current neither for the future traffic flow conditions without the development. The analyses were therefore limited to the roundabout and signal-controlled conditions.

The capacity analyses for the future traffic have been determined for the signal-controlled intersection of K175 and Isitjiaba Street only as the provision of a traffic circle at this intersection will require additional road works to comply with the minimum design standards for these large traffic circles.

Results for 2021 Demand

It is concluded from the above results that the addition of the expected background traffic and traffic distributed as discussed previously, will not result in unacceptable traffic flow conditions on the adjacent road network and access positions based on the roundabout control.

The signal-controlled intersection analyses results show that care should be exercised in the final planning of the signal settings for the main intersection. No road upgrades or widening are required for this situation.

The traffic flow at the two accesses to the site will not result in unacceptable traffic flow conditions if constructed as indicated in this report. No road upgrades will be required other than the construction of the access intersections to the satisfaction of Gautrans and Tshwane.

Results for 2026 Demand

It is concluded from the above results, as for the 2026 traffic demand, additional capacity may be required for the northern approach to the intersection to accommodate the Weekday PM peak hour traffic.

The signal controlled intersection analysis results show that care should be exercised in the final planning of the signal settings for the main intersection. No road upgrades or widening are required for this situation. However, the current shared right turn lane from south must be converted to a compulsory right turn lane and the northern

approach lane markings must be changed to make provision for a dedicated right turn lane. These changes will result in LOS = D traffic flow conditions subject to detailed signal setting designs to be done.

The traffic flow at the access to the site will not result in unacceptable traffic flow conditions if constructed as indicated in this report. No road upgrades will be required other than the construction of the access intersections to the satisfaction of the City of Tshwane and where applicable Gautrans..

Road Upgrades Required

The current traffic flow conditions in the region of the site are such that no additional road upgrades would be required to accommodate the additional traffic that could be generated by the development when implemented. Road upgrades are however required for the construction of the access traffic circle and traffic signals are to be provided at the intersection of K175 and Isitjiaba Street.

Summary Of Proposed Improvements

Minor Road Improvements Required

The capacity analyses have shown that no minor or major Road upgrades would be needed to accommodate the traffic generated by the proposed development other than the construction of the access traffic circle and provision of traffic signals at the intersection of K175 and Isitjiaba Street.

Changes are however required with regard to the current lane markings layout at the intersection of K175 and Isitjiaba Street.

Major Improvements

There are no major road upgrades required along the existing main road network or at the main road intersection. The K175/Isitjiaba Street is constructed with slip lanes from west to south, east to south and south to west. There are paved areas at the traffic islands that have been constructed that could be used for additional lanes should it be needed in future.

Public Transport and Parking Requirements

Public Transport – Taxis

There are no official public transport facilities located along the adjacent street and none is currently planned close to the site. It is proposed to have dedicated taxi parking onsite and this should be discussed with the taxi associations in the region to ensure the optimum usage of this facility.

It is expected that the development will generate pedestrian volumes that could be significant along Isitjiaba Street and at the access intersection. Specific attention should be given to the accommodation of passengers from by-passing taxis – this should be done by the provision of taxi laybys along the K175 and Isitjiaba Street.

An existing informal taxi-stop facility is provided along the K175 south of the intersection. Conflict between vehicular and pedestrian/bicycle traffic at the access control point must be minimized and a separate access must be provided for pedestrians at the access point.

Private Vehicle Parking

All parking should be provided on the site. No direct parking should be allowed from the adjacent roadways. The total number of parking bays provided on site must comply with the requirement of the Local Authority.

It is required in terms of the approved development rights that parking should be provided at a ratio of 6 bays per 100m² floor area. The current South African manual for parking standards, as issued by the South African Department of Transport, was last updated in 1985.

Goods Vehicles Off-Loading Facilities

Heavy vehicles will be visiting the site. The site layout is such that sufficient manoeuvring space will be provided for heavy vehicles on site. It is recommended that the final site development plan must show all circulation routes for heavy vehicles as well as positions where loading/off-loading will take place.

All parking on site is to be paved as required by the local municipality and a sufficient number of parking bays, based on the minimum requirements by the Authority must be provided on the site.

Conclusions and Recommendations

Based on the available information, capacity analyses results and assumptions made in the report, it is concluded that the traffic generated by the development could be accommodated on the street network and no major Road upgrades would be required for the accommodation of the traffic generated.

It is therefore recommended that the development as submitted is to be approved from traffic engineering point of view. The following control measures will apply:

- Access to the site is to be provided to the satisfaction of the City of Tshwane Roads and Stormwater Department;
- Confirmation for the removal of the proposed K202 route eastbound from the K175 route must be obtained from Gautrans;
- The current roads master plan for the region must be updated to make provision for all the roads in the region;
- Traffic signals are to be provided at the intersection of the K175 route and Isitjiaba Street and a traffic circle must be constructed along Isitjiaba Street at the proposed access position to the site – this must comply with the minimum requirements of the City of Tshwane;
- Wayleave applications are to be submitted to both the City of Tshwane and Gautrans before any work may be done within the adjacent road reserves;
- A site development plan is to be submitted to the Local Authority for evaluation and approval before any construction works can commence.
- All parking should be provided on the sites – a parking ratio of 4 parking bays per 100m² GLA is recommended/supported;
- All off-loading facilities must be provided on site in accordance to the town-planning scheme of the municipality. All turning facilities for goods vehicles must be provided on site to prevent reversing onto streets. Sufficient manoeuvring space is to be provided at loading bays where heavy vehicles are to circulate.

Annexure J1: Town Planning Motivational Memorandum

Annexure J2a: Bulk Services Report

Annexure J2b: Civil Engineering Designs and Details

Annexure J2c: Water Supply Confirmation Letter

Annexure J3a: Electrical Reticulation Layout

Annexure J3b: Eskom Confirmation Letter

Annexure J4: Traffic Impact Assessment

Select the appropriate box

The application is for an upgrade of an existing development

n/a

The application is for a new development

X

Other, specify

n/a

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:

Application to the site

<p>GN 985 of 4 Dec 2014 as amended by GN R 324 of 7 April 2017</p>	<p>Listing Notice 1 Activity 12</p>	<p>The development of— (iii) bridges exceeding 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs – (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse</p>	<p>The proposed development is planned to accommodate a sewer pipeline that will cross a wetland.</p> <p>A Water Use License has been lodged with the Department of Water and Sanitation (DWS) to authorise the crossings.</p>
<p>GN 985 of 4 Dec 2014 as amended by GN R 324 of 7 April 2017</p>	<p>Listing Notice 1 Activity 19</p>	<p>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.</p>	<p>The proposed development is planned to accommodate a sewer pipeline that will cross a wetland.</p> <p>A Water Use License has been lodged with the Department of Water and Sanitation (DWS) to authorise the crossings.</p>
<p>GN 985 of 4 Dec 2014 as amended by GN R 324 of 7 April 2017</p>	<p>Listing Notice 1 Activity 27</p>	<p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.</p>	<p>The total area of the proposed development site is approximately 5.64 hectares in extent.</p>
<p>GN 985 of 4 Dec 2014 as amended by GN R 324 of 7 April 2017</p>	<p>Listing Notice 3 Activity 12</p>	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. c. Gauteng</p>	<p>Sections of the land are indicated as both important and ecological support areas. These areas have been investigated as part of the specialist studies.</p>

		<p>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or</p> <p>iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation, or had equivalent zoning.</p>	
<p>GN 985 of 4 Dec 2014 as amended by GN R 324 of 7 April 2017</p>	<p>Listing Notice 3 Activity 14</p>	<p>The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse measured from the edge of a watercourse;</p> <p>c. Gauteng iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.</p>	<p>The proposed development is planned to accommodate a sewer pipeline that will cross a wetland.</p> <p>A Water Use License has been lodged with the Department of Water and Sanitation (DWS) to authorise the crossings.</p>

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES	NO
-----	----

If yes, describe the legislation and the Competent Authority administering such legislation

Water Use License Application (WULA): General Authorisation	
Legislation	Competent Authority
National Water Act, 1998 (Act No 36 of 1998)	Department of Water and Sanitation

If yes, have you applied for the authorisation(s)?

YES	NO
YES	NO

If yes, have you received approval(s)? (Attach in appropriate appendix)

The Water Use License Application is currently on Phase 3 (submission of Technical Documentation). The Department will require that the Basic Assessment Report be submitted as part of the Technical Documentation submission.

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
Constitution of the Republic of South Africa (Act No 108 of 1990)	Government of South Africa	18 December 1996
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	Department of Environmental Affairs (DEA) and Gauteng Department of Agriculture and Rural Development (GDARD)	27 November 1998
Regulations GN. R. 982, 983, 984 and 985 promulgated under Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998) in Government Gazette 38282 on 4 December 2014 as amended by Regulations GN. R. 324, 324, 325, 326 and 327 of 7 April 2017.	Gauteng Department of Agriculture and Rural Development (GDARD)	7 April 2017
National Water Act (Act No 36 of 1998)	Department of Water Affairs (DWA)	26 August 1998
National Heritage Resources Act No 25 of 1999 (Act No 25 of 1999 as amended)	South African Heritage Resources Agency (SAHRA)	28 April 1999
The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)	National -Department of Agriculture Forestry and Fisheries (DAFF)	27 April 1983
Gauteng Environmental Management Framework	Gauteng DARD	-
<ul style="list-style-type: none"> i. Companion Guideline on the Environmental Impact Assessment Regulations, 2010 ii. Environmental Management Framework Guidelines, 10 October 2012. iii. Public Participation Guideline, 10 October, 10 October 2012. iv. Fee Regulations Guidance Document, April 2014 	Gauteng DARD	Various dates

v. Guideline on need and desirability in terms of the Environmental Impact Assessment Regulations, 2010 vi. EIA Listed Activities and Timelines (January 2015) Section 24G and Similar Listings (January 2015)		
All relevant Provincial regulations, Municipal by-laws and ordinances This includes: i. Gauteng Provincial Environmental Management Framework GPEMF 2015 ii. SPLUMA Bylaws of COT iii. The Gauteng Draft Red Data Policy iv. The Gauteng Draft Ridges Policy v. Protection of Agricultural Land in Gauteng Revised Policy (June 2006) vi. City of Tshwane Municipality Spatial Development Framework (SDF) vii. City of Tshwane Metropolitan Municipality's Open Space Framework viii. Gauteng Transport Infrastructure Act	City of Tshwane Metropolitan Municipality	Various dates

Description of compliance with the relevant legislation, policy or guidelines:

Legislation, policy of guideline	Description of compliance
Constitution of the Republic of South Africa (Act No 108 of 1990)	<ul style="list-style-type: none"> • Obligation to ensure that the proposed development will not result in pollution and ecological degradation; and • Obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development. <p>The proposed project can be considered as a sustainable development that will prevent pollution and ecological degradation whilst promoting justifiable economic and social development.</p>
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	The National Environmental Management Act (Act No. 107 of 1998) (NEMA) is the overarching framework for environmental legislation as well as the Regulations for Environmental Impact Assessment. It sets out the principles that serve as a general framework for environmental planning, as guidelines by reference to which organs of state must exercise their functions and guide other laws concerned with the protection or management of the environment. The application considers the environmental and socio-economic conditions in compliance with the NEMA principles.
National Water Act (Act No 36 of 1998)	The Act provides for the management of South Africa's water resources. It aims to ensure that the Republic's water resources are protected, used, developed, conserved, and controlled.

Legislation, policy of guideline	Description of compliance
	<p>According to the Act, any proposed water uses must be specified and registered and/or licensed. Similarly, any modifications to drainage lines on site must be investigated in terms of water use requirements. Consequently, a water use license will be submitted if required.</p>
<p>National Heritage Resources Act No 25 of 1999 (Act No 25 of 1999 as amended)</p>	<p>The site is it has a Very Low Paleontological Sensitivity.</p>
<p>Gauteng Environmental Management Framework</p>	<p>The aim of the EMF is to guide protection and enhancement of environmental assets and natural resources along with development patterns to ensure sustainable environmental management and development patterns within and around the Gauteng Province. The development site is located in Zone 1 which aims to promote development infill, densification, and concentration of urban development within the urban development zones as defined in the Gauteng Spatial Development Framework (GSDF), in order to establish a more effective and efficient city region that will minimise urban sprawl into rural areas. The proposed development is fully supportive of the objectives of the EMF.</p>
<ul style="list-style-type: none"> i. Companion Guideline on the Environmental Impact Assessment Regulations, 2010 ii. Environmental Management Framework Guidelines, 10 October 2012 iii. Public Participation Guideline, 10 October, 10 October 2012 iv. Fee Regulations Guidance Document, April 2014 v. Guideline on need and desirability in terms of the Environmental Impact Assessment Regulations, 2010 vi. EIA Listed Activities and Timelines (January 2015) vii. Section 24G and Similar Listings (January 2015) 	<p>Guidelines have informed this Application for Environmental Authorisation procedures and project / BAR.</p>
<p>Spatial Planning and Land Use Management Act, 2013</p> <ul style="list-style-type: none"> i. The National Development Framework ii. Gauteng Spatial Development Framework iii. Regional Spatial Development Framework iv. Section 7 of the Spatial Planning and Land Use Management Act, 2013 v. Metropolitan Spatial Development Frameworks (MSDF). vi. Regional Spatial Development Frameworks (RSDF) vii. City of Tshwane Municipality Spatial Development viii. City of Tshwane Metropolitan Municipality's Open Space Framework 	<p>Guidelines have informed this Application for Environmental Authorisation procedures and project / BAR</p>

1. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the 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.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not include the no go option into the alternative table below.**

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

Proposed Activity: Proposed Shopping Centre and Associated Services on the Remainder and Erf 1 1, 2, 3, 4, 5 and 6 of Portion 22, and Portion 26 of the Farm Ekangala 610 J.R., within the City of Tshwane Metropolitan Municipality.

Provide a description of the alternatives considered

No.	Alternative Type: Activity	Description														
1	<p>PROPOSED ACTIVITY: Shopping Centre and associated services</p>	<p>Proposed development of a new community Shopping Centre, which will include associated services on the Remainder and Erf 1, 2, 3, 4, 5 and 6 of Portion 22 and Portion 26. The Shopping Centre will sponsor anchor tenants and several line stores of which large percentage will be national franchise-type business concerns.</p> <p>The proposed Shopping Centre will ultimately extend to a total maximum of approximately 13 764m² gross floor area, which will be implemented in phases. The present application is to follow for a maximum gross floor area of 14 112m² to be developed.</p> <p>The development controls contained in the zoning certificate are indicated in the table below:</p> <table border="1" data-bbox="485 1491 1445 1886"> <tbody> <tr> <td>Density</td> <td>Not applicable</td> </tr> <tr> <td>Height</td> <td>10 metres (2 storeys)</td> </tr> <tr> <td>Floor Area Ratio (FAR)</td> <td>Not applicable</td> </tr> <tr> <td>Coverage</td> <td>50%</td> </tr> <tr> <td>Building-lines</td> <td></td> </tr> <tr> <td>Streets</td> <td>10 meters</td> </tr> <tr> <td>Other</td> <td>5 meters along rear and side boundaries as well as ground floor along southern boundary, for double volume or storeys above ground level along south boundary.</td> </tr> </tbody> </table> <p>In order to connect to the existing sewerage system in Ekangala A, north-east of the proposed Shopping Centre, a sewerage line will be constructed as part of the Shopping Centre development.</p>	Density	Not applicable	Height	10 metres (2 storeys)	Floor Area Ratio (FAR)	Not applicable	Coverage	50%	Building-lines		Streets	10 meters	Other	5 meters along rear and side boundaries as well as ground floor along southern boundary, for double volume or storeys above ground level along south boundary.
Density	Not applicable															
Height	10 metres (2 storeys)															
Floor Area Ratio (FAR)	Not applicable															
Coverage	50%															
Building-lines																
Streets	10 meters															
Other	5 meters along rear and side boundaries as well as ground floor along southern boundary, for double volume or storeys above ground level along south boundary.															

No.	Alternative Type: Activity	Description
2	Alternative 1: Light Industrial Development	<p>The introduction of a light industrial development, which will include warehouses, storage facilities, workshops, etc. only, although suited to the general functioning and land uses of the surrounding urban environment and other light industrial areas situated to the west of the site, light industrial uses are considered unsuitable due to the following reasons:</p> <ul style="list-style-type: none"> • Over-saturation of a single-use activity. • Increase of heavy vehicles on the surrounding road network, causing further damage to existing roads in the area. • Lack of diversity and vibrancy associated with a business development and related uses
3	Alternative 3: No Go	<p>This implies that the site be left as is and that no development or alteration be done. If this alternative is pursued the sites existing habitat will be retained. This option has the following drawbacks:</p> <ul style="list-style-type: none"> • The potential to provide housing, educational facilities, supply retail and leisure will be lost • A very viable opportunity to create jobs and income for the local market during the construction and operational phase will be negated • The area will fall further in disrepair and the protection and appropriate management of the ecological significant areas will be negated; or • Illegal squatters or vagrants may inhabit the site. <p>Given the fact that the site will eventually degenerate if left unmanaged, and the fact that it is most likely unsuitable to be utilized for grazing or agricultural purposes due to its location, it is reasonable to state that the no-go option is less favorable than some of the other options presented. Furthermore, should this property not be developed it would be left as an isolated and disconnected land due to all the surrounding areas.</p>

No.	Alternative type, - Location	Description
1	Proposal - Infill development location (preferred)	<p>This is the most preferred location type due to the balance achievable between social, environmental, and economic requirements:</p> <ul style="list-style-type: none"> • The land belongs to the Applicant • Aligns to the prerequisites of the Ekurhuleni Metropolitan Municipality SDF • Situated within the urban realm adjacent to existing and proposed urban infrastructure, service, and amenities. • Socially inclusive due to its location in numerous communities and along public transport routes.
2	Alternative 1 – Inner City Location	<p>An inner-city location would be environmentally and socially feasible, however economically unviable, provided that the same area extent of land be found available for development as inner-city resources are very scarce.</p> <p>Furthermore, the inner-city location is not socially, environmentally, or economically feasible due to the following:</p> <ul style="list-style-type: none"> • Not situated adjacent to primary movement corridors • Not accessible to a range of socio-economic population groups • Isolated nature of development and therefore not inclusive

		<ul style="list-style-type: none"> • Contrasting densities and heights regarding the mixed-use nodal development • Availability of land at an affordable cost minimal.
--	--	--

No.	Alternative type, - Pipeline Route	Description
1	Proposed Sewer Pipeline route	<p>This is the most preferred pipeline route due to minimal effect on the wetland:</p> <ul style="list-style-type: none"> • It will connect to the existing sewerage system in Ekangala A, approximately 900m northeast of the proposed development. • Manholes will be constructed with raised lids to make sure the manhole covers are above the 100 year flood line levels • The flows from the proposed development is small and will not have an effect on the capacity of the existing system
2	Alternative 1 – Sewer Pipeline route	<p>This is the least preferred pipeline route due to the following:</p> <ul style="list-style-type: none"> • It will connect to the existing sewerage system in Ekangala A, approximately which 1.6km northeast of the proposed development and most of the pipeline installation will cover a greater extent within the wetland and consequently have a severe impact • Greater distance from site will lead to high costs for construction material

No.	Alternative type, Technology	Description
1	Proposal Technology	<p>Conventional construction equipment will be used during the construction phase, without energy, or water-saving devices.</p> <p>Brick and other material will be sourced where it is the least expensive without regard to the sustainability of the development.</p>
2	Alternative 1	<p>Standard construction equipment will be used during the construction phase of the Industrial Development</p> <p>Measures will be put in place to make the development as ecologically responsible as possible such as the installation of:</p> <ul style="list-style-type: none"> • Energy efficient light bulbs • Solar heating units, • Low flow water taps • Use of local labour • Use of local materials

No-Go Alternative

This implies that the site be left as is and that no development or alteration be done. If this alternative is pursued the site's existing habitat will be retained. This option has the following drawbacks:

- The potential to provide housing, educational facilities, supply retail and leisure will be lost

- A very viable opportunity to create jobs and income for the local market during the construction and operational phase will be negated
- The area will fall further in disrepair and the protection and appropriate management of the ecological significant areas will be negated; or
- Illegal squatters or vagrants may inhabit the site.

Given the fact that the site will eventually degenerate if left unmanaged, and the fact that it is most likely unsuitable to be utilized for grazing or agricultural purposes due to its location, it is reasonable to state that the no-go option is less favorable than some of the other options presented. Furthermore, should this property not be developed it would be left as an isolated and disconnected land due to all the surrounding areas.

In the event that no alternative(s) has/have been provided, motivation must be included in the table below.

Not applicable as alternatives are provided.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

Proposed activity (*Total environmental (landscaping, parking, etc.) and the building footprint*) **Proposed Shopping Centre**

Size of the activity:

Approximately 5.64 ha.

Alternatives:

Alternative 1 (if any)

Not Applicable

Alternative 2 (if any)

--

or, for linear activities:

Proposed activity: **Proposed Sewer line to connect the proposed Shopping Centre to the existing sewer infrastructure**

Length of the activity:

0.9 km

Alternatives:

Alternative 1 (if any)

1.5km

Alternative 2 (if any)

n/a

m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

Size of the site/servitude:

Proposed activity

Alternatives:

Alternative 1 (if any)

n/a

Alternative 2 (if any)

n/a

n/a

n/a

Ha/m²

5. SITE ACCESS

Proposal

Does ready access to the site exist, or is access directly from an existing road?

YES	NO
-----	----

If NO, what is the distance over which a new access road will be built

n/a

Describe the type of access road planned:

The proposed access to the Shopping Center will be from Isitjaba Road. The proposed access will be 140m from the edge of the K175 road reserve (> 100m) and therefore within the acceptable standards of Tshwane and for a class 4 road.

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1

Does ready access to the site exist, or is access directly from an existing road?

n/a n/a

If NO, what is the distance over which a new access road will be built

n/a

Describe the type of access road planned:

The proposed access to the Shopping Center will be from Isitjaba Road. The proposed access will be 140m from the edge of the K175 road reserve (> 100m) and therefore within the acceptable standards of Tshwane and for a class 4 road

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2

Does ready access to the site exist, or is access directly from an existing road?

n/a n/a

If NO, what is the distance over which a new access road will be built

n/a

Describe the type of access road planned:

Not Applicable as the site will be left as is.

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated

0

Number of times

(only complete when applicable)

6. LAYOUT OR ROUTE PLAN

Refer to **Annexure A**

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
 - A4 size for activities with development footprint of 10sqm to 5 hectares;
 - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
 - A2 size for activities with development footprint of >20 hectares to 50 hectares);
 - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
 - A0 = 1: 500
 - A1 = 1: 1000
 - A2 = 1: 2000
 - A3 = 1: 4000
 - A4 = 1: 8000 ($\pm 10\ 000$)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, stormwater infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
 - Rivers and wetlands;
 - the 1:100 and 1:50 year flood line;
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross-section of the watercourse must be included (to allow the position of the relevant buffer from the bank to be clearly indicated).

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;

- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

7. SITE PHOTOGRAPHS

Refer to **Annexure E**

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

8. FACILITY ILLUSTRATION

Facility illustrations not applicable - Refer to **Annexure A2** for Proposed Site Development Plan.

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

- 1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route times

Instructions for completion of Section B for location/route alternatives

- 1) For each location/route alternative identified the entire Section B needs to be completed
- 2) Each alternative location/route needs to be clearly indicated at the top of the next page
- 3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives times (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route (complete only when appropriate for above)

Section B – Location/route Alternative No. (complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property Description:
(Including Physical Address and Farm name, portion etc.)

The site is situated at the corner of Main Road and R568, Ekangala.
The Remainder and Erf 1, 2, 3, 4, 5, and 6 of Portion 22; and Portion 26 of the Farm Ekangala 610 JR within the City of Tshwane Metropolitan Municipality.

2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative:

1. Project Proposal: **The Remainder and Erf 1, 2, 3, 4, 5, and 6 of Portion 22; and Portion 26 of the Farm Ekangala 610 JR within the City of Tshwane Metropolitan Municipality.**
2. Alternative 1

Latitude (S):

Longitude (E):

25° 49' 00.43" S	28° 43' 20.39" E
Same as above	Same as above

In the case of linear activities:

Alternative:

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

25° 40' 59.51" S	28° 43' 11.21" E
25° 40' 51.49" S	28° 43' 23.31" E
25° 40' 41.13" S	28° 43' 35.74" E

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached n/a

The 21digit Surveyor General code of each cadastral land parcel

Erf 1 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	1	
Erf 2 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	2	
Erf 3 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	3	
Erf 4 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	4	
Erf 5 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	5	
Erf 6 of Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	6	
Portion 22 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	2	2

Portion 26 of the Farm Ekangala 610 JR																					
	T	0	J	R	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	2	6
	1	2			3				4						5						

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	--------------------	-------------	-------------	--------------	-------------	------------------

4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain	Undulating plain/low hills	River front
-----------	---------	--------------------------	--------	--------------	----------------------------	-------------

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

Shallow water table (less than 1.5m deep)

Dolomite, sinkhole or doline areas

Seasonally wet soils (often close to water bodies)

Unstable rocky slopes or steep slopes with loose soil

Dispersive soils (soils that dissolve in water)

Soils with high clay content (clay fraction more than 40%)

Any other unstable soil or geological feature

An area sensitive to erosion

	NO
	NO
YES	
	NO
	NO
YES	
	NO
	NO

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s)

YES	NO
-----	-----------

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

n/a	n/a
-----	-----

c) are any caves located within a 300m radius of the site(s)

YES	NO
-----	----

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

n/a	n/a
-----	-----

d) are any sinkholes located within a 300m radius of the site(s)

YES	NO
-----	----

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

n/a	n/a
-----	-----

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?

YES	NO
-----	----



Figure 5: Gauteng Agricultural Potential Atlas (Source: GDARD)

Please note: The Department may request specialist input/studies in respect of the above.

7. GROUND COVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site.

Natural veld - good condition % =	Natural veld with scattered aliens % = 100	Natural veld with a heavy alien infestation % =	Veld is dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Old Cultivated land % =	Paved surface (hard landscaping) % =	Building or other structure % =	Bare soil % =

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

A Geotechnical Assessment was completed by Louis Kruger Geotechnics CC in October 2021 and is attached hereto under **Annexure G1**.

General topography and drainage

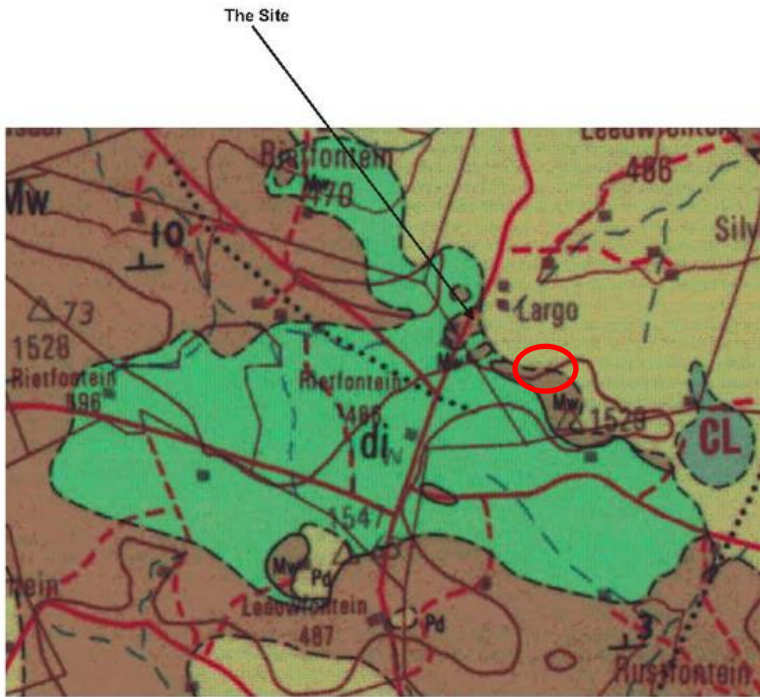
The site slopes at an average of 5% towards the west. Surface water drains by means of sheet wash towards the west. A drainage feature striking west to east is situated on the central part of the site.

Method of investigation

Ten test pits were dug at predetermined positions and the soils were described according to the standard method proposed by Jennings, B rink and Williams (1973). Disturbed samples of the most prominent soil horizons were taken and submitted to a soil's laboratory for foundation indicator tests. Due to the variation in consistency and composition no undisturbed samples were taken.

Geology and soil profile

According to the 1:250 000 scale geological, the site is underlain by sandstone of the Waterberg Group and by transported materials; the regional geology is shown in **Figure 6**. The geology was confirmed during the investigation; sandstone was encountered in all the test pits. The test pits are shown in **Figure 7**.



From the 1 : 250 000 Geological Series 2528 Pretoria (Council for Geoscience)

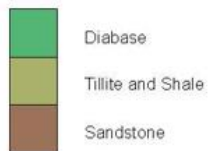


Figure 6: Regional Geology Map

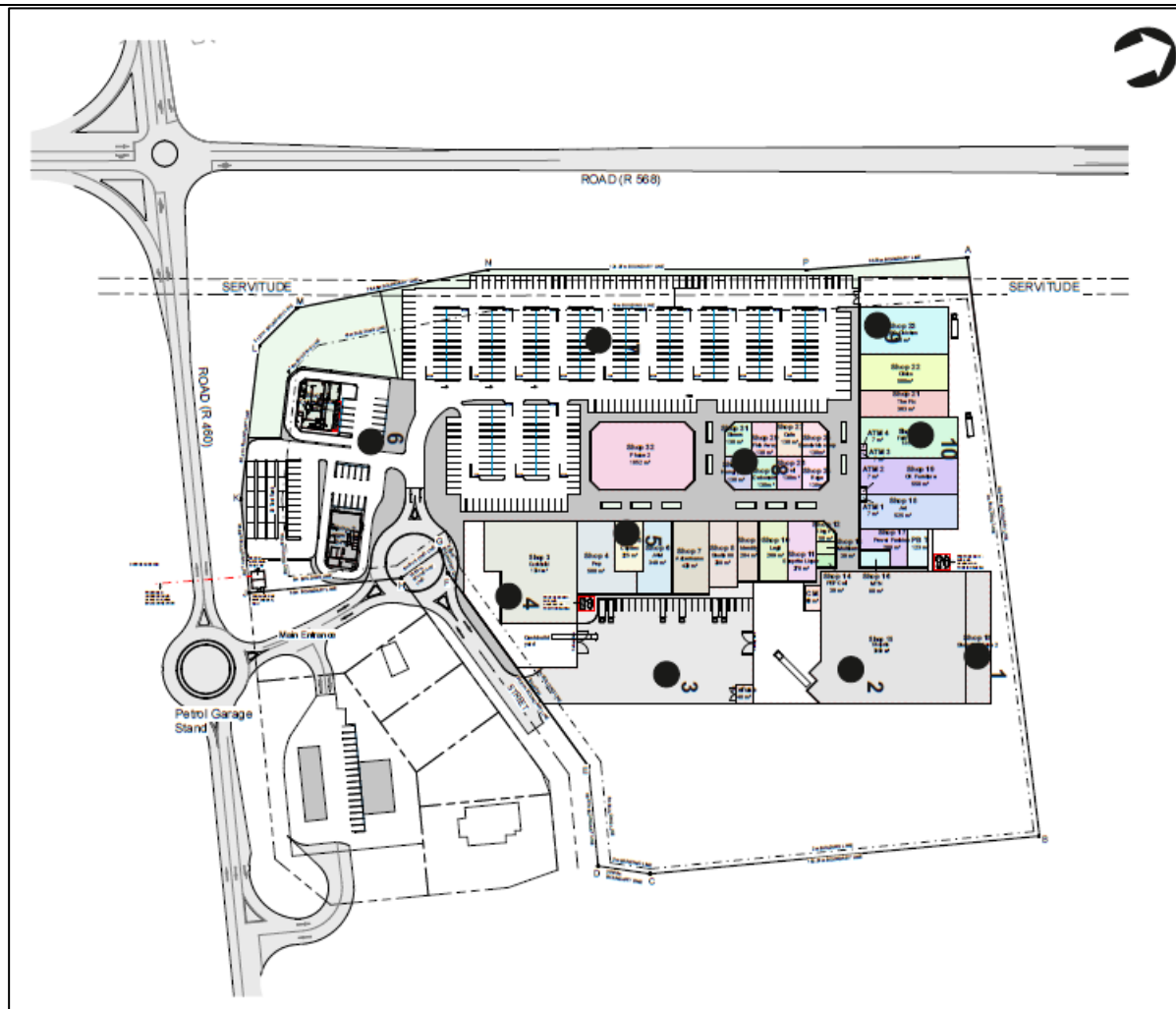


Figure 7: Test pits positions

Colluvium

Slightly moist, brown occasionally mottled black towards the base, medium dense, intact and slightly pinholes, silty sand with trace amounts of roots and highly weathered gravels of mixed origin with nodular ferricrete towards the base was encountered in all the test pits from surface up to an average depth of 1.0 meters.

Sandstone

Residual sandstone

Two types of residual sandstone were identified on the site:

- **A top layer of greyish brown residual sandstone:** Moist, greyish brown occasionally mottled black, orange brown and reddish brown, medium dense, slightly pinholed sandy silt with trace amounts of highly weathered sandstone gravels and ferricrete nodules was encountered in all the test pits from an average depth of 1,0 meters up to an average depth of 2.1 meters.
- **A bottom layer of orange brown residual sandstone:** Moist, orange brown occasionally patchy greyish brown mottled black, orange brown and reddish brown, medium dense to dense, slightly pinholed gravelly silty sand occasionally slightly ferruginised with trace amounts of highly weathered sandstone gravels was encountered in five test pits from an average depth of 1.6 meters up to an average depth of 2.2 meters.

Sandstone bedrock

Sandstone bedrock was encountered in test pit 9 at a depth of 2.4 meters.

Geohydrology

Ground water seepage was encountered in test pits 4 and 5 at an average depth of 1.3 meters below surface. The presence of pedogenic material (ferricrete) furthermore confirms that a seasonal, perched water table could be present during and after periods of high rainfall.

Laboratory test results**Indicator test results**

The laboratory test results have been summarised in the following table:

Material	TP	Depth (m)	PI	%Clay	%Silt	%Sand	%Gravel
Colluvium	4	1.1	SP	2	16	81	
Greyish brown residual sandstone	2	1.6	16	29	15	53	3
Greyish brown residual sandstone	4	1.6	14	14	15	68	3
Greyish brown residual sandstone	10	1.6	15	17	12	64	7
Greyish brown residual sandstone	1	1.5	14	13	12	48	27

The difference between the colluvium and the residual sandstone is shown by higher sand and lower clay content of the colluvium and the difference between the greyish brown residual sandstone and the orange residual andesite is reflected by the lower sand and higher gravel content of the orange residual andesite. The laboratory tests furthermore clearly reflect the variation in the composition of the materials.

Potential expansiveness

The potential expansiveness of the materials encountered on the site was calculated according to the method proposed by Van de Merwe (1964). The following material characteristics are considered when applying this method:

- Plasticity index
- Clay fraction (<0.002mm)
- Thickness of expansive material
- Thickness of non-expansive material

Assuming the laboratory test results typify the material encountered on the site, the application of the method of Van der Merwe shows that colluvium and orange residual sandstone classify as "Low" and are therefore considered non-expansive. The greyish brown residual sandstone classifies as "Low" and "Medium", it is recommended that a conservative approach be adopted and a classification of "Medium" rather than "Low" be assigned to the greyish brown residual sandstone. With this approach the calculated heave for the test pit is between 7,5mm and 15mm.

Collapse potential

Due to the variation in consistency and composition no undisturbed samples were taken.

Engineering geological zoning

Due to the relatively uniform soil profile the site is not divided into different engineering geological zones.

Geotechnical considerations

The following geotechnical considerations, which could influence the proposed development were identified:

Founding of structures:

- The composition and consistency of the colluvium varies; therefore, it is not considered suitable founding material. If unadapted structures are founded on this material and the moisture content should change, unacceptable differential, vertical movements could occur, with resultant cracking of structures.
- The greyish brown residual sandstone is potentially expansive, and classifies as "Medium". Therefore, it is not considered suitable founding material. If unadapted structures are founded on this material, and the moisture condition of the in situ material should vary, unacceptable differential movements, with resultant cracking may occur in structures.
- The calculated heave is between 7,5mm and 15mm.
- The composition and consistency of the orange residual sandstone varies; therefore, it is not considered suitable founding material. If unadapted structures are founded on this material and the moisture content should change, unacceptable differential vertical movements could occur, with resultant cracking of structures.

Excavatability

Gradual refusal occurred at an average depth of 2.5 meters below surface. In test pit 9 the back actor refused at an average depth of 2.5 meters.

Construction material

The colluvium and residual sandstone classified as A-2-4 and A-2-6. The Plasticity Index and Grading Modulus were used to assess the suitability as construction material.

Groundwater

A seasonal perched water table, which could cause the flooding excavations, could be present during or after periods of high rainfall. This is confirmed by the groundwater seepage in test pits 4 and 5 and the presence of pedogenic material.

Stability of excavations

Limited instability occurred in the sidewalls of the test pits.

Geotechnical Classification

The site was classified according to the Geotechnical Classification for Urban Development (after Patridge, Wood and Brink 1993). The criteria for classification are shown in the following table:

	Constraint	Most Favourable (1)	Intermediate (2)	Least Favourable (3)
A	Collapsible soil	Any collapsible horizon or consecutive horizons totalling a depth of less than 750mm in thickness	Any collapsible horizon or consecutive horizons totalling a depth of more than 750mm in thickness	A least favourable situation for this constraint does not occur.

B	Seepage	Permanent or perched water table more than 1,5 metres below surface	Permanent or perched water table less than 1,5 meters below surface.	Swamps or marshes.
C	Active Soil	Low soil heave predicted	Moderate soil heave predicted	High soil heave predicted
D	Highly compressible soil	Low soil compressibility expected	Moderate soil heave predicted	High soil heave predicted
E	Erodibility of soil	Low	Intermediate	High
F	Difficulty of excavation to 1,5m depth	Scattered or occasional boulders less than 10% of the total volume	Rock or hardpan pedocretes between 10 and 40% of the total volume	Rock or hardpan pedocretes more than 40% of total volume
G	Undermined ground	Undermining at a depth greater than 100m below surface (except where total extraction mining has not occurred)	Old undermined areas to a depth of 100m below surface where step closure has ceased	Mining within less than 100m of surface or where total extraction mining has taken place
H	Instability in areas of soluble	Possibly unstable	Probably unstable	Known sinkholes and dolines
I	Steep slopes	Between 2 and 6 degrees	Slopes between 6 and 18 degrees and less 2 degrees (Natal and Western Cape) Slopes between 6 and 12 degrees and less 2 degrees (all other regions)	More than 18 degrees (Natal and western Cape) More than 12 degrees (all other regions)
J	Areas of unstable natural slopes	Low risk	Intermediate risk	High risk (especially in areas subject to seismic activity)
K	Areas subject to seismic activity	10% probability of an event less than 100cm/s ² within 50 years	Mining induced seismic activity more than 100cm/s ²	Natural seismic activity more than 100cm/s ²
L	Areas subject to flooding	A "most favourable" situation for this constraint does not occur	Areas adjacent to a known drainage channel or floodplain with slope less than 1%	Areas within a known drainage channel or floodplain

Based on the above, the site is classified as 2A, 2B, 2C, 2D, 2E, 1/2F, 1I.

NHBRC CLASSIFICATION

The residual sandstone is potentially expansive and the calculated heave is between 7,5mm and 15mm, therefore the site is zoned as H1/H2. The colluvium and orange residual sandstone is expected to be potentially collapsible/compressible. Due to the consistency and composition the collapsed/settlement could not be quantified. The average thickness of this material exceeds one meter, therefore a zoning of C2-S2 is added. Groundwater seepage occurred at an average depth of 1,3 meters in two test pits therefore a zoning of P (Perched water table is added).

The entire site is zoned as NHBRC Zone P (Perched water table) – C2-S2-H1/H2

It is important to note that the zoning is based on the profiling of test pits and the interpolation of information between test pits; therefore it is possible that variations from the expected conditions can occur.

Conclusions and Recommendations

It is important to note that the recommendations are based on the profiling of test pits and the interpolation of information. It is therefore possible that variations from the expected conditions can occur.

Foundations for light structures

The average thickness of the alluvium, which is considered to be potentially collapsible / compressible, is 1,0 meters. It is assumed that most of this layer will be removed during construction.

The residual sandstone is potentially expansive and the calculated heave is between 7,5mm and 15mm. the colluvium and orange residual sandstone is expected to be potentially collapsible / compressible. Due to the consistency and composition the collapse / settlement could be quantified. Therefore, this material is considered unsuitable in its natural state to act as a founding medium. This even applies for light structures with a foundation pressure of less than 100kPa. From the discussion, foundation improvement and imparting flexibility in the brickwork are clearly required. The alternatives are recommended:

- **Stiffened or cellular raft:** Found structures on a stiffened or cellular raft. Structures should be provided articulation joints and lightly reinforced masonry.
- **Soil raft:** Remove all or necessary parts of the expansive horizon to 1.0 meters beyond the perimeter of the structures. The loose material in the bottom of the excavations should be compacted, and the excavations backfilled with inert material, compacted to at least 93% of Mod AASHTO density at -1% to +2% of optimum moisture content. Structures can be founded on normal, lightly reinforced strip footings on the backfill and should be provided with light reinforcement in the masonry if the residual movements are <7.5mm, or the construction type should be appropriate to residual movements.
- **Piled construction:** Piled foundations with suspended floor slabs, with or without ground berms.

It is important though that in spite of the guidelines given above, inspection of foundation excavations and the involvement of a competent engineer familiar with structural founding are necessary. It is furthermore recommended that the trenches for the services be profiled and that a construction report be compiled for the development. The purposed of the construction report is to confirm or adapt the zoning of the site, and to provide more accurate information regarding the founding conditions.

Foundations for large structures

Detailed foundation investigations should be done on the footprints of large structures.

Excavatability

The Excavatability of the materials encountered on site was evaluated according to the South African Bureau of Standards Standardized Specification for Civil Engineering Construction DB: Earthworks (Pipe Trenches). The excavatability is considered to classify as "soft to intermediate" up to an average depth of two meters below surface. It is important to note the evaluation is based primarily on the profiling of test pits and the interpolation of information between test pits. It is therefore possible that variations from the expected conditions can occur.

Geohydrology

All excavations should be provided with adequate drainage. Structures should be provided with damp proofing and provision should be made to prevent the ingress of water into and below foundations.

Construction material

Based on the laboratory test results and guidelines given in the THR14, the colluvium and residual sandstone could, depending on the composition, be suitable as fill. It is recommended that the suitability of material that is to be used, be confirmed by detailed laboratory testing.

Services

Due to the expected corrosivity, it is recommended that all services be protected in accordance with SANS 1200G.

Stability of excavations

It is recommended that all excavations be cut back or shored.

General recommendations

Water has significant influence on the behaviour of the in-situ material. To reduce differential movements of structures it is necessary to maintain moisture equilibrium under the structures. Therefore, it is recommended that the following measures be implemented:

- No accumulation of surface water must be allowed around the perimeter of the structures and the entire development must be properly drained.
- Down pipes should discharge into a lined or precast furrow. This furrow should discharge the water 1,5 meters away from the foundation onto a paved or grassed surface sloping away from the building.
- Preferably, if no gutters or paving is to be provided around structures, a 1,5-meter-wide sealed concrete apron should be cast along the perimeter of the structures the water must be channeled away from the foundation.
- Leaks in water bearing services should be attended to without undue delay.
- No large shrubs or trees should be planted close to structures that the distances provided in the following table:

Description	Mature Height of Tree		
	Up to 8m	8m to 15m	Over 15m
Buildings other than single storey buildings of lightweight construction.	-	0,5	1.2
Single Storey buildings of lightweight construction (e.g., timber framed)	-	0,7	1,5
Free standing masonry walls	-	1,0	2,0
		0,5	1,0
Drains and underground services	0,5	1,5	3,0
	-	1,0	2,0

Are there any rare or endangered flora or fauna species (including red list species) present on the site

YES	NO
-----	----

If YES, specify and explain:

According to GDARD records, no Red Data species were recorded on the site or in the vicinity of the site or within 5 kilometres.

Ten species were however recorded in the quarter degree grid of the site. In addition, DFFE lists four more species for the area. These fourteen species were assessed in terms of presence of suitable habitat in site.

For most of the species, no suitable habitat was observed on site. Suitable habitat was observed for two declining species for which suitable habitat was recorded. One of the species, *Hypoxis hemerocallidae* was observed on site. Suitable habitat could further potentially be available for one orchid species listed by authorities.

The assessment of the site however indicated that most of the vegetation on the site has been affected by the past disturbances, which makes it unlikely that this orchid species will occur on site.

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

YES	NO
-----	----

If YES, specify and explain:

A 200-meter perimeter area around the site was assessed for sensitivities. The surrounding land comprised a mosaic of natural, disturbed and altered grassland.

The northern areas were historically ploughed, but some woodland elements have appeared in these areas over time. The areas south of the site were characterised by formal and informal business. A wetland occurs east of the site, and some small patches of natural grassland were still present in the landscape.

The site is a continuation of these land uses, with most of its vegetation being historically altered by anthropological disturbances and the lack of conservation efforts to protect natural habitats.

Are there any special or sensitive habitats or other natural features present on the site?

YES	NO
-----	----

If YES, specify and explain:

The vegetation ecology and plant biodiversity that could possibly be affected by the development of the township and associated sewer link is rated to have a low sensitivity. Historical anthropomorphic activities have altered much of the vegetation structure and composition which resulted in a very poor reflection of species that would normally be representative of the Rand Highveld Vegetation type.

Was a specialist consulted to assist with completing this section

YES	NO
-----	----

If yes complete specialist details

Name of the specialist:	Mrs Christa Custers (Eco Assessments Ecological and Environmental Consultants)		
Qualification(s) of the specialist:	Botany Ecology <i>Pri.Sci Nat</i> (400003/03)		
Postal address:	P.O. Box 441037, Linden		
Postal code:	2104		
Telephone:	(011) 782 3428	Cell:	Not Available
E-mail:	info@ecoassessments.co.za	Fax:	(086) 649 9150
If YES list the specialist reports attached below	YES	NO	

Annexure G: Specialist Studies
Annexure G1: Geotechnical Assessment
Annexure G2: Geohydrology Impact Assessment
Annexure G3: Vegetation Ecological Assessment
Annexure G4: Vertebrate Habitat Assessment
Annexure G5: Wetland Assessment
Annexure G6: Heritage Impact Assessment

Please note: If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated.

A Geohydrological Impact Assessment was completed by HK Geohydrological Services Pty Ltd in October 2021 and is attached hereto under **Annexure G2**.

Hydro census

Information on five boreholes could be found during the hydro census study in the region of the proposed sewer line. Four of these boreholes are located at the Ekangala Waste Water Treatment Plant which is located on the southern side of the Grootspuit. These boreholes serve as groundwater monitoring facilities for the Waste Water Treatment Plant. The fifth borehole was found just north of the planned sewer line and shopping centre site at the Zivuseni Primary School. The borehole at the school is currently not used.

The village receive Municipal piped bulk water supply and does not use groundwater production boreholes as a water resource.

The water table could be measured in the four groundwater monitoring boreholes located at the Ekangala waste water treatment plant as well as the borehole located at the Zivuseni Primary School. The water level depths at the Waste Water Treatment Plant range between 1.60 and 2.89 metres below ground level. The water level depth at the school located close to the proposed sewer line and shopping centre site is 16.32mbgl

BH	Coordinates		Altitude (mamsl)	BH Depth	WL Depth	WL Altitude	Remarks
	Latitude	Longitude					
HCBH 1	25.67690°	28.72441°	1473	-	16.32	1457	Borehole at Zivuseni Primary School.
MBH EA01	25.66676°	28.76066°	1425	30	2.89	1422	0 to 12 solid casing. 12 to 30 m perf casing.
MBH EA02	25.66492°	28.76044°	1421	22	2.21	1419	0 to 10 solid casing. 10 to 22 m perf casing.
MBH EA03	25.66554°	28.75953°	1422	22	1.69	1420	0 to 10 solid casing. 10 to 22 m perf casing.
MBH EA04	25.66615°	28.75916°	1423	22	1.60	1421	0 to 10 solid casing. 10 to 22 m perf casing.
River 1	25.676735°	28.73299°	-	-	-	-	River sample position 1
River 2	25.673172°	28.742219°	-	-	-	-	River sample position 2
Surface water 3	25.68513°	28.71876°	-	-	-	-	River sample position 2

Test pits and percolation tests

One new test pit was prepared, on surface on the sewer line profile. The pit was prepared for a double ring inflow meter test. The infiltration rate of the test pit can be found described in Table below.

Test pit 01 The test was done on surface. The hydraulic conductivity rate measured at this pit is 3.666×10^{-5} cm/s or 0.0348 m/d, which relates to a very slow hydraulic conductivity rate

Co-ordinates	Elapsed Time	Time Period	Total Quantity of water (ml)	Infiltration rate (cm/s)	Infiltration rate (cm/h)	Infiltration rate (m/d)
Pit 1 S -25.67988° E -28.72797°	15	15	100	1.4666×10^{-4}	0.530	0.139
	30	15	100	1.4666×10^{-4}	0.530	0.139
	45	15	100	1.4666×10^{-4}	0.530	0.139
	60	15	50	7.333×10^{-5}	0.265	0.0696
	90	30	50	3.666×10^{-5}	0.132	0.0348
	120	30	50	3.666×10^{-5}	0.132	0.0348
	150	30	50	3.666×10^{-5}	0.132	0.0348
	180	30	50	3.666×10^{-5}	0.132	0.0348

Groundwater Quality

Four groundwater monitoring boreholes could be found located around the existing waste water treatment plant which is located on the southern side of the Grootspuit. The waste water treatment plant is located 1km east of the Ekangala Village and downstream of the village. These four boreholes are located topographically around and below the waste water treatment site. For all practical reasons these four boreholes will be the first monitoring facilities to receive contaminated water from the waste water treatment plant and can therefore not be used as monitoring facilities for the village or the planned new sewerage pipe lines.

It was therefore decided to take water samples from the surface water bodies upstream and downstream of the village near the position of the planned sewer line, to be used as baseline water quality information.

The chemical water quality analyses of the two river water samples show that none of the chemical parameters analysed for are above the standards limits. The chemical analyses of the water show good water quality with determinants below the standard limits for domestic water use.

The E.Coli and Total coliform bacteria count for the water from both sampling points are above the Standard limits if compared to drinking standards. The E.Coli and Total coliform bacteria count for the river water sample River 1 show healthy (un-contaminated) surface water conditions (for a natural open water system) in the dam (not according drinking water standards). As the water moves down the healthy (read un-contaminated) river system the water is aerated with the result that the E.Coli and Total coliform bacteria count even lowers to levels below 100CFU/100mℓ. These phenomena show that the river system is healthy and is not contaminated by the current sewerage systems installed in the area.

A natural healthy river system may have E.Coli and Total coliform bacteria count of a 100CFU/100mℓ to 200CFU/100mℓ. This is not safe for domestic purposes but is natural for an open water river system. Counts of 1000CFU/100mℓ and above for E.Coli and Total coliform bacteria may indicate to contaminated water.

Groundwater Flow Direction

The north western side of the Ekqangala village is located on a topographical water divide. The surface area in the village is fairly unpaved with limited formal storm water management. Stormwater is managed by sheet wash

which enhance groundwater infiltration. The fact that groundwater is not abstracted in the area will limit groundwater movement in the aquifer to base flow.

It is expected in a fractured and weathered aquifer that the groundwater contours to a large degree will follow the surface contours. It can therefore also be expected that in general the groundwater flow will mimic the surface water flow. The surface contours can be used as indicator in which direction groundwater flow will be.

The groundwater and surface water flow directions will in general be from the topographic high areas in the village site towards the topographical low areas in the east and north east, towards the Grootspuit drainage system which drains towards the north east.



Figure 8: Groundwater flow direction

Parsons rating system

Aquifer Classification

The aquifer at the Ekrankala Village can be classed as a minor aquifer in a minor aquifer region and can be described as a low to moderately yielding aquifer system of variable water quality.

Aquifer vulnerability

A moderate tendency or likelihood does exist for contamination to reach a specific position in the groundwater system after introduction at some location above the uppermost aquifer.

Aquifer susceptibility

The aquifer is rated to have a medium susceptibility. Susceptibility is a qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification.

Groundwater Quality Management Classification

The GQM index of this option is rated at 4, with a medium protection level needed

Aquifer vulnerability due to hydrological conditions

According to Groundwater Protocol document, Version 2, dated March 2003, the vulnerability of the Groundwater Aquifer due to the Hydrogeological Conditions at the Planned Ekangala Sewer line can be rated as **medium to high** risk. The distance from the surface to the aquifer is in the region of 2 to 10 metres according the hydrocensus information gathered during the study

For surface sanitation spills at the Ekangala sewer line position, the travel distance vertically will be an estimated 2 to 10 metres to the water table. The permeability rate measured on site is very slow at a rate of 0.0348m/d

Vulnerability Class	Measurement	Definition
Extreme (Usually highly fractured rock and/or high groundwater table)	High risk and short distance(<2m) to water table	Vulnerable to most pollutants with relatively rapid impact from most contamination disposed of at or close to the surface
High (usually gravely or fractured rock, and/or high water table)	High risk and short distance(<2m) to water table	Vulnerable to many pollutants except those highly absorbed, filtered and/or readily transformed
Medium (usually fine sand, deep loam soils with semi-solid rock and average water table > 10m)	Low risk and medium to long distance to water table	Vulnerable to inorganic pollutants but with negligible risk of organic or microbiological contaminants
Low (usually clay or loam soils with semi-solid rock and deep water table >20m)	Minimal and low risk and long to very long distance to water table	Only vulnerable to the most persistent pollutants in the very long term
Negligible (usually dense clay and/or solid impervious rock with deep water table)	Minimal risk with confining layers	Confined beds present with no significant infiltration from surface areas above aquifer.

Assessment of the reduction of contaminants in the unsaturated zone

The surface material layer that is found on site have a medium capacity to absorb contaminants and a high capacity to create an effective barrier to contaminants. A high reduction of bacteria and viruses will be evident in the unsaturated aquifer if a spill does happen. Nitrates and phosphates will be reduced to some extent. Chlorides will be minimally reduced. Little reduction of chemical contaminants is expected. The top layer is a good barrier

Unsaturated Zone Conditions	Factor Effecting Reduction			Contamination Reduction			Comments
	Rate of flow in unsaturated zone	Capacity of the media to absorb contaminants	Capacity to create an effective barrier to contaminants	Bacteria and Viruses	Nitrates and Phosphates	Chlorides	
Clay	Very slow <10mm/d	High	High	Very High Reduction	High Reduction	High Reduction	Very Good barrier to movement of contaminants. May have problems with water retention in pit
Silt	Slow 10-100mm/d	Medium	High	High Reduction	Some Reduction	Minimal Reduction	Good barrier to movement of biological contaminants, but

							little reduction in chemical contaminants.
Sandy loam	Slow 10-100mm/d	Medium	High	High Reduction	Some Reduction	Minimal Reduction	Good barrier to movement of biological contaminants, but little reduction in chemical contaminants.
Fractured or weathered sandstone	Medium 0.1 - 10m/d	Medium	Medium	High Reduction	Minimal Reduction	Minimal Reduction	Fair barrier to movement of biological contaminants, but little reduction in chemical contaminants.
Fine sand	Medium 0.1 - 10m/d	Minimal	High	High Reduction	Minimal Reduction	Minimal Reduction	Good barrier to movement of biological contaminants, but little reduction in chemical contaminants.

Geohydrological risk from an on-surface source

As far as the geohydrological risk from the planned sewerage pipeline is concerned, the assessment is based on the level of risk of the source. Risk levels are based on three factors: 1) attenuation ability in unconsolidated materials; 2) risk load and travel time of degradable pollutants, in aquifer systems and 3) vulnerability of the aquifer and behavior of interstitial water regimes. Soil or unconsolidated material may provide a very effective attenuation buffer for certain contaminants and may have a very low attenuation on other risks. The nature of the soil materials and the thickness of this zone, are key issues in determining attenuation capacity. The sand layer on surface and the un-weathered status of the Dwyka Formation host rock may sufficiently protect the aquifer below from on surface spills.

Position in respect of domestic water sources

The location of a possible risk source, in relation to water sources utilised for human consumption, is of primary concern. The Ekangala Village used piped water for domestic use. No water production boreholes other than the un-used borehole at the Zivuseni Primary School is used for domestic purposes. There are no groundwater production boreholes at risk in the area

Position in respect of drainage features

The Grootspuit drains the area at the Ekangala Village. This river system will be at risk if a sanitation leak does happen at the position of the newly planned sewerage line

Conclusion and recommendations

During the construction phase the potential impacts without mitigation measures are rated as "Negligible" to "Low". With mitigation measures the significance of the impact is rated as "Negligible".

- Construction should preferably take place in the dry season, as surface water runoff is minimal. Especially when crossing the Grootspuit and the wet areas. Surface water may create difficult working conditions especially during backfilling of trenches. Water levels in the aquifer may be at its lowest point during dry periods
- All vehicles shall be properly maintained and serviced so that no oil leaks occur on site.
- Any stockpiled soil and rock should have storm water management measures implemented.
- Spill trays must be provided for refuelling of plant vehicles

During the operational phase the significance of the impacts without mitigation measures are rated as "Moderate". With mitigation measures the significance of the impact is rated as "Low"

- Storm water originating in the village must be kept away from the sanitation lines,

especially the inspection pits.

- Erosion of the trenches after the construction phase must be stopped and mitigated at an early stage.
- Manhole lids must be tamper proof and must be inspected on a regular basis.

A Vegetation Ecological Assessment was completed by Eco Assessments Ecological and Environmental Consultants in November 2021 and is attached hereto under **Annexure G3**.

Floral Assessment

Vegetation Types

The proposed development site is located in the Grassland Biome and within the Mesic Highveld Grassland Bioregion and in the Rand Highveld Grassland vegetation type within this Bioregion. This vegetation type borders on the Central Sandy Bushveld to the north of Ekangala.

The Rand Highveld Grassland stretches across Gauteng, North-West, Free State and Mpumalanga Provinces. Grasses and herbs (forbs) form the main taxa in these grasslands. The conservation status of this vegetation type is given as Endangered as only % of this grassland is conserved in small Nature Reserves. Almost half of this grassland has been transformed by land uses such as cultivation, plantations, urbanisation or dam-building, while cultivation and invasive trees have affected large portions of the other half.

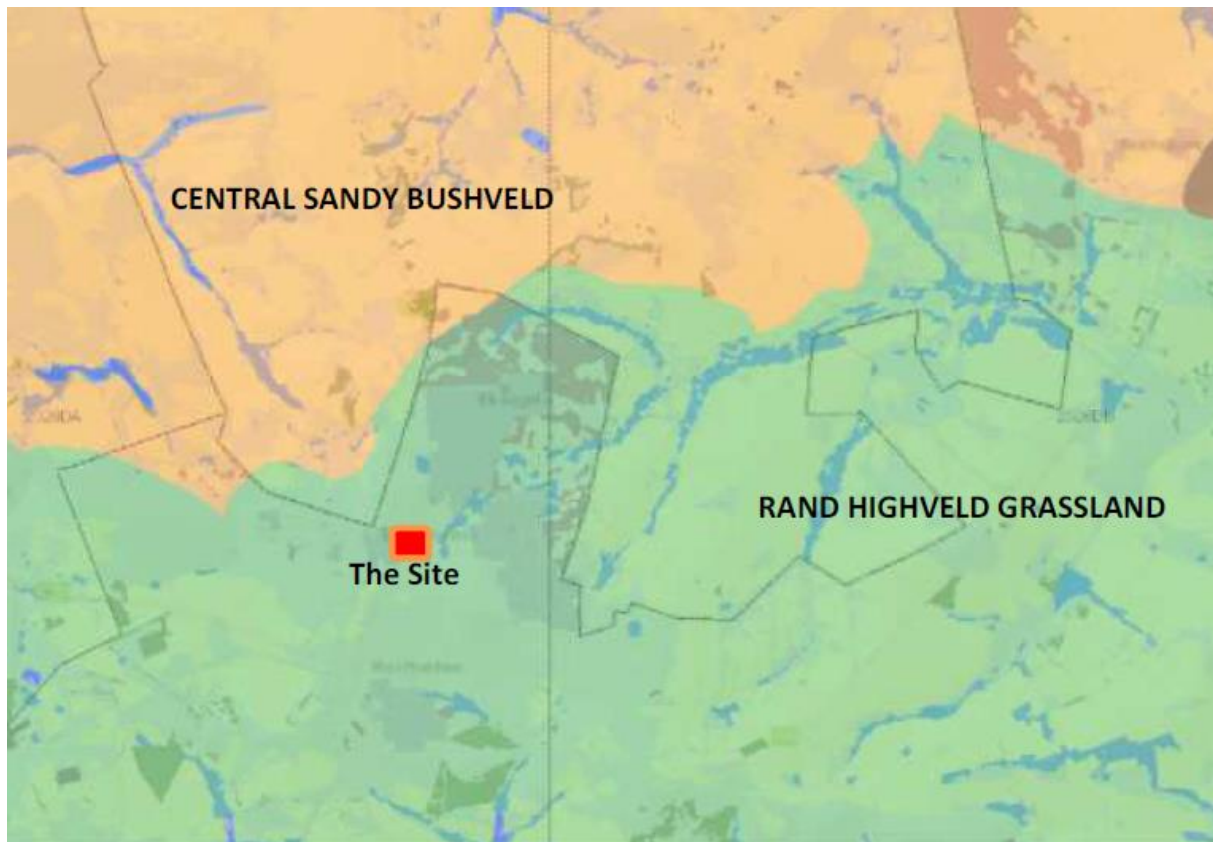


Figure 9: Vegetation map

Threatened Ecosystems

In Notice GN in section 52 National Environmental Management Biodiversity Act (No 10 of 2004), all the ecosystems that are listed are nationally threatened and in need of protection. Rand Highveld Grassland is considered to be Endangered Criteria A1 Threatened Ecosystem. This implies that there has been an

irreversible loss of natural habitat where the remaining natural habitats are less than the biodiversity target +15%.

DFFE Comments and Protocols

The desktop study conducted by evaluating the DFFE Screening Tool and considering the NEMA Minimum Requirements (Protocols) of the Terrestrial Biodiversity Theme and the Plant Species Theme, indicated the following sensitivities for the site:

Theme	Status and comments
Terrestrial Biodiversity Theme	Very High Critical Biodiversity Area 2 Focus Areas for land-based protected areas expansion Vulnerable ecosystem
Plant Species Theme	Medium Sensitivity Four species of concern listed for the area

Protected Areas

The site does not affect any formally protected areas.

Historical status

The google images indicate that the grasslands on site were already negatively affected by anthropogenic disturbances in 2004. Footpaths and exotic trees were present on the site for several years. It can be expected that veld fires have been a yearly occurrence due to lack of conservation planning such as the implementation of fire breaks. All these factors have had an influence on the vegetation that is present on site today.

Ecological Units – Shopping Centre study area

Three Vegetation units were identified within and around the study area:

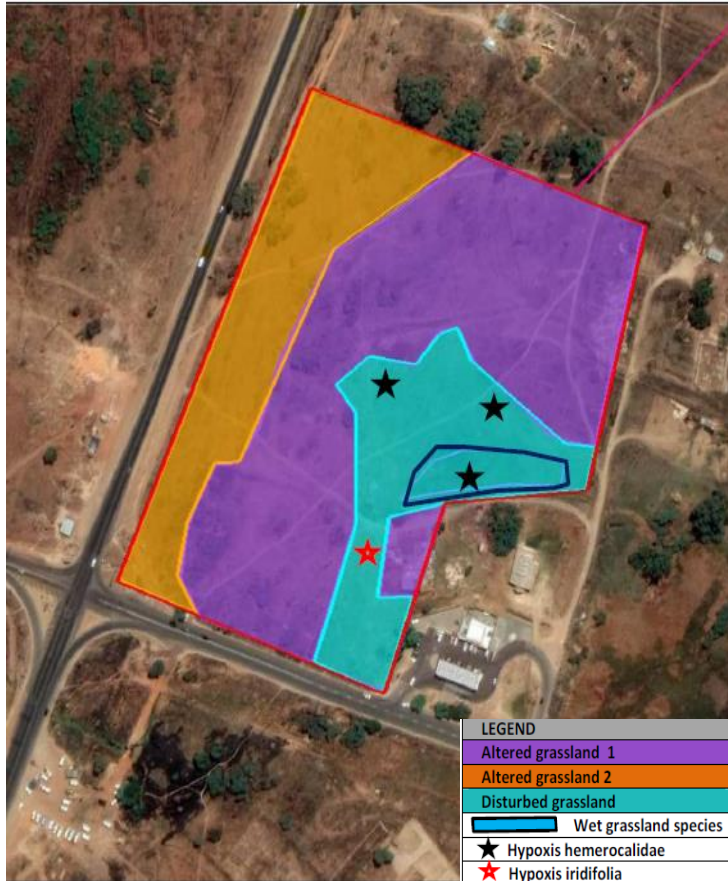


Figure 10: Vegetation unit map

Disturbed grassland: This grassland was observed towards the centre and south of the site. Mostly natural grassland species were found in the 1.3-hectare piece of grassland but with a moderate to low species richness. The vegetation cover was further found to be low, which has left the soil exposed to raindrop impact and erosion. The dominance of *Stoebe vulgaris* further indicated that the vegetation has been disturbed in the past. This is a hardy, indigenous dwarf-shrub thriving in nutrient deficient soils with a history of poor veld management.

Within this area, some elements that are conservation worthy were observed. On the southern edge, a small wet grassland area has developed due to a leaking water pipe. A population of *Hypoxis hemerocalidae* and *Hypoxis iridifolia* occurred there as well as uncommon species such as *Drimia elata* (jeukbol) and orchid *Disa woodii*.

The conservation status of the Disturbed grassland was considered to Moderate.

Altered grassland 1: This section of grassland was located towards the centre of the site. The area is supported natural forb and grass species where the vegetation has recovered over time. Most of this area was however found to be poor in species richness. The exact nature of the past disturbances is unknown, but may have included activities that disturbed the natural soil structure, hence the original set of species typical of this grassland, was not present.

Within this grassland, single trees and bush clumps were recorded including exotic species such as *Accacia mearnsii* and *Eucalyptus grandis* bluegums as well as indigenous species such as *Dichrostachys cinerea*, *Grewia flava* and *Acacia karoo*.

The conservation status of the vegetation is considered to be Poor due to Low species richness and presence of exotic species.

Altered grassland 2: This grassland zone was located along the north-south bound road R568. The vegetation was found to be sparse and poor in species richness. Google images as far back as 2004 indicate that this section was disturbed many years ago, and has not recovered since then. Tree species included mostly exotic species typical of previously disadvantaged disturbed/ploughed grassland.

The conservation status is considered to be Poor.

Ecological Units – Sewer line study area

Altered grassland: The grassland along the proposed sewer line was historically ploughed. Presently it is also grazed by sheep and goats. The vegetation has not recovered from these disturbances. Subsequently the species richness was found to be poor and did not resemble the original natural vegetation of Rand Highveld Grassland.

Grass species included the sub-climax and climax such *Hyparrgenia hirta* and *Setaria spaciolata*. *Hyparrgenia hirta* is typical of disturbed places such as old cultivated lands and road reserves. Trees in the vicinity of the sewer line study area included bluegum, black wattle and indigenous sweet thorn (*Acacia karroo*).

Along the route, a small wet area was observed where *Berkheya radula* and the grass species *Imperata cylindrica* were observed. The species typically grow in wetter soils. The wet area was not sensitive from a vegetation point of view due to the low species richness observed and small area that was affected.

The conservation status of the vegetation along the pipeline is subsequently considered to be poor due to historic and significant disturbances to the vegetation.



Figure 11: Vegetation map of the sewer line

NENMBA: Red Data Flora

According to GDARD records, no Red Data species were recorded on the site or in the vicinity of the site or within 5 kilometres.

Ten species were however recorded in the quarter degree grid of the site. In addition, DFFE lists four more species for the area. These fourteen species were assessed in terms of presence of suitable habitat in site.

For most of the species, no suitable habitat was observed on site. Suitable habitat was observed for two declining species for which suitable habitat was recorded. One of the species, *Hypoxis hemerocallidae* was observed on site. Suitable habitat could further potentially be available for one orchid species listed by authorities. The assessment of the site however indicated that most of the vegetation on the site has been affected by the past disturbances, which makes it unlikely that this orchid species will occur on site.

Surrounding land use

A 200-meter perimeter area around the site was assessed for sensitivities. The surrounding land comprised a mosaic of natural, disturbed and altered grassland.

The northern areas were historically ploughed, but some woodland elements have appeared in these areas over time. The areas south of the site were characterised by formal and informal business. A wetland occurs east of the site, and some small patches of natural grassland were still present in the landscape.

The site is a continuation of these land uses, with most of its vegetation being historically altered by anthropological disturbances and the lack of conservation efforts to protect natural habitats.

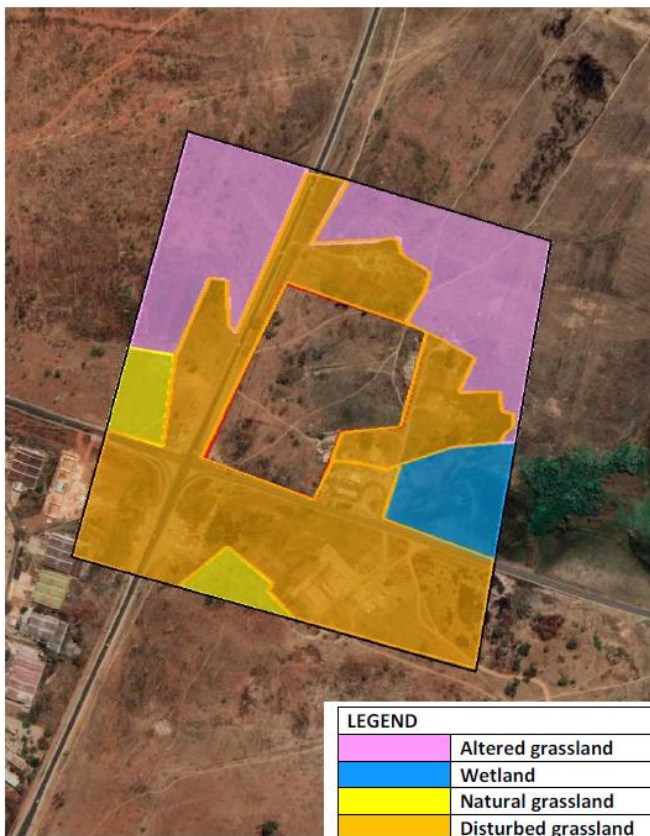


Figure 12: 200-meter radius around the site

Discussion

Although, the proposed development site could positively as a support for the local ecology since such support is not dependent on a pristine environment or undisturbed vegetation, there are however aspects of the site that would affect the ecological support of the site.

The site is located in close proximity to an intersection where a garage, taxi rank and old industrial park is located. It is further located between the suburbs of Ekangala and this intersection. This aspect limits the sites potential to act as an ecological support area, as there will always be some pressure for development on this intersection. A development land use would be more suitable for such an area, as it can then assist in removing risks with ad hoc fires, the spread or invasion of alien invasive plants and the indiscriminate use of the site that may permit pollution, plant harvesting and other anthropomorphic impacts.

Other aspects that undermine the ecological role of the site, is that it was found to not be an important area for Red listed bird species as indicated in the faunal assessment and the vegetation was found to be in Moderate but mostly Poor condition.

Terrestrial Biodiversity

Considering all aspects assessed the areas within the site boundaries as well as along the sewer line is classified as having a Low ecological sensitivity.

This based on the fact that the vegetation structure and composition is not natural and therefore does not qualify as primary vegetation. No species of conservation concern have been recorded on the site and not such species were observed during the field survey.

The site also does not lie adjacent or in close proximity to a protected area or similar of conservation concern (i.e. ridge or natural habitat). The site does however lie just upslope of a water course,



Figure 13: Sensitivity map

Conclusion and Recommendations

The vegetation ecology and plant biodiversity that could possibly be affected by the development of the township and associated sewer link is rated to have a low sensitivity. Historical anthropomorphic activities have altered much of the vegetation structure and composition which resulted in a very poor reflection of species that would normally be representative of the Rand Highveld Vegetation type.

The intersection close to the site supports a taxi rank, an old industrial park, a Total Energies filling station and a few small informal businesses. The intersection is further located in close proximity to Ekangala towns located one kilometre north-east of the site.

Taking into account the disturbed vegetation on site, the site is not considered a suitable area for conservation effort as no aspects of the vegetation was found to necessitate the creation of an open space or similar land use.

The conservation of small patches of level grassland is not suitable in the long run, as urbanization soon overruns such areas with other informal uses that alters the natural grassland. This is typically an artefact of the disruption of normal ecological processes that include infrequent fire, regular cultivation of the grass sward, the absence of exotic plants and the limited disturbance of the soil surface.

The current presence of urbanisation activities close to the site mean that the feasibility of the site contributing meaningfully to a protected area is negligible. The potential occurrence of any species of conservation concern occurring on the site or re-occurring on the site is considered low to none without a significant restoration effort that will land up being costly.

The site does however include a number of specimens of *Hypoxis Hemerocallidea*, an orange listed plant species. An appropriate plan needs to be developed to ensure that this plant is not impacted upon during the construction phase of the development.

There is no reason found in the assessment why development can not be supported on the proposed site should the proposed mitigation measures be implemented.

A Vertebrate Habitat Assessment was completed by Eco Assessments Ecological and Environmental Consultants in November 2021 and is attached hereto under **Annexure G4**.

Mammal Habitat Assessment

Local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges.

Two of the four major habitat types are present on the study site, i.e., terrestrial and wetlands.

Observed and Expected Mammal Species Richness

Large mammals (such as buffalo, blue wildebeest, white rhino, zebra, lion, cheetah and others) have long since been extirpated for sport and later for grazing. Most medium-sized mammal species like warthog, common duiker, steenbok, Cape porcupine, black jackal, caracal and African wild cat were also driven from the site.

The species richness is poor due to the disturbed nature and small size of the study site. It is estimated that 53 species of mammal may occur on or nearby the study site. The occurrence of only two mammal species (Rough-haired golden mole and Highveld Gerbil) was confirmed on the site.

Exotic feral and domesticated mammal species are expected to occur on the study site (e.g. cattle, sheep, goats, house mice, house rats, cats and dogs) since these species are normally associated with humans.

The species assemblage is typical of what can be expected of an area that is severely disturbed and does not have sufficient habitat to sustain populations. Most of the species of the resident diversity are fairly common and widespread, such as yellow mongoose, Africa mole rat, Multimammate mouse and Highveld gerbil. These species are likewise robust and capable of persisting in ecologically disturbed conditions. The two genet species and slender mongooses all have wide habitat tolerances, and that coupled with their catholic diets and reticent habitats render them persistent carnivores.

The study site offers no caves or suitable structures answering to the exacting roosting requirements of cave-dwelling bats, but it is likely that they have roosts elsewhere and during summer sunsets commute to the site to hawk for invertebrates rising over the waterbodies and wetlands. It can be expected that the water is an excellent source of insects that rise in swarms at summer sunsets and act as feeding patches for hawking vesper bats.

The present-day species richness is low to fair because of the size of the site and the fact that mainly two habitat types occur on the study site. The site is mostly disturbed, and connectivity is poor, except along the drainage line. The overall quality of conservation is larley ranked as poor.

Red Listed Mammal Species Identified

A total of eight mammal species with Red Data status could possibly occur on the site.

The study site falls outside the natural range of the Juliana's golden mole. This species should not occur on the study site.

Due to the absence of rupicolous habitat on the site, certain Red Data mammals should be absent from the site, which include mountain reedbuck and grey rhebok. The white-tailed mouse is often found in rocky areas with good grass cover, which are not present on the study site. Therefore, this species should not occur on the site.

The site has also been so transformed by anthropogenic influences that the oribi should not occur on or near the site.

Due to their ability to fly and to cover large distances, the distribution information on some bat species is insufficient. This has resulted in Red Data species such as the Blasius's (Peak saddle) horseshoe bat and short-eared trident bat being included as a precautionary measure.

Due to the presence of especially wetland-associated vegetation cover, the possibility of Red listed mammal species occurring increases dramatically. Protecting these habitat types would automatically protect many Red Data status species. The swamp shrew and Cape clawless otter species could occur on or near the site.

The Southern African hedgehog occurs in a wide variety of habitat types, but must have sufficient vegetation. The possibility exists that some individuals occur on the study site.

Due to severely disturbed nature of the site, very few prey items and poor connectivity, predators like the serval, leopard, brown hyena and Africa striped weasel should not occur on site.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

Roberts Marsh Rat (*Dasymus robertsii*)

Marsh Rats are dependent on intact wetland ecosystems, as they have not been found in artificial or degraded wetlands and are thus patchily distributed in their distribution range. Marsh rats are opportunistic carnivores and good swimmers, adapted to living in very marshy habitats where they build runways and nests in dense ground cover.

During the site visit such habitat was found on the site and there is a small possibility that the Robert's marsh rat could occur on the site.

Spotted-necked Otter (*Hydrictis maculicollis*)

Although the water of the drainage line, east of the site, is polluted and contains litter, many common rivers frog tadpoles were observed in the drainage line, which could provide food for a few water-dependent mammal species. This drainage line can still serve as a distribution corridor for the spotted-necked otter, especially north to a large manmade dam which is in the 500 meter buffer areas. The spotted-necked could occur on or near the study site from time to time.

Maquassie Musk Shrew (*Crocidura maquassiensis*)

Very few localities exist where this species has been collected. The species was collected in the not-too distant Roodeplaat dam area in the Gauteng Province. However, most specimens were collected under rocks or rocky areas. Such habitat does not occur in the study site. the Maquassie musk shrew should not occur in such a anthropogenically altered habitat.

Rough-haired Golde Mole (*Chrysospalax villosus*)

Rough-haired golden moles do not make subsurface runs like other golden moles, but excavate burrows, the entrances to which are characterised by loose piles of soils at the sides and back and which are left open when they leave the burrows to forage. The rough-haired golden mole prefers dry, sandy ground grassland. They are often found on the fringes of marshes or vleis. Such habitat occurs along the drainage line. During the survey, which was done in optimum conditions, one burrow was found near the study site which had typical rough-haired golden mole burrow characteristics.

Bird Habitat Assessment

The principal habitat types detected on the site that are most relevant to bird ecology and community structure are:

- Disturbed grasslands
- Wetlands

The habitats adjacent to the study site vary and consist mostly of degraded grassland, residential developments and busy provincial roads.

Expected and Observed Bird Species Richness

Most of the expected species are typical generalists that might occupy the fabricated habitats available, especially the various transformed lands and other man-induced alterations such as buildings, while others are aerial feeders that mainly use the airspace above the habitats. Species typically inhabiting aquatic habitats would be likely to occur in significant numbers due to the presence of this habitat.

The natural grasslands are in poor to fair condition and not sufficient to support species dependent on this habitat.

The disturbed nature of the habitat, and the location which includes busy tar roads and a filling station, collectively mean that avian diversity is lower than normal. During the survey, 65 bird species were observed.

Threatened and Red Listed Bird Species

A total of 28 threatened or near threatened species were recorded in the area of the site. however, only two were actually recorded for the study site, namely the Maccua duck and Lanner falcon. The possibility exists that species such as the secretarybird may occur on the site from time to time. However, for most Red Data species the nature of the site is such that their occurrence is extremely unlikely. Due to the limited extent and quality of the habitats, half the species are expected to be at best erratic visitors and the other half are only expected as infrequent vagrants, their inclusion being primarily due to the Precautionary Principle. The odd Verreaux's eagle and Cape vulture may fly over the site, but the area is unlikely to an important hunting or scavenging habitat.

African Grass Owl (*Tyto capensis*)

In the past the African grass owl should have occurred on the site. But regular heavy grazing pressure and too frequent burning prevent the development of rank grassland habitat required by the African grass owl to breed.

The African grass owl should not occur on the site as a breeding species.

Herpetofauna Habitat Assessment

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal, rupicolous and wetland-associated vegetation cover. From a herpetological habitat perspective, it was established that two of the four major habitat types are present on the study site, i.e., terrestrial and wetland-associated vegetation cover.

The site visit was conducted during summer. The natural grasslands were first transformed for agricultural purposes and later by the anthropogenic influences such as a filling station, fences, invasive plants, gravel roads, littering, powerlines, footpaths, diggings, a maize field, buildings, a recycling area, dumping, overgrazing and cattle and goats. The study site is thus ecologically disturbed in many parts. To the north of the site a few moribund termitaria were recorded on the study site. these structures are generally good indicators of the occurrence of small herpetofauna. Accordingly, it is estimated that the herpetofauna population density for the study site is somewhat higher. At the time of the site visit, the basal cover was poor in some places and would not provide adequate nourishment and cover for small terrestrial herpetofauna.

Important wetland-associated vegetation cover occurs along the drainage line just east of the study site and a large manmade dam near the site in the 500-metre buffer. The water of the drainage line is polluted and contains litter, but many common river frog tadpoles were observed in the drainage line which indicates that this habitat is still suitable for water dependent herpetofauna species. This drainage line is even more important as a corridor for herpetofauna movement. In some areas along the drainage line, wetland vegetation provides for many vertebrate species.

Connectivity with areas around the study site is poor due to the busy R460 Road south of the site and the R568 Road west of the site. Residential properties occur to the north and east of the site. Real opportunities for migration exist along the drainage line.

Expected and Observed Herpetofauna Species Richness

Of the 50 reptile species that may occur on the study site, one was confirmed during the site visit and of 17 amphibian species that may possibly occur on the study site, one was confirmed during the site visit.

The American red-eared terrapin (*Trachemys scripta elegans*) and the Brahminy blind snake (*Ramphotyphlops braminus*) are the only feral reptile or amphibian species known to occur in South Africa, but with only a few populations, they are not expected to occur on this particular site.

The species assemblage is typical of what can be expected of habitat that is severely disturbed, but with sufficient habitat to sustain populations. Most of the species of the resident diversity are fairly common and widespread (i.e., the common house snake, Cape skink, speckled rock skink, variable skink, yellow-throated plated lizard, savanna lizard, Transvaal gecko, guttural toad, common river frog, striped stream frog and Boettger's caco).

The species richness is poor to fair due to the small size and disturbed nature of the study site.

Threatened and Red listed Reptile and Amphibian Species

The study site falls outside the natural range of the Nile crocodile and the Southern African python and these species should not occur on the site.

Recommended Mitigation Measures

Protection of the drainage line and manmade dam:

Every effort should be made to retain the linear integrity, flow dynamics and water quality of the non-perennial stream and man-made dam.

The following mitigation measures are proposed by the specialist:

- If the Southern African Hedgehog or any other mammal species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity.
- If the Giant Bullfrog, South African hedgehog or any herpetological species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity.
- Education of the construction staff about the value of wildlife and environmental sensitivity is imperative. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- Alien and invasive plants must be removed.
- During the construction phase there will be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate some of the environmental impact.
- Measures will have to be taken to stop water pollution during construction and operational phases of the project. The polluted water run-off from the sewage works must not contaminate the non-perennial stream.
- If any holes or trenches are dug for construction, they should be completed quickly; otherwise these excavations may act as a death trap for small mammals and herpetofauna. The removal of invasive plants will increase the quality of habitat for most of the vertebrates

A Wetland Assessment was completed by WaterMakers in September 2021 and the summary of the report is presented below Refer to **Annexure G5** for the complete report.

Biophysical Attributes

Climate

The climate for the study area has been derived from the recorded data (en.climate-data.org and worldweatheronline.com) for Bronkhorstspuit. The area receives seasonal summer rainfall and has very dry winter. Long term average rainfall ranges from 620 – 700mm, with long term average between around 660mm. most rains fall between November and March, peaking between December and February. Summer day temperatures, in July, fluctuate daily on average between 15°C and 27°C in January, but may go above 33°C. the coldest winter temperatures, in July, fluctuate daily on average between 2°C and 10°C. Incidence of frost is frequent, which restricts the growth of high shrubs and trees under natural conditions, enabling grasslands to persist.

Associated Aquatic Ecosystems

The study area is located within the Olifants Water Management and the Upper Olifants Sub Water Management, forming part of the quaternary catchment B20H. The watercourse within the study area drains into the Grootspuit River which subsequently drain into the Wige River several kilometres downstream.

Associated Wetlands / Riparian Areas

Wetland soils

Soil profiles, were highly disturbed throughout the study area as result of historic impacts, such as agriculture, infrastructure developments (including commercial, road, sewage, potable water) as well as subsistence farming practices that is still continuing at present. The traversed catenas within the footprint of the proposed shopping centre as well as the associated catchment west and south from the development resembled a plinthic topo-sequence.

The Katspruit and Champagne soil forms are permanent wet soils which historically dominated the valley bottom position approximately 100m to 500m east from the study area (erosion processes have likely removed considerably quantities of organicrich horizons).

Wetland vegetation

The majority of the study area had been disturbed through various historic and current anthropogenic practices. The most profound impact with the largest extent in the study area was considered to be past and present heavy grazing regimes, historic agriculture, changes in hydro-pedological catchment process and linear infrastructure developments which have led to vegetative successional changes and reduced basal cover. The majority of wetland habitats within the immediate proximity of study area and sewage connection line were considered to be temporary in nature, which for the most part was also considered the benchmark wetland zonation state according to augered soil profiles.

The disturbed conditions in and around the study area as a result of anthropogenic impacts made vegetation a poor wetland indicator, particularly for temporary zoned wetland habitats.

Delineated Wetland and Riparian Areas

No wetlands were delineated within the footprint of the proposed shopping centre. However, within 500m from the proposed development and within the vicinity of the proposed sewer line, two HGM types, a hillslope

seepage connected to a watercourse and valley bottom wetland (historically likely unchanneled), were delineated and classified into two hydro-geomorphic (HGM) units, HGM 1 and HGM 2.

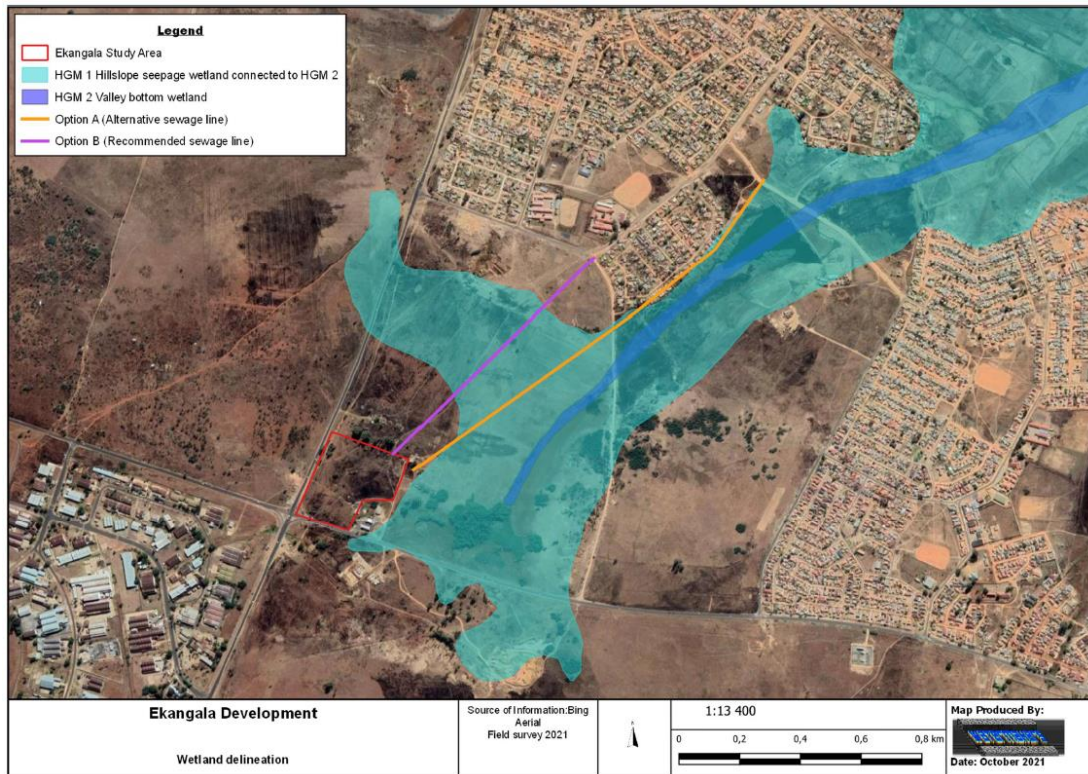


Figure 14: Wetland delineation map

A few small artificial wetlands were noted within the study area, one is caused by a leak of the water pipeline running behind the garage, which has been formerly directed towards the wetland downstream via an open channel. Two other historic excavations on the property contained wetland plants as a result of subsurface lateral flow paths (albic horizon) that has been exposed. None of these wetlands were considered natural and therefore does not have a legal status pertaining to them.

Present Ecological Status (PES)

The Present Ecological Class for **HGM 1** (seepage wetland) is a **category D** (largely modified with a large loss of natural habitats and basic ecosystem functions that has occurred). Distribution and retention patterns of water within the wetland has been negatively affected through agriculture, historic imagery reveals intensive agriculture production taking place in the previous century including drainage channels as well as ploughing against the contour to increase run off from fields.

HGM 2 (valley bottom wetland) is also has a **category D** PES. This is due to historic and current impacts on the wetland in combination with land use changes in the surrounding catchment resulted in geomorphological, hydrological and vegetation changes within the valley bottom wetland.

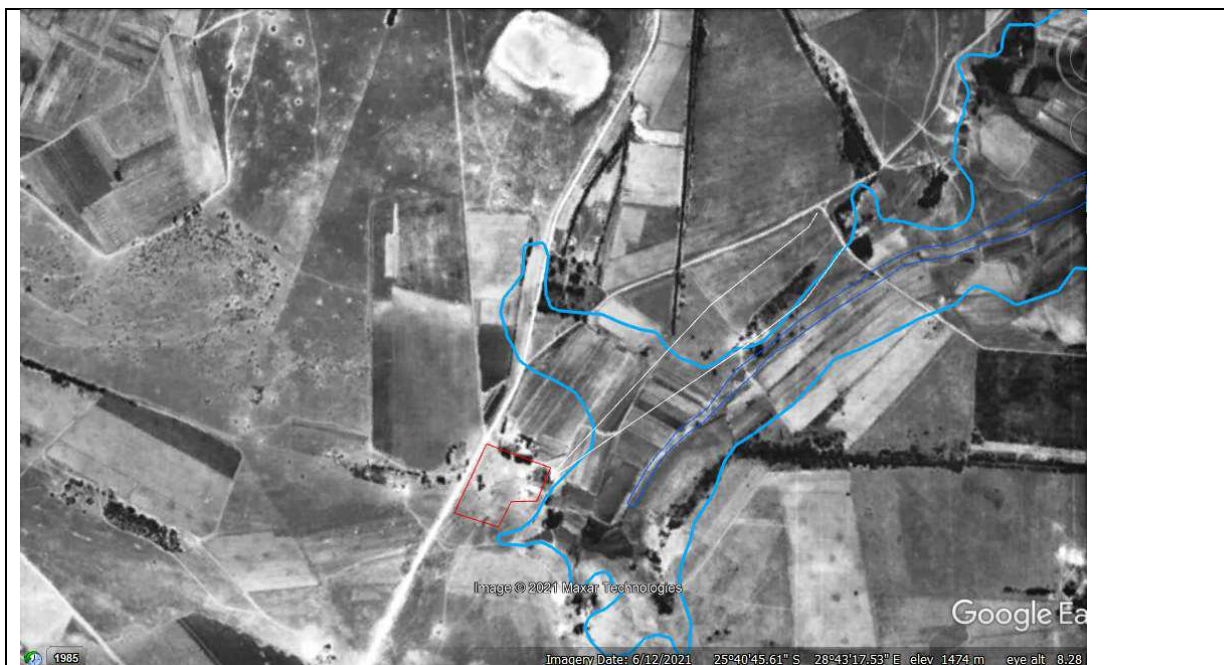


Figure 15: Historic image taken in 1962 overlaid in Google Earth shows the extent of agriculture within HGM 1

Ecological Importance and Sensitivity

The hillslope seepage wetlands were assigned a high Ecological Importance and Sensitivity, mostly as a result of the Freshwater Ecosystem Priority Areas (FEPA) designation. Further, the hillslope seepage wetlands were regarded as having a moderate.

Hydrological and Functional Importance due to the potential ecosystem services they provide, especially in terms of water flow regulation, phosphate trapping and nitrate removal. Direct human benefits were regarded as low within HGM 1 and HGM 2 which included utilization for grazing (higher moisture regimes associated with wetland areas result in wetland areas being utilised for longer periods, especially during winter) as well as some ad hoc hunting taking place by members of the surrounding communities.

Conclusion and Recommendations

Determination of preliminary buffer requirements for the identified wetland features present were determined to be 30m from the edge of the delineated wetland areas, based on development densities, slope, annual precipitation, rainfall intensity, channel width, catchment to wetland ratio, etc.

The impact assessment identified sedimentation of watercourse, increased erosion and increased run-off received by water courses, introduction and spread of invasive vegetation, impacts on ground and surface water quality as well as soils as well as an altered hydrological regime as the major potential impacts during the construction and operational phase. Several general and specific mitigation measures were proposed in order to reduce negative impacts and incorporate some potentially positive impacts from the proposed development following the application of the mitigation hierarchy. Some of the most pertinent recommendations include maintenance of the hydrological drivers supporting wetland downstream. Typical catena's within the study area indicated lateral subsurface hydrological pathways which could potentially be disrupted by foundations that are placed too deep. This will not only potentially cut off some of the hydrological drivers feeding wetland downstream, but also cause potential long term water damage to

buildings and associated infrastructure. In general, soils are deeper in the western half of the development site, compared to the eastern half of the study area. Areas should therefore be filled in where it is necessary to create level ground, rather than cut into soil horizons, which could disrupt subsurface lateral hydrological drivers.

The same type of subsurface lateral flow impact could occur through the installation of the sewage pipeline connection. In order to avoid intercepting return flows from the adjacent hillslope, sewage line Option B should be chosen (as it also avoids more sensitive, wetter wetland habitat that contain subsurface flows). A hydrogeological technician or hydrogeologist should perform TLB test profiles along the planned sewage line Option B to ensure that there are no major lateral subsurface flow paths potentially intercepted (the area is dominated by vertic clays, therefore overland flow is expected). Where subsurface lateral flows are detected, appropriate mitigation measures such as changing the route alignment and or include design facilitation of lateral flows through permeable layering and installation of clay plugs to prevent preferential flows along the pipeline. The same investigation can then also determine the maximum depth of foundations of the mall development and associated infrastructure in order to avoid interception off subsurface lateral flow paths. Once the TLB test profiles have been completed, findings must be formalised in a wetland management and monitoring plan that will include soil handling procedures as well as rehabilitation methodology to be implemented.

Further, the proposed sewage line will have to traverse through smectic clays situated towards the northeast. These vertic soils (vertisols) have high swelling and shrinking properties known to impact on developments. The pipeline installation design must therefore cater for these soil properties in order to avoid potential leakages. A monitoring program and system should be designed for especially the sewage network to detect any leaks timeously. Further, a wetland monitoring program must be initiated shortly prior to the advent of the construction phase in order to confirm baseline conditions. Monitoring frequencies must be high during the construction phase (e.g. monthly) and remain high if significant wetland impact occur. If there are no wetland associated issues identified at completion of the construction phase, monitoring can be reduced to annual visits for 4 years.

Following the proposed mitigation measures and approaches, the risk of the development impacting on watercourses is expected to be low.

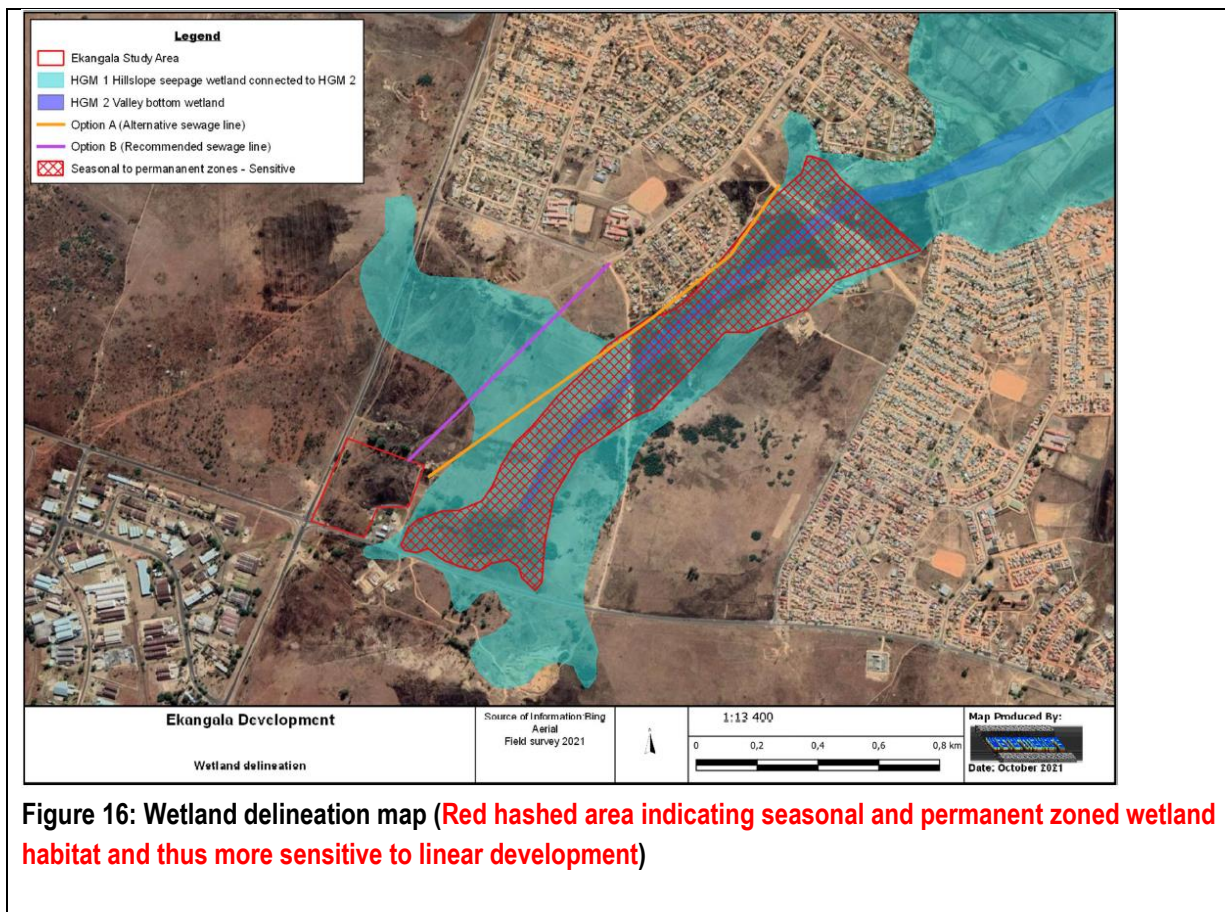


Figure 16: Wetland delineation map (Red hashed area indicating seasonal and permanent zoned wetland habitat and thus more sensitive to linear development)

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site.

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial ^{AN}	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport ^N	23. Train station or shunting yard ^N	24. Railway line ^N	25. Major road (4 lanes or more) ^N
26. Sewage treatment plant ^A	27. Landfill or waste treatment site ^A	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam ^A	34. Small Holdings	
35. Other land uses (describe): Informal Business / Taxi Rank				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this, please use the appropriate number and orientation of hashed blocks

NORTH

1	1	1	1	2
1	1	1	1	1/2
1	1		1	2
15	35	1	1/35	1
15	1	1	1	1

= Site

WEST

EAST

SOUTH

Note: More than one (1) Land-use

may be indicated in a block

Please note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached

YES

NO

If yes indicate the type of reports below

Annexure G: Specialist Studies

Annexure G1: Geotechnical Assessment

Annexure G2: Geohydrology Impact Assessment

Annexure G3: Vegetation Ecological Assessment

Annexure G4: Vertebrate Habitat Assessment

Annexure G5: Wetland Assessment

Annexure G6: Heritage Impact Assessment

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

The subject property is situated in Region 7 within the City of Tshwane Metropolitan Municipality (Demacon, 2021). Region 7 is an extensive rural region with a low population density, high unemployment and close to a quarter of the dwelling units remaining informal. The region includes the areas of Bronkhorstspuit, Ekangala, Ekandustria, low-income residential areas and surrounding rural areas. The urban area of Bronkhorstspuit is more developed, with modern infrastructure, such as water, electricity, roads, communication networks and sanitation. The area contains some of the best farming land in Gauteng. The area has a rather weak spatial structure characterised by heavy through traffic, vast open spaces, and small economic centres.

Socio-Economic Profile

Population Size and Composition

The area is predominantly rural, with low population densities. The highest densities are not in and around the Bronkhorstspuit CBD but in Ekangala. The total population size is approximately 109766 (StatsSA Census 2011). The region has a young population, with the age groups below 20 and 34 year being the largest.

Levels of education

- 7% of adults have no schooling
- 19% of adults are schooled up to grade 12

The region has fairly low education levels, with few people having a tertiary qualification.

Employment

Approximately 26% of economically active persons are permanently unemployed.

Accommodation

A total of 7170 dwelling units, or 22% of dwellings in the region are informal.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) *Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-*

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) the construction of a bridge or similar structure exceeding 50m in length;*
- (c) any development or other activity which will change the character of a site-*
 - (i) exceeding 5 000 m² in extent; or*
 - (ii) involving three or more existing erven or subdivisions thereof; or*
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or*
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.*

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act,

YES	NO
-----	----

1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?

--	--

If YES, explain:

Not Applicable

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

According to the Department of Forestry, Fisheries and Agriculture (DFFE), the archaeological and cultural sensitivity of the site is considered to be low.

General Desktop Study

A detailed archaeological and historical overview of the study area and surroundings were undertaken. This work was augmented by an assessment of reports and data contained on the South African Heritage Resources Information System (SAHRIS). Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork. The study revealed that the surroundings of the study area is characterised by a long and significant history.

Fieldwork Findings

The fieldwork was undertaken by way of intensive walkthroughs of the study area. These intensive walkthroughs were undertaken by two archaeologists on the 17th August 2021.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the team. The identified archaeological and heritage sites were numbered from ES-01 to ES-12. The recorded tracklogs and heritage sites in relation to the proposed development footprint areas are depicted in **Figure 17**.



Figure 17: Google Earth image depicting the tracklogs that were recorded in the field (yellow line) and the identified heritage sites.

Heritage sites identified within the proposed Shopping Complex

A total of 10 heritage sites were identified within this area. These are primarily comprised of poorly preserved structural remains associated with the two nearby farmsteads. In the interest of better interpreting these sites, it was deemed crucial to make an assessment of the depictions of this area and its structures on available old aerial photographs. Aerial photographs taken in 1939, 1964 and 1980 were assessed. Only structural remains from each site that are visible on these images will be indicated and briefly discussed.

Figure 18 below depicts a section of the 1939 aerial photograph. A cluster of livestock enclosures appear to be directly associated with the structural remains identified at sites ES-1 and ES-2. A structure is depicted at sites ES-04. The structure appears to be associated with a long furrow-like feature. One possibility is that this furrow-like feature was used as a cattle dip. A stonewall with planted trees is depicted at site ES-7. At ES-12, a farmstead comprising a farm dwelling and at least two associated structures are depicted.

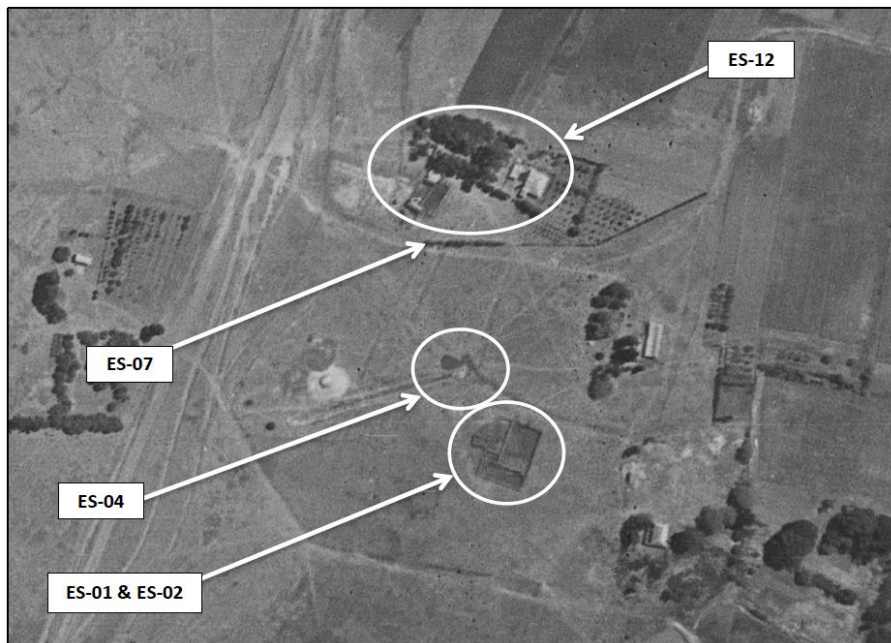


Figure 18: Depiction of the proposed shopping complex footprint area and surroundings on the 1939 aerial photographs.

Figure 19 depicts a section of the 1964 aerial photograph. A cluster of livestock enclosures appear to appear to be directly associated with the structural remains identified at ES-01 and ES-02. A shed with associated livestock enclosure is depicted at site ES-03. A structure is depicted at ES-04. The structure appears to be associated with a long furrow-like feature. One possibility is that this furrow-like feature was used as a cattle dip. What appears to be a low stone-wall or fence is depicted at site ES-06. A stonewall with planted trees is depicted at sites ES-07. At ES-12, a farmstead comprising a farm dwelling and several associated structures is depicted. These structures also include sheds and livestock enclosures.

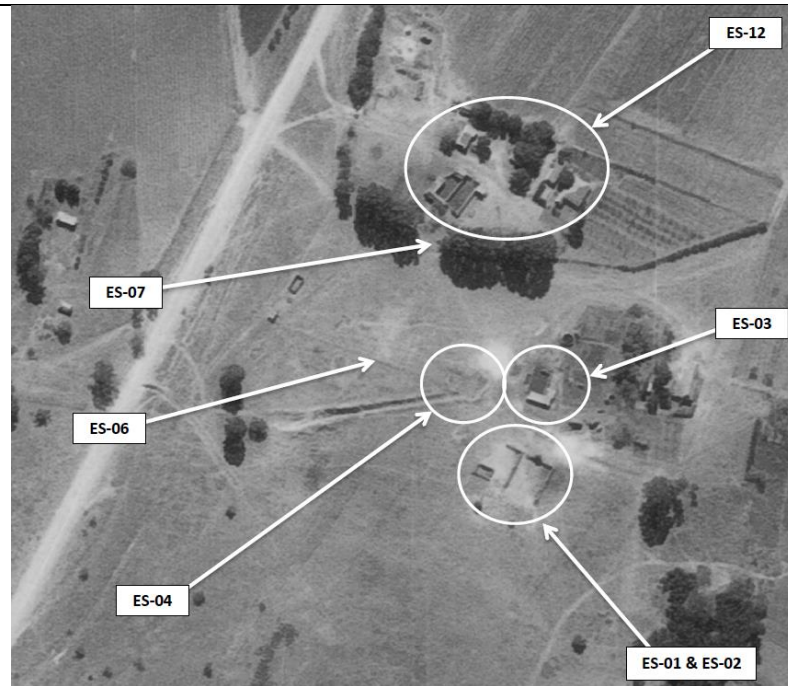


Figure 19: Depiction of the proposed shopping complex footprint and surroundings on the 1964 aerial photograph

Figure 20 depicts a section of the 1980 aerial photograph. A cluster of livestock enclosures appear to be directly associated with structural remains identified at sites ES-01 and ES-02. A shed with associated livestock enclosure is depicted at site ES-03. A structure is depicted at site ES. The structure appears to be associated with a long-like feature. One possibility is that this furrow-like feature was used as a cattle dip. What appears to be low stone-walls or fences are depicted at sites ES-05 and ES-06. A stonewall with planted trees is depicted at sites ES-07. At ES-12, a farmstead comprising a farm dwelling and numerous associated structures is depicted.

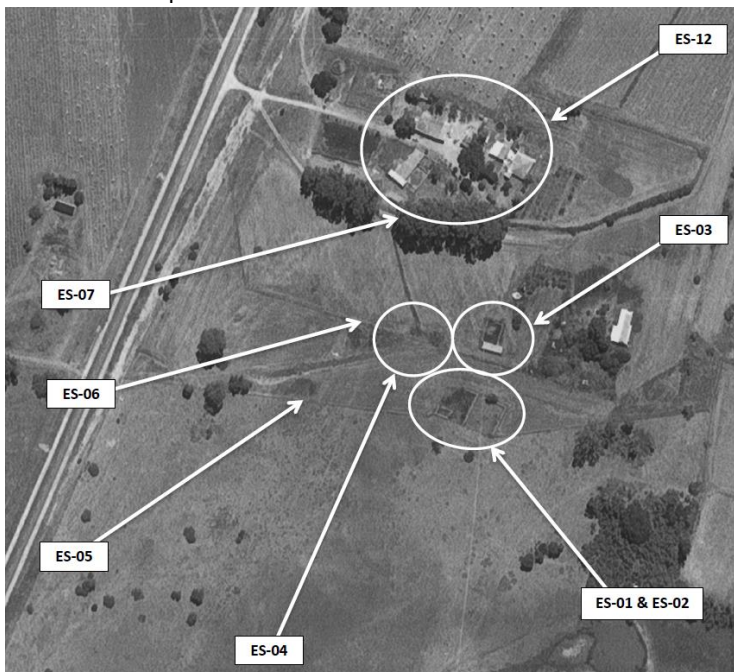


Figure 20: Depiction of the proposed shopping complex footprint area and surroundings on the 1980 aerial photograph

Heritage sites identified within the Proposed Shopping Complex

ES-01 and ES-02

Type: Remains of a stone structure and associated livestock enclosure

Description: the site consists of a square stone-walled structure (ES-01) with an associated stone-kraal (ES-02). During the fieldwork, two sites were identified here. However, the assessment of the old aerial photographs (**Figure 18 to 20**) indicated that a single, attached structure is located here.

The structural remains of the enclosure and stone kraal are poorly preserved, with only the lower foundations and walls still visible. No cultural material could be observed on the surface of the site.

Both sites are already depicted on the 1939 aerial photograph. This means that these structures are at least 82 years old. However, all the structures from the site are in a poor state of preservation.

Site extent: The site is approximately 35m x 35m in extent.

Significance: Although the structural remains from the site are at least 82 years old, they are poorly preserved and not unique. As result, sites ES-01 and ES-02 are deemed to be Generally Protected C (GP.C) or Low significance.

ES-03

Type: Remains of a shed with associated livestock enclosure.

Description: The site consists of the remains of a demolished structure. From the various building materials scattered on site, it appears as if the structure consisted of an older stone section and a more contemporary brick addition.

The structural remains of the site are depicted for the first time on the 1964 aerial photograph. This means that the site is at least 57 years old, and may be older than 60 years. However, all the structures from the site are in a poor state of preservation.

Site extent: The site is approximately 40m x 30m in extent.

Significance: Although the structural remains from the site are at least 57 years old, and possibly even older than 60 years, they are poorly preserved and not unique. As a result, site ES-03 is deemed to be Generally Protected C(GP.C) or Low Significance.

ES-04, ES-05, ES-06

Type: Remains of a stone structure and walling

Description: Sites ES-04 consists of poorly preserved remains of what appears to have been a rectangular stone enclosure, possibly used as a livestock enclosure. The walls have collapsed almost entirely and only small sections are left. No other cultural material was observed. Single-row stone lines, possibly the remains of jackal-proof fences, were identified at sites ES-05 and ES-06.

The structural remains from site ES-04 are already depicted on the 1939 aerial photograph. This means that it is at least 82 years old. However, all the structures from the site are in a poor state of preservation.

Site Extent: The structural remains at the site ES-04 are approximately 10m x10m in extent.

Significance: Although the structural remains from ES-04 are at least 82 years old, they are poorly preserved and not unique. Additionally, the stone lines from site ES-05 and ES-06 are simply the remains of fences. These three sites are of Generally Protected C (GP.C) or Low Significance.

ES-07

Type: Stone Wall

Description: The site consists of a stone wall that is located approximately 7m north of the development footprint area for the proposed shopping complex. The wall is located under a lane of trees that was most likely planted here as a windbreak for the old farmstead located north of the site.

The structural remains from site ES-07 are already depicted on the 1939 aerial photograph. This means that the site is at least 82 years old. However, all the structures from the site are in a poor state of preservation.

Site Extent: The wall is approximately 130m long.

Significance: Although the structural remains from ES-07 are at least 82 years old, they are poorly preserved and not unique. The site is of Generally Protected C (GP.C) or Low Significance.

ES-08

Type: Remains of walling

Description: The site consists of single-row stone line or wall. It seems possible for the structural remains of the site to be the remains of jackal-proof fences. These fences were built with stones packed all along the base of the fences. Once the fencing is removed, all the remains are the single rows of stones where fencing used to be.

Site Extent: The wall is approximately 5m long.

Significance: The site is not believed to be very old and is also not unique. As a result, the site is deemed to be of Generally Protected C (GP.C) or Low Significance.

ES-09

Type: Concrete foundation

Description: The site consists of a concrete foundation. The concrete has cracked in a few places and is overgrown with grassy vegetation. The site is located behind a Total garage. No other cultural material was found.

Site Extent: The site is 15m x 15m in extent.

Significance: The site is not believed to be very old and poorly preserved. It is deemed to be of Generally Protected (GP.C) or Low Significance.

ES-10

Type: Remains of an old farmstead.

Description: The site consists of the remains of an old farmstead. The farmstead comprises a number of poorly preserved structures, including an old farmhouse. The walls of the farmhouse have collapsed, and sections have been demolished. A Google Earth image dated to 2004, shows the remains of the structures, suggesting that by 2004 the site was unoccupied and left in a dilapidated state.

No other cultural material was observed. The site is located approximately 66m north of the development footprint area of the proposed shopping complex and approximately 23m from the nearest point along the proposed sewer line.

The farmstead at the site ES-09 is already depicted on the 1939 aerial photograph. This means that the site at least 82 years old. However, all the structures from the site are in a poor state of preservation.

Site Extent: The site is approximately 120m x 80m in extent.

Significance: The site represents the remains of an old farmstead. However, the site is in a poor state of preservation. The site is deemed to be of Generally Protected C (GP.C) or Low Significance.

Heritage Sites Identified within the Sewer Line footprint

A total of 2 heritage sites were identified within this area.

ES-11

Type: Dam wall

Description: The site consists of the poorly preserved remains of a dam wall. It is depicted the first time on the aerial photograph taken in 1964. As a result, the dam wall is at least 57 years old. However, it is poorly preserved.

Site Extent: The site is approximately 40m x 30m in extent.

Significance: Although the structural remains of the site may be older than 60 years, it is poorly preserved. As a result, the site is deemed to be of Generally Protected C (GP.C) or Low Significance.

ES-12

Type: Remains of a structure.

Description: The site consists of the remains of a square stone structure that is located at the edge of a wetland. The site is in a poor state of preservation. No other cultural material was observed. The exact origin or function of the structure is not presently known.

The available aerial photographs (1939, 1964 and 1980) were assessed to established whether any structures or buildings are depicted at the site position. No evidence could be found on the 1939 and 1964 aerial photographs of any structures at the site and its immediate surroundings. The 1980 aerial photograph depicts

black homesteads north-west and north-east of the site, but none of these are located in any proximity to the structure.

Site Extent: The site is 5m x 5m in extent.

Significance: The site is deemed to be Generally Protected B (GP.C) or Low Significance.

Palaeontology

According to the PalaeoMap on the SAHRIS database, the Palaeontological Sensitivity of the site is considered to be Moderate. As such, it is recommended that a palaeontological desktop study be undertaken.



Figure 21: Palaeontological Sensitivity map

Assessment of the Impact on the identified Heritage Sites

Although 12 heritage sites were identified within or close proximity to the proposed development, footprint areas, these sites are poorly preserved and deemed to be of Generally Protected C (GP.C) or Low Significance.

Mitigation Measures required for the sites ES-1 to ES-12

Although 12 heritage sites were identified within or close proximity to the proposed development, footprint areas, these sites are poorly preserved and deemed to be of Generally Protected C (GP.C) or Low Significance.

As a result, no mitigation measures would be required for these sites.

General Recommendations

The following general recommendations must be implemented:

- An archaeological watching brief is required throughout the construction activities.
- According to the palaeontological sensitivity map of SAHRIS, a palaeontological desktop assessment is required. This must be undertaken as soon as possible, and long before construction commences.

Conclusions

Even the unmitigated impact of the proposed development is expected to result in very limited impacts in terms of the identified heritage fabric of the study area. As a result, on the condition that the recommendations made are to be adhered to, no heritage reasons can be given for the development not to continue.

Will any building or structure older than 60 years be affected in any way?

YES	NO
-----	----

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES	NO
-----	----

If yes, please attached the comments from SAHRA in the appropriate Appendix

Not Applicable

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

Note: The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

1. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?

YES	NO
-----	----

If yes, has any comments been received from the local authority?

YES	NO
-----	----

Not Applicable. This is the Draft Basic Assessment Report that will be submitted for review and comments. Any comments received from the Local Authority will be included into the Final Basic Assessment Report.

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

Not Applicable, the comments will be included on the Final BAR

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The public participation report is attached as **Annexure E**.

As part of the initial assessment and viability of the proposed development the City of Tshwane Metropolitan Municipality – Environmental Management Department of the was invited participate.

The Ward councillor of the area Cllr Oupa Patrick Matshiane (Ward 104) received emails including documents like the Background Information Document. Comment from the municipality on the Draft BA will be included in the public participation report of this Final Basic Assessment.

2. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES

NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Please refer to **Appendix 6** Comments and Response Register (CRR) attached hereto under the

If "NO" briefly explain why no comments have been received

Please refer to the Comments and Response Register (**Appendix 6**) of the Public Participation Report attached hereto under **Annexure E** for issues raised by the I&APs.

Additional Information

- Newspaper notices were placed in the local newspaper.
- On-site notices were placed on-site at the same time and at the main entrance of the site, and along the sides of the property.
- Adjacent landowners were informed of the proposed activity by faxing, e-mailing and/or mailing a BID
- (Background Information Document) to them explaining the proposed activity and the location of the site. They were also encouraged to respond to the BID in order to compile an I&AP list with all relevant issues and concerns.
- The Ward Councillor was informed of the proposed road development by e-mail.

I&APs were invited to arrange for individual meetings to discuss details should you wish to.

3. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

4. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below:

Annexure E provides details of the public consultation process that will be followed during the project.

Appendix 1 - Proof of site notices

Appendix 2 - Written notices issued; Emails, Faxes, Letters & BID

Appendix 3 - Proof of newspaper advertisements

Appendix 4,7,8,10 - Communications to and from registered I&APs

Appendix 5 - Minutes of any public and or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 9 - Copy of the I&AP Register

Appendix 11 -Other

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed.
- 2) Each alternative needs to be clearly indicated in the box below.
- 3) Attach the above documents in a chronological order.

Section D has been duplicated for alternatives times
(complete only when appropriate)

Section D Alternative No. (complete only when appropriate for above)

1. WASTE, EFFLUENT & EMISSION MANAGEMENT

Solid Waste Management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	NO
n/a	

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

The building rubble and solid construction waste (such as sand, gravel, concrete and waste material) that cannot be used for filling and rehabilitation and other litter and waste generated during the construction phase will be removed from site and be disposed of safely and responsibly at a licensed landfill site, i.e., a landfill licensed in terms of Section 20 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989).

Where will the construction solid waste be disposed of (describe)?

All non-recycled general waste will be removed by a registered waste Contractor and taken to the licensed Landfill Site.

Will the activity produce solid waste during its operational phase?

YES	NO
n/a	

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

n/a

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

YES	NO
-----	----

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

Construction waste to be disposed of, will be disposed of by the waste contractors at a licensed facility, it is the responsibility of the contractor to locate facilities capable of facilitating the waste/ product. This could include a landfill or recycling facility.

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES	NO
-----	----

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
-----	----

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

Recycling facilities for paper and glass will be available within the small waste transfer station on the property.

General Waste Management

- Litter and rubble on the construction site and in the construction, camp will be monitored strictly by a dedicated housekeeping team.
- All waste generated on site will be separated into metal, paper, plastic, glass & contaminated paper, glass, plastic and polystyrene and will be recycled.

Construction rubble

- All rubble from demolition activities will be used on site as part of the existing development or will be taken off the construction site and disposed at an appropriate landfill.
- No material shall be left on site that may harm man or animals. Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site.
- Surplus concrete will not be dumped indiscriminately.
- Concrete water will be re-used in the batching process

Operational waste

- As per the NEM: WA, waste is to be sorted and recycled at source.

The Environmental Management Programme will incorporate measures of optimal reuse or recycling without compromising the integrity of the site with possible pollution. As construction material is regarded as a waste material, it will not be recycled on site as it will require appropriate licensing.

Liquid Effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
n/a	

If yes, what estimated quantity will be produced per month?

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?

n/a	n/a
-----	-----

Will the activity produce any effluent that will be treated and/or disposed of on site?

Yes	NO
-----	----

If yes, what estimated quantity will be produced per month?

n/a

If yes describe the nature of the effluent and how it will be disposed.

Not Applicable

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES	NO
-----	----

If yes, provide the particulars of the facility:

Facility name:	n/a		
Contact person:	n/a		
Postal address:	n/a		
Postal code:	n/a		
Telephone:	n/a	Cell:	n/a
E-mail:	n/a	Fax:	n/a

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

No waste water will be produced for this proposed activity.

Liquid Effluent (Domestic Sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?

YES	NO
-----	----

If yes, what estimated quantity will be produced per month?

n/a

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?

YES	NO
-----	----

Will the activity produce any effluent that will be treated and/or disposed of onsite?

YES	NO
-----	----

If yes describe how it will be treated and disposed off.

Not Applicable

Emissions into the Atmosphere

Will the activity release emissions into the atmosphere?

YES	NO
-----	----

If yes, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

Emissions during construction will mostly be in the form of dust and smoke.

Odour from the refuse yards are to be combated by the provision of a compaction unit and is to be walled.

The EMPr attached in **Annexure H** of the Basic Assessment Report indicates various ways in which these emissions will be minimized and controlled.

2. WATER USE

Indicate the source(s) of water that will be used for the activity

Municipal	Directly from water board	groundwater	river, stream, dam or lake	other	the activity will not use water
------------------	---------------------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate

the volume that will be extracted per month:

Not applicable

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix

Does the activity require a water use permit from the Department of Water Affairs?

YES

NO

If yes, list the permits required

The water use license: General Authorisation Application will be submitted to DWS after the commenting period of this report expires and all relevant comments have been addressed.

If yes, have you applied for the water use permit(s)?

YES

NO

If yes, have you received approval(s)? (attached in appropriate appendix)

YES

NO

3. POWER SUPPLY

Please indicate the source of power supply eg. Municipality / Eskom / Renewable energy source

Municipality

If power supply is not available, where will power be sourced from?

Not applicable

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The following energy savings methods shall be investigated for possible implementation for the proposed development:

- Use of energy efficient lighting,
- Use of day light wherever possible in lieu of artificial lighting,
- Use of renewable solar powered lighting for external lighting,
- Switching off of all electrical appliances at night and times not in use,
- Use of high-efficient HVAC systems,
- Possibility of co-generation in co-operation with the supply authority,
- Use of solar water heating,
- Setting thermostats of water heaters at the most efficient level,
- Insulation of hot water pipes and hot water storage tanks,
- Use of low-flow shower heads,
- Use of high-efficient electric motors,
- Use of variable speed drives on electric motors,
- Use of appropriate conductor size to reduce distribution losses,
- Use of control methods to reduce maximum demand and exploit off peak electricity tariffs,
- Insulation of windows, walls, ceilings and roofs.

Notices of awareness regarding the effective use of energy will be posted within the proposed sports-facilities to make the people aware of the importance of using electricity effectively. See EMPr in Appendix H: EMPr

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Alternative energy sources were investigated as part of the design of the proposed development, however, due to the nature of the project no alternative energy source was deemed feasible in terms of the practicality and economic implications of the proposed development. However, energy efficient technology will be promoted for this proposed development to lower the footprint on the current energy grid for the area.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i)).

1. ISSUES RAISED BY INTERESTED & AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

All issues raised by Interested and Affected Parties have been included into the Public Participation Report.

Please refer to the comments and Response Register (**Appendix 6**) of the Public Participation Report attached hereto under **Annexure E** for issues raised by the I&APs.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)

(A full response must be provided in the Comments and Response Report that must be attached to this report):

Refer to **Annexure E** for Comments and Response Report.

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION & OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts.

A combination of the following methods was used to identify impacts during the Basic Assessment:

2.1. Specialist Study Findings

A minimum of legally responsible specialist studies is conducted (as usually required by the relevant authority). These usually include a red data fauna & flora assessment and heritage impact assessment. The findings of such specialist studies will highlight potential impacts on protected or endangered species or environments.

2.2. Site Inspection

The EAP and specialists conduct several site visits and identified potential sensitive environments. These areas are then red-flagged to be investigated further and excluded from development if necessary.

2.3 Technical / Desktop Studies

Technical and specialist reports such as the geotechnical and agricultural assessments are used to identify those areas and aspects that may be impacted on, but that will not be identified through the other specialists' studies.

2.4 Public Participation

Conducting public participation produces an issues list. Such a list needs to be screened for relevant impacts which then need to be addressed by specialist studies or identified for further investigation.

2.5 GDARD Policies, Review / Terms of Reference

GDARD C-Plan 3 as well as the policies provides the red flags that must be investigated by the specialists. Furthermore, the GDARD officials and the different sub-directorates within the department review the application and give comments to the relevant environmental officer. The issues identified are forwarded to the environmental consultant and these issues are addressed or translated as impacts.

2.5 Methodology to determine significance of impacts

The significance of the identified impacts will be determined using the approach outlined below. This incorporates two aspects or assessing the potential significance of impacts (terminology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998), namely occurrence and severity, which are further sub-divided as follows:

Table 1: Methodology to Assess Impacts

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Magnitude (severity) of impact	Scale / extent of impact

To assess each of these factors for each impact, the following four ranking scales are used:

Probability	Duration
5 – Definite/don't know	5 – Permanent
4 – Highly probable	4 – Long-term
3 – Medium probability	3 –Medium-term (8-15 years)
2 – Low probability	2 – Short-term (0-7 years) (impact ceases after the operational life of the activity)
1 – Improbable	1 – Immediate
0 – None	
Scale	Magnitude
5 – International	10 – Very high/don't know
4 – National	8 – High
3 – Regional	6 – Moderate
2 – Local	4 – Low
1 – Site only	2 – Minor
0 – None	

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

SP (significance points) = (probability + duration + scale) x magnitude

The maximum value is 150 significance points (SP). The impact significance will then be rated as follows:

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates moderate environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Refer to Table 2 and Table 3 below:

2.1 Significance scores of expected impacts

Preferred Alternative – Preferred Alternative – Proposed Shopping Centre and Associated Services on the Remainder and Erf 1 1, 2, 3, 4, 5 and 6 of Portion 22, and Portion 26 of the Farm Ekangala 610 J.R., within the City of Tshwane Metropolitan Municipality.

Table 2: Assessment of Potential Impact of the Preferred Alternative

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
Construction phase							
ISSUE: AIR QUALITY							
1.1 Dust/Air pollution - The generation of fugitive dust associated with construction activities & earthworks.	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
2. ISSUE TOPOGRAPHY							
2.1 Visual Impacts Topographical features contribute to the landscape character and sense of place of an area. Visual scarring due to cutting and embankments and areas devoid of vegetation are most obvious when located on elevated areas in the landscape	Local (2)	Long term (4)	Highly probable (4)	Moderate (6) - Situated within an area that has already been developed	60	Moderate environmental significance	High
2.2 Bulk earthworks: Deep cuttings, high embankments, disposal of soil and excavations cause local changes to topography	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
3. ISSUE GEOLOGY AND SOILS							
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	Site only (1)	Medium term (4)	Highly Probable (4)	Moderate (6)	54	Moderate environmental significance	High
3.2 Soil pollution	Site only (1)	Immediate (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High
4. ISSUE FAUNA AND FLORA							
4.1 Degradation, destruction of habitats/ ecosystem	Site only (1)	Long term (4)	Medium Probable (3)	Moderate (6)	48	Moderate environmental significance	High
4.2 Impacts on fauna and flora	Site only (1)	Long term (4)	Medium Probable (3)	Moderate (6)	48	Moderate environmental significance	High
5. ISSUE HYDROLOGY							
5.1 Stormwater flow and drainage- Developments cause the modification of drainage patterns. Stormwater may be concentrated at certain points, increasing the velocity of flow in one area and reducing flow in	Local (2)	Long term (4)	Medium Probability (3)	Moderate (6)	54	Moderate environmental significance	High

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
another. This may contribute to flooding, soil erosion, sedimentation, scouring and channel modification downstream of the development.							
5.2 Impact on wetlands and water quality	Local (2)	Short term (2)	Medium probability (3)	Moderate (6)	42	Moderate environmental Significance	Medium
5.3 Pipeline leaks	Local (2)	Immediate (1)	Medium probability (3)	Moderate (6)	36	Moderate environmental significance	Medium
SOCIO-ECONOMIC AND CULTURAL HISTORICAL ENVIRONMENT							
6. ISSUE AESTHETICS, LANDSCAPE CHARACTER AND SENSE OF PLACE							
6.1 Noise/ vibration	Site only (1)	Immediate (1)	Highly probable (4)	Moderate (6)	36	Moderate environmental significance	High
6.2 Visual impact	Site only (1)	Medium term (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High
7. ISSUE SOCIAL WELL-BEING AND QUALITY OF THE ENVIRONMENT							
7.1 Safety and Security	Local (2)	Short term (2)	Low probability (2)	Moderate (6)	36	Moderate environmental significance	High
7.2 Job opportunities	Region (3)	Long term (4)	Highly Probable (4)	Moderate (6)	66	Moderate Environmental significance	Medium
8. ISSUE HISTORICAL ENVIRONMENT							
8.1 Destruction of cultural / heritage sites	Site only (1)	Immediate (1)	Low Probability (2)	Minor (2)	8	Low Environmental Significance	Medium
9. ISSUE INFRASTRUCTURE AND SERVICES/WASTE							
9.1 Waste	Site only (1)	Short time (2)	Medium probability (3)	Minor (2)	14	Low environmental significance	High
9.2 Pressure on existing infrastructure and services	Local (2)	Long term (4)	Low probability (2)	Moderate (6)	48	Moderate environmental significance	Medium
10. ISSUE DESIGN AND LAYOUT							
10.1 Functional design of Residential development	Local (2)	Long term (4)	Low Probability (2)	Minor (2)	16	Low environmental significance	Medium

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
Operational phase							
ISSUE: AIR QUALITY							
1.1 Dust/Air pollution - The generation of fugitive dust associated with construction activities & earthworks.	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
2. ISSUE TOPOGRAPHY							
2.1 Visual Impacts Topographical features contribute to the landscape character and sense of place of an area. Visual scarring due to cutting and embankments and areas devoid of vegetation are most obvious when located on elevated areas in the landscape	Local (2)	Long term (4)	Highly probable (4)	Moderate (6) - Situated within an area that has already been developed	60	Moderate environmental significance	High
2.2 Bulk earthworks: Deep cuttings, high embankments, disposal of soil and excavations cause local changes to topography	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
3. ISSUE GEOLOGY AND SOILS							
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	Site only (1)	Medium term (4)	Medium probability (3)	Moderate (6)	48	Moderate environmental significance	High
3.2 Soil pollution	Site only (1)	Immediate (3)	Medium probability (2)	Moderate (6)	36	Moderate environmental significance	High
4. ISSUE FAUNA AND FLORA							
4.1 Degradation, destruction of habitats/ ecosystem	Site only (1)	Long term (4)	Medium Probable (2)	Moderate (8)	56	Moderate environmental significance	High
4.2 Impacts on fauna and flora	Site only (1)	Long term (4)	Medium Probable (2)	Moderate (8)	56	Moderate environmental significance	High
5. ISSUE HYDROLOGY							
5.1 Stormwater flow and drainage- Developments cause the modification of drainage patterns. Stormwater may be concentrated at certain points, increasing the velocity of flow in one area and reducing flow in another. This may contribute to flooding, soil erosion, sedimentation, scouring and channel modification downstream of the development.	Local (2)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
5.2 Impact on wetlands and water quality	Site only (1)	Immediate (1)	Low probability (2)	Minor (2)	8	Moderate environmental Significance	Medium
5.3 Pipeline leaks	Local (2)	Short term (2)	Medium probability (4)	Moderate (8)	42	Moderate environmental significance	Medium
SOCIO-ECONOMIC AND CULTURAL HISTORICAL ENVIRONMENT							
6. ISSUE AESTHETICS, LANDSCAPE CHARACTER AND SENSE OF PLACE							
6.1 Noise/ vibration	Site only (1)	Immediate (1)	Highly probable (4)	Moderate (6)	36	Moderate environmental significance	High
6.2 Visual impact	Site only (1)	Medium term (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
7. ISSUE SOCIAL WELL-BEING AND QUALITY OF THE ENVIRONMENT							
7.1 Safety and Security	Local (2)	Short term (2)	Low probability (2)	Moderate (6)	36	Moderate environmental significance	High
7.2 Job opportunities	Region (3)	Long term (4)	Highly Probable (4)	Moderate (6)	66	Moderate Environmental significance	Medium
8. ISSUE HISTORICAL ENVIRONMENT							
8.1 Destruction of cultural / heritage sites	Site only (1)	Immediate (1)	Low Probability (2)	Minor (2)	8	Low Environmental Significance	Medium
9. ISSUE INFRASTRUCTURE AND SERVICES/WASTE							
9.1 Waste	Site only (1)	Short time (2)	Medium probability (3)	Minor (2)	14	Low environmental significance	High
9.2 Pressure on existing infrastructure and services	Local (2)	Long term (4)	Low probability (2)	Moderate (6)	48	Moderate environmental significance	Medium
10. ISSUE DESIGN AND LAYOUT							
10.1 Functional design of Residential development	Local (2)	Long term (4)	Low Probability (2)	Minor (2)	16	Low environmental significance	Medium

Alternative 1: Light Industrial Development

Table 3: Assessment of Potential Impact of the Preferred Alternative

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
Construction phase							
ISSUE: AIR QUALITY							
1.1 Dust/Air pollution - The generation of fugitive dust associated with construction activities & earthworks.	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
1.2 Gas Emission	Local (2)	Long term (4)	Highly probable (4)	Moderate (6) - Situated within an area that has already been developed	60	Moderate environmental significance	High
2. ISSUE TOPOGRAPHY							
2.1 Visual Impacts Topographical features contribute to the landscape character and sense of place of an area. Visual scarring due to cutting and	Local (2)	Long term (4)	Highly probable (4)	Moderate (6) - Situated within an area that has already been developed	60	Moderate environmental significance	High

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
embankments and areas devoid of vegetation are most obvious when located on elevated areas in the landscape							
2.2 Bulk earthworks: Deep cuttings, high embankments, disposal of soil and excavations cause local changes to topography	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
3. ISSUE GEOLOGY AND SOILS							
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	Site only (1)	Medium term (4)	Highly Probable (3)	Moderate (6)	48	Moderate environmental significance	High
3.2 Soil pollution	Site only (1)	Immediate (3)	Medium probability (2)	Moderate (6)	36	Moderate environmental significance	High
4. ISSUE FAUNA AND FLORA							
4.1 Degradation, destruction of habitats/ ecosystem	Site only (1)	Long term (4)	Medium Probable (2)	Moderate (8)	56	Moderate environmental significance	High
4.2 Impacts on fauna and flora	Site only (1)	Long term (4)	Medium Probable (2)	Moderate (8)	56	Moderate environmental significance	High
5. ISSUE HYDROLOGY							
5.1 Stormwater flow and drainage- Developments cause the modification of drainage patterns. Stormwater may be concentrated at certain points, increasing the velocity of flow in one area and reducing flow in another. This may contribute to flooding, soil erosion, sedimentation, scouring and channel modification downstream of the development.	Local (2)	Long term (4)	Medium Probability (3)	Moderate (6)	54	Moderate environmental significance	High
5.2 Impact on wetlands and water quality	Site only (1)	Immediate (1)	Low probability (2)	Minor (2)	8	Low environmental Significance	Medium
SOCIO-ECONOMIC AND CULTURAL HISTORICAL ENVIRONMENT							
6. ISSUE AESTHETICS, LANDSCAPE CHARACTER AND SENSE OF PLACE							
6.1 Noise/ vibration	Site only (1)	Immediate (1)	Highly probable (4)	Moderate (6)	36	Moderate environmental significance	High
6.2 Visual impact	Site only (1)	Medium term (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High
7. ISSUE SOCIAL WELL-BEING AND QUALITY OF THE ENVIRONMENT							
7.1 Safety and Security	Local (2)	Short term (2)	Low probability (2)	Moderate (6)	36	Moderate environmental significance	High
7.2 Job opportunities	Region (3)	Long term (4)	Highly Probable (4)	Moderate (8)	88	Moderate Environmental	Medium

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence	
							significance	
8. ISSUE HISTORICAL ENVIRONMENT								
8.1 Destruction of cultural / heritage sites	Site only (1)	Immediate (1)	Low Probability (2)	Minor (2)	8	Low Environmental Significance	Medium	
9. ISSUE INFRASTRUCTURE AND SERVICES/WASTE								
9.1 Waste	Site only (1)	Short time (3)	Medium probability (3)	Minor (2)	14	Low environmental significance	High	
9.1 Pressure on existing infrastructure and services	Local (2)	Long term (4)	Low probability (2)	Moderate (6)	48	Moderate environmental significance	Medium	
10. ISSUE DESIGN AND LAYOUT								
10.1 Functional design of Industrial development	Local (2)	Long term (4)	Low Probability (2)	Minor (2)	16	Low environmental significance	Medium	

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
Operational phase							
ISSUE: AIR QUALITY							
1.1 Dust/Air pollution - The generation of fugitive dust associated with construction activities & earthworks.	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
1.2 Gas Emissions	Local (2)	Long term (4)	Medium Probability (3)	Moderate (6)	54	Moderate environmental significance	High
2. ISSUE TOPOGRAPHY							
2.1 Visual Impacts Topographical features contribute to the landscape character and sense of place of an area. Visual scarring due to cutting and embankments and areas devoid of vegetation are most obvious when located on elevated areas in the landscape	Local (2)	Long term (4)	Highly probable (4)	Moderate (6) - Situated within an area that has already been developed	60	Moderate environmental significance	High
2.2 Bulk earthworks: Deep cuttings, high embankments, disposal of soil and excavations cause local changes to topography	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
3. ISSUE GEOLOGY AND SOILS							
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	Site only (1)	Long term (4)	Highly probable (4)	Moderate (6)	54	Moderate environmental significance	High
3.2 Soil pollution	Site only (1)	Medium term (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High
4. ISSUE FAUNA AND FLORA							

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
4.1 Degradation, destruction of habitats/ ecosystem	Site only (1)	Long term (4)	Medium Probable (2)	Moderate (8)	56	Moderate environmental significance	High
4.2 Impacts on fauna and flora	Site only (1)	Long term (4)	Medium Probable (3)	High (8)	64	Moderate environmental significance	High
5. ISSUE HYDROLOGY							
5.1 Stormwater flow and drainage- Developments cause the modification of drainage patterns. Stormwater may be concentrated at certain points, increasing the velocity of flow in one area and reducing flow in another. This may contribute to flooding, soil erosion, sedimentation, scouring and channel modification downstream of the development.	Local (2)	Long term (4)	Medium Probability (3)	Moderate (6)	54	Moderate environmental significance	High
5.2 Impact on wetlands and water quality	Site only (1)	Short term (2)	Low probability (2)	Minor (2)	10	Low environmental Significance	Medium
SOCIO-ECONOMIC AND CULTURAL HISTORICAL ENVIRONMENT							
6. ISSUE AESTHETICS, LANDSCAPE CHARACTER AND SENSE OF PLACE							
6.1 Noise/ vibration	Region (3)	Long term (4)	Medium probability (3)	High (8)	80	Moderate environmental significance	High
6.2 Visual impact	Site only (1)	Medium term (3)	Medium probability (3)	Moderate (6)	42	Moderate environmental significance	High
7. ISSUE SOCIAL WELL-BEING AND QUALITY OF THE ENVIRONMENT							
7.1 Safety and Security	Local (2)	Short term (2)	Low probability (2)	Moderate (6)	36	Moderate environmental significance	High
7.2 Job opportunities	Region (3)	Long term (4)	Highly Probable (4)	High (8)	88	Moderate Environmental significance	Medium
8. ISSUE HISTORICAL ENVIRONMENT							
8.1 Destruction of cultural / heritage sites	Site only (1)	Immediate (1)	Low Probability (2)	Minor (2)	8	Low Environmental Significance	Medium
9. ISSUE INFRASTRUCTURE AND SERVICES/WASTE							
9.1 Waste	Site only (1)	Short time (3)	Medium probability (3)	Minor (2)	14	Low environmental significance	High
9.2 Pressure on existing infrastructure and services	Local (2)	Long term (4)	Low probability (2)	Moderate (6)	48	Moderate environmental significance	Medium
10. ISSUE DESIGN AND LAYOUT							

Potential Impact	Scale	Duration	Probability	Magnitude	Significance Points	Impact Significance	Confidence
10.1 Functional design of Industrial development	Local (2)	Long term (4)	Low Probability (2)	Minor (2)	16	Low environmental significance	Medium

Table 4: Assessment of potential impacts and proposed mitigation measures

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
<p>1.1 Dust /Air pollution The generation of dust associated with construction activities & earthworks</p>	<p>Moderate</p>	<ul style="list-style-type: none"> • The building area is to be physically screened off with a shade cloth fence at least 1.8m in height, to prevent dust from being blown onto the road or neighbouring properties. • Dust generation should be kept to a minimum. • Dust must be suppressed on access roads and construction areas during dry periods by the regular application of water or a biodegradable soil stabilisation agent. • Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution. • It is recommended that the clearing of vegetation from the site should be selective and done just before construction so as to minimise erosion and dust. • Should construction in areas that have been stripped not be commencing within a short period of time the exposed areas shall be re-vegetated or stabilised. Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20 m²), applying mulching or brush packing, or creating windbreaks using brush or bales. • Excavating, handling or transporting erodable materials in high wind or when dust plumes are visible shall be avoided. • All materials transported to site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials. • No burning of refuse or vegetation is permitted. 	<p>Low</p>
<p>2.1 Visual Impacts - Topographical changes</p>	<p>Moderate</p>	<ul style="list-style-type: none"> • The site area is to be physically screened off with a shade cloth fence at least 1.8m in height. • The site must be managed appropriately and all rubbish and rubble removed to a recognized waste facility. • Excess soil and bedrock should be disposed of at an appropriate facility. • A certificate of disposal must be obtained for any waste that is disposed of. • Waste must not remain on site for more than 2 weeks. • Refuse bins must be provided by the Contractor for rubbish to be used by staff. 	<p>Low</p>

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> • Excess concrete must be disposed of correctly and at an appropriate facility. • No waste may be placed in any excavations on site. • The construction camp must be located as far from other properties as possible. • Light pollutions should be minimised. • The construction footprint must be minimised. • Construction / management activities must be limited to the daylight hours between 7:00am and 5:30pm weekdays; 7:00am and 1:30pm on Saturdays. • Lighting on site is to be sufficient for safety and security purposes, but shall not be intrusive to neighbouring residents, disturb wildlife, or interfere with road traffic. • Should overtime/night work be authorized, the Contractor shall be responsible to ensure that lighting does not cause undue disturbance to neighbouring residents. • In this situation, low flux and frequency lighting shall be utilised. 	
2.2 Bulk earthworks	Moderate	<ul style="list-style-type: none"> • Avoid development on excessively steep slopes. • Avoid cutting steep embankments • Provide the necessary erosion protection measures. 	Low
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	Moderate	<ul style="list-style-type: none"> • Appropriate erosion and stormwater management structures must be installed around the construction site. • All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks. • Plant and vehicles are to be repaired immediately upon developing leaks. Drip trays shall be supplied for all repair work undertaken on machinery on site or campsite area. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. • Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. • Vehicles to be used during the construction phase are to be kept in good working condition and should not be the source of excessive fumes. • Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and banded. • All excavations and foundations must be inspected regularly. 	Low

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> Once earthworks are complete, disturbed areas are to be stabilised with mulch, straw or other approved method. 	
3.2 Soil Pollution	Moderate	<ul style="list-style-type: none"> Ensure correct position of construction caps, equipment yards, refueling depots, concrete batching plant etc. to avoid areas susceptible to soil and water pollution. Ensure appropriate handling of hazardous substances Remediate polluted soil. The maintenance of vehicles and equipment used for any purpose during the development will take place only in the maintenance yard. Any breakdown in the field requires the presence of a spill treatment team and equipment. This team must prevent and mitigate any spills that occur in this situation. Equipment used in the development process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as <i>Petro-Clean™</i>. The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. No Hydrocarbons may escape into the environment. A spill recovery kit must be on site, along with trained personnel. 	Low
4.1 Degradation, destruction or elimination of habitats/ecosystems	High – Moderate	<ul style="list-style-type: none"> No littering by construction workers is permitted. Any litter will be collected and removed off-site to a registered waste site. Stockpiles of vegetation are only to be located in areas approved by the ECO and may not exceed 2m in height. Methods of stacking must take cognisance of the possible creation of a fire hazard. No burning of stockpiled vegetation is permitted. All alien plants that occur in South Africa. None of these species may be introduced and they must all be controlled. The alien plants on site will be removed during construction. Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material). Alien vegetation re-growth must be controlled throughout the entire site during the construction period. 	Moderate

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> • Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. • Use indigenous plant species in all gardens 	
<p>4.2 Impacts on fauna and flora</p>	<p>Moderate -low</p>	<ul style="list-style-type: none"> • The contractor must ensure that no fauna species are disturbed, trapped, hunted or killed during the construction phase. • Disturbance to birds, animals and reptiles and their habitats should be prevented at all times. • The illegal hunting or capture of wildlife will not be tolerated. Such matters will be handed over to the relevant authorities for prosecution. • These species should then be relocated to a natural habitat. • During the construction phase, artificial lighting must be restricted to areas under construction only. Where lighting is required for safety or security reasons, this should be targeted at the areas requiring attention. Yellow sodium lights or Compressed Fluorescent Bulbs (CFL"s) should be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs. • Ideally fences should not restrict the natural migratory movements of certain animals. The site offers limited suitable migratory habitat. Electric fences have a negative impact on certain animal species including Bushbabies, geckoes, chameleons, bullfrogs and tortoises. Palisade fencing with adequate gaps is recommended for the conserved public open spaces. • All invader or exotic plant species must be removed from the site and disposed of at a landfill site. • All Declared Weeds and invaders must be removed from the site. • Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. 	<p>Low</p>

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> • Only indigenous floral species (preferably using endemic or local species from the area), which are water wise and require minimal horticultural practices may be used during landscaping and rehabilitation. • The body corporate should be encouraged to plant indigenous non-invasive plants. The attention of property owners must be drawn to the most recent Declared Weeds List (2001) in the <i>Conservation of Agricultural Resources Act 43 of 1983</i> and the associated penalties and prohibitions • The least environmentally damaging insecticides, to manage invertebrate pests, must be applied. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Use insecticides that are specific to the pest (species specific) in question. The lowest effective dosages must be applied. The suppliers advice should always be sought. Do not irrigate for 24 hours after applying insecticides in areas where there is a chance of contaminating water-courses or dams, fungal pathogens should be used in preference to chemical insecticides. 	
5.1 Stormwater flow, drainage and increased runoff due to hardened surfaces	Moderate	<ul style="list-style-type: none"> • Natural storm water must flow freely, either as sheet flow or where necessary in open grass swales, to allow for infiltration and retention. Natural veld grass must be left undisturbed as far as possible, to allow natural drainage. • Drainage channels must be constructed along access roads every 50m to divert runoff during construction period. • Energy dissipaters (gabions/grass bales etc.) must be installed at all potential large flow volume areas, especially during the construction phase where large areas will be open soil. • Where feasible the use of vegetated swales should be used to accommodate surface runoff, in order to increase infiltration into the soil. The swales should be vegetated with indigenous, riparian vegetation in order to provide habitat for bird life and other aquatic and semi-aquatic species. Where feasible, the swales should be provided adjacent to the property boundaries along the natural gradient • The cross-section of the swale should be parabolic or trapezoidal in shape with side slopes no steeper than 1:3, to maximise the wetted channel perimeter. It is 	Low

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<p>recommended that the longitudinal slope not exceed 2% where possible and that a maximum slope of 4% be used. Where a 4% slope must be exceeded, check dams should be provided at a minimum interval of 17m. As a rule of thumb the total surface area of the swale must be 1% of the area that drains into the swale. The surface of the swale must be carefully constructed, to avoid compaction, which will inhibit dense vegetation growth and effective runoff infiltration. The installation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.</p> <ul style="list-style-type: none"> • Maintenance of the swale should include periodic mowing of the grass (never shorter than the design flow depth of the channel). Bare areas should be re-seeded and debris and blockages regularly removed. Sediment depositions should be regularly removed from the swale, to prevent pollution of the runoff from contaminants contained therein. • Please note that the recommendations for the design of the swales are guidelines only and that the designs of the swales, sedimentation ponds and check dams must be done by a hydrological engineer. • Permeable paving should be used to reduce runoff and increase infiltration and ground water recharge. • As much as possible water should be retained on site to be reused again for irrigation and habitat creation. • Both storm water and excess effluent intended for irrigation must be purified according to DWS standards. 	
<p>5.2 Impacts Drainage line and water quality</p>	<p>High - Moderate</p>	<ul style="list-style-type: none"> • To avoid sewer pipeline leak. <ul style="list-style-type: none"> ○ Linear infrastructure such as water and sewage lines must be designed in such a way as to cope affectively with the swelling and shrinking properties associated with the vertic and melanic topsoil and well-structured subsoil horizons dominating the area east of the mall ○ All engineering specifications for the pipe section should be adhered to by the contractor. ○ Resident Engineer to oversee construction of the pipe section. ○ The municipality must implement a leak detection system and repair water leaks as soon as leaks are detected. 	<p>Low</p>

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> ○ Operational and Maintenance Plans compiled for the pipeline should be implemented by the municipality. ○ Contact details of the municipal department responsible for pipeline maintenance must be advertised to the residents of Ekangala so that leaks or water shortages can be reported as soon as possible ○ The sewerage pipelines should be constructed with heavy duty Class 34 (SABS 791), uPVC material as planned. This is mainly because steel materials are susceptible to breakage and interrupt the flows by blocking sediment materials in case of heavy flows. On the contrary, uPVC pipe will float, thus allowing water to flow on top and under it without the pipe breaking ○ A walk-through survey should be undertaken long the entire pipeline route 6 months after completion of construction activities and then again at yearly intervals to survey for signs of subsidence along the pipeline route. Any subsidence should be immediately repaired. <ul style="list-style-type: none"> ● Utilize proper waste management practices. ● Cover any wastes that are likely to wash away or contaminate storm water ● Ensure handling, transport and disposal of hazardous substances are adequately controlled and managed. ● Provide containment areas for potential pollutants at construction camps, refueling depot and concrete batching plants. ● Fuel storage shall be within the construction camp, and within a bunded area with at least 110% of the volume of the amount of fuel stored, as per agreement and approval of the ECO. No storage of any fuel will be allowed on site, other than what is approved by the applicable provincial government departments. ● Drip trays (min 10cm deep) are to be placed under all vehicles if they stand for more than 3 hours. The drip tray must be able to contain 110% of the total amount/ volume of oil in the vehicle. Spill kits must be available in all 	

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<p>vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible with the vehicles to which they are dispensing. In addition the dispensing devices must be fitted with the necessary valves/ apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped.</p> <ul style="list-style-type: none"> • Cement mixing shall be done only at specifically selected sites. After construction activities ended the cement shall be crushed and removed from the site. This mixing area shall then be ripped and rehabilitated. • Limit the construction footprint and support areas (e.g. temporary access servitudes) as far as possible; • No indiscriminate destruction of wetland vegetation should be allowed; • Make use of geotextiles within disturbed areas of steeper topography to avoid erosion through surface water runoff; • Stormwater management along informal roadways to reduce gulley erosion formation; • Construct within the low-flow (dry) period; • Correct site reinstatement and landscaping following any disturbances will abate channel and gulley formation; • Proper re-instatement of soils and landscaping to limit erosion gulley formation. • Soil layers within wetland zones are to be stored in their respective layers and replaced after entrenching has occurred in reverse order i.e. the original soil layering must be retained should entrenching within wetland habitat found to be necessary. Provision for this should be detailed within a rehabilitation plan and the site reinstatement should be audited by suitably qualified personnel. • No dumping of any excess building material or other wastes or litter should be allowed within any wetland and buffer areas; • Exotic vegetation recruitment was observed as an impacting feature within the wetlands. It is recommended that an exotic vegetation management strategy be developed as part of a rehabilitation plan to manage the present and future emergent exotic vegetation; • Subsistence hunting or harvesting of fauna or flora within the wetland zones should be prohibited; 	

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
6.1 Noise/ vibration	High	<ul style="list-style-type: none"> • Noise levels shall be kept within acceptable limits, and construction crew must abide by National Noise Laws and local by-laws regarding noise. • If work is to be undertaken outside of normal work hours permission, must be obtained. Prior to commencing any such activity the Contractor is also to advise the potentially affected neighbouring residents. Notification could include letter-drops. • No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. • Construction / management activities involving use of the service vehicle, machinery, hammering etc, must be limited to the hours between 7:00am and 5:30pm weekdays; 7:00am and 1:30pm on Saturdays; no noisy activities may take place on Sundays or Public Holidays. • Activities that may disrupt neighbours (e.g. delivery trucks, excessively noisy activities etc) must be preceded by notice being given to the affected neighbours at least 24 hours in advance. • Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc) must be used as per operating instructions and maintained properly during site operations 	Low
6.2 Visual Impact	Low	<ul style="list-style-type: none"> • The site is in an extremely disturbed state with existing properties that are not well maintained. • Structures that are to be erected should be aesthetically pleasing and blend into the area as far as possible to minimise the visual impact. • Buildings must be maintained in good standing at all times 	Low
7.1 Safety and Security	Moderate	<ul style="list-style-type: none"> • A fence will be constructed around the site prior to commencement of construction • The Applicant will be in contact with the local security firms. • Signs should be erected on all entrance gates indicating that no temporary jobs are available, thereby limiting opportunistic labourers and crime. • The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) and the National Building Regulations • All structures that are vulnerable to high winds must be secured (including toilets). 	Low

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<ul style="list-style-type: none"> • Potentially hazardous areas such as trenches are to be cordoned off and clearly marked at all times. • The Contractor is to ensure traffic safety at all times, and shall implement road safety precautions for this purpose when works are undertaken on or near public roads. • Necessary Personal Protective Equipment (PPE) and safety gear appropriate to the task being undertaken is to be provided to all site personnel (e.g. hard hats, safety boots, masks etc.). • All vehicles and equipment used on site must be operated by appropriately trained and / or licensed individuals in compliance with all safety measures as laid out in the Occupational Health and Safety Act (Act No. 85 of 1993) (OHSA). • An environmental awareness training programme for all staff members shall be put in place by the Contractor. Before commencing with any work, all staff members shall be appropriately briefed about the EMP and relevant occupational health and safety issues. • All construction workers shall be issued with ID badges and clearly identifiable uniforms. • Access to fuel and other equipment stores is to be strictly controlled. • Emergency procedures must be produced and communicated to all the employees on site. This will ensure that accidents are responded to appropriately and the impacts thereof are minimised. This will also ensure that potential liabilities and damage to life and the environment are avoided. • Adequate emergency facilities must be provided for the treatment of any emergency on the site. • The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. Emergency contact numbers are to be displayed conspicuously at prominent locations around the construction site and the construction crew camps at all times. • The Contractor must have a basic spill control kit available at each construction crew camp and around the construction site. The spill control kits must include absorptive material that can handle all forms of 	

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<p>hydrocarbon as well as floating blankets / pillows that can be placed on water courses.</p> <ul style="list-style-type: none"> • The Contractor shall make available safe drinking water fit for human consumption at the site offices and all other working areas. • Washing and toilet facilities shall be provided on site and in the Contractors camp. • Adequate numbers of chemical toilets must be maintained in the Contractors camp to service the staff using this area. At least 1 toilet must be available per 20 workers using the camp. Toilet paper must be provided. • The chemical toilets servicing the camp must be maintained in a good state, and any spills or overflows must be attended to immediately. • The chemical toilets must be emptied on a regular basis. • The Contractors site must be located on the high side of the site so any leakages or spillages will be contained on site. • HIV AIDS awareness and education should be undertaken by all Contractor staff. 	
7.2 Economic opportunities	Low	<ul style="list-style-type: none"> • Make use of local labour. • Provide clear and realistic information regarding employment opportunities and other benefits for local communities in order to prevent unrealistic expectations. • Provide skills training for construction workers. • Provide job opportunities at one of the few areas that will provide work in the area. • Skills training and transfer. 	High positive
8.1 Destruction of cultural / heritage sites No sites of cultural or heritage importance were found during the Heritage impact Assessment	Low	<ul style="list-style-type: none"> • Ensure that construction staff members are aware that heritage resources could be unearthed and the scientific importance of such finds. • Ensure that heritage objects are not to be moved or destroyed without the necessary permits from the South African Heritage Resources Agency (SAHRA) in place. 	Low
9.1 Waste	Low	<ul style="list-style-type: none"> • Adequate number of waste disposal receptacles are to be positioned at strategic locations within the development. • Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks and these points should not be 	Low

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		<p>located in areas highly visible from the properties of the surrounding land-owners/tenants/in areas. These areas should also be already disturbed. The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the relevant Authority.</p> <ul style="list-style-type: none"> • No waste materials shall at any stage be disposed of in public areas or adjacent properties, or where the wind direction will carry bad odours across the properties of adjacent tenants or landowners. The piling of any material that could rot and release unpleasant smells into the air will not be permitted. Burning of waste is not permitted. Spot fines of up to R100 may be administered if the employees are found to be polluting the area in any way. • Several waste bins must be provided and clearly marked or colour coded according to industry standards to allow for recycling of waste into <ul style="list-style-type: none"> ○ Paper ○ Biodegradable ○ Glass ○ Plastics ○ General • No burning of waste. • Wayleaves required for all disposed waste. • The waste bins shall be cleared by municipal services on a weekly basis. During municipal strikes special arrangements must be made to have the waste removed via private waste removal services. 	
9.2 Existing infrastructure	Medium	<ul style="list-style-type: none"> • Integrity of existing services to be ensured. • Adherence to Service Report • Adherence to Traffic Impact Study requirements. • The service systems are to be designed according to the minimum requirements of and submitted to the City of Ekurhuleni Metropolitan Municipality for approval. No construction activities must commence on site prior to obtaining the necessary approval. • Underground services should be designed in such a way so as to require minimum maintenance to avoid disturbance of the underground and superficial environment. 	Medium-low

Potential Impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
10.1 Functional design	Medium	<ul style="list-style-type: none"> Areas where services infrastructure has been installed must be rehabilitated with indigenous vegetation on completion. Installation of alternative measures, such as low energy and water consuming technology. 	High positive

NO GO:

No-Go Alternative

This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the Competent Authority decline the application, the 'No-Go' option will be followed and the status quo of the site will remain.

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Annexure G: Specialist Studies
Annexure G1: Geotechnical Assessment
Annexure G2: Geohydrology Impact Assessment
Annexure G3: Vegetation Ecological Assessment
Annexure G4: Vertebrate Habitat Assessment
Annexure G5: Wetland Assessment
Annexure G6: Heritage Impact Assessment

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

• Assumptions

In undertaking this BAR, it has been assumed that:

- All requirements from the local authority will be met by the proponent as a separate undertaking to the EIA process;
- The information provided by the proponent and the project planning team / specialists is accurate and discloses all information relevant to EIA, proposed project and possible impacts.
- Where supporting or baseline information was unavailable, a precautionary approach is adopted.

• Gaps in Knowledge

All specialist studies are conducted to certain levels of confidence, but in all instances known methodologies have been used and confidence levels are generally high. This means that in most cases the situation described in the pre-construction environment is accurate at high certainty levels, but there exists a low probability that some issues have not been identified during the studies. Furthermore, statistical analyses and mathematical models are merely tools which assist the researcher in assessing field observations and have innate assumptions which can reduce objectivity of the results obtained. This is not seen as a major flaw but should always be considered when assessing results.

Gaps in knowledge known to LEAP at this time, includes:

- Predicting the impact to the socio-economic and bio-physical environment for the life-cycle of the proposed project (i.e. 25-50 years) although it is expected to be positive since the social contribution will be high.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING & CLOSURE PHASE – NOT APPLICABLE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

The decommissioning or closure of the proposed project is not anticipated.

Proposal

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented

Alternative 1

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented

Alternative 2

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Not Applicable

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

Not Applicable

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Cumulative impacts are included in the detailed impact assessment included in Appendix I but in summary, the following impacts have been considered as cumulative for each phase of development:

Construction Phase:

- Dust emissions
- Emissions from vehicles and equipment (CO₂, NO_x, SO_x, VOC's etc.)
- Noise increases due to construction activities
- Surface water run-off • Disturbance of natural system
- Construction waste
- Loss of topsoil
- Loss of land capability
- Alteration of topography
- Soil erosion
- Electricity consumption
- Water consumption
- Fuel consumption
- Raw materials consumption
- Loss of habitat
- Degradation of ecological systems
- Disruption of natural corridors
- Traffic disruptions
- Decline/increase in economy
- Employment

Operational Phase:

- Dust emissions
- Emissions from vehicles and equipment (CO₂, NO_x, SO_x, VOC's etc.)
- Noise increases due to construction activities
- Surface water run-off
- Disturbance of natural system
- Soil erosion
- Electricity consumption
- Water consumption
- Fuel consumption
- Traffic disruptions
- Decline/increase in economy
- Employment

It should be noted that even taking into account their cumulative nature, these impacts could be satisfactorily mitigated. All the impacts with the potential to have cumulative impacts on the environment is evaluated in the above extraction of the Impact Assessment. As defined in the introduction of this section (4), Cumulative impacts are those impacts that are created as a result of the combination of impacts of the proposed project, with impacts of other projects or operations, to cause related impacts, as well as a single impact over a certain time period which then results in the accumulation of negative/ positive impacts making the significance higher. These impacts occur when the incremental impact of the project, combined with the effects of other past, present and reasonably foreseeable future projects, are cumulatively considered. The assessment of cumulative impacts on a site-specific basis is however complex especially if many of the impacts occurs on a much wider scale than the site currently

being assessed and evaluated. Through proper management of the EMPr and continual monitoring regarding the identified impacts will result in the, mineralisation of these cumulative impacts.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal

Proposal The following provides the rationale for the EAP's reasoning that the project should be grant positive Environmental authorisation:

- The proposed development will not have a detrimental impact on other development in the area.
- The Applicant has the capacity and resources to adequately implement the mitigation measures stipulated in the EMPr;
- The application site is within the urban edge and will restrict urban sprawl and thus adheres to the spatial objective to protect valuable agricultural land outside the urban edge.
- There are no sensitive social receptors (surrounding landowners) located in close proximity to the site.

Alternative 1:

Not Applicable

Alternative 2

Not Applicable

No-go (compulsory)

This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the GDARD decline the application, the 'No-Go' option will be followed and the status quo of the site will remain.

3. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

In accordance with GN No. 982, the Environmental Impact Phase is aimed at identifying and assessing potential impacts caused by the proposed development. The ability to mitigate any of the identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMP) for consideration by I&APs and ultimately by the GDARD.

Table 4: Proposed Activity: Impact Summary

	Before Mitigation	After Mitigation
BIOPHYSICAL ENVIRONMENT		
1.1 Dust/Air pollution - The generation of fugitive dust associated with construction activities & earthworks.	Moderate	Low
2.1 Visual Impacts: Topographical features contribute to the landscape character and sense of place of an area. Visual scarring due to cutting and embankments and areas devoid of vegetation are most obvious when located on elevated areas in the landscape.	Moderate	Low
2.2 Bulk earthworks: Deep cuttings, high embankments, disposal of soil and excavations cause local changes to topography	Moderate	Moderate
3.1 Soil erosion, loss of topsoil, deterioration of soil quality	High	Low
3.2 Soil pollution (due to hydrocarbon spillages)	Moderate	Low
4.1 Degradation, destruction of habitats/ ecosystem and impact on connectivity – classified as a Ecological Support Areas	High	Moderate
4.2 Impacts on fauna and flora	Moderate	Low
5.1 Stormwater flow and drainage- Developments cause the modification of drainage patterns. Stormwater may be concentrated at certain points, increasing the velocity of flow in one area and reducing flow in another. This may contribute to flooding, soil erosion, sedimentation, scouring and channel modification downstream of the development.	Moderate	Low
5.2 Impact on water quality (due to hydrocarbon spillages)	Moderate	Low
SOCIO-ECONOMIC ENVIRONMENT		
6.1 Noise/ vibration	Low	Low
6.2 Visual impact on adjacent residents and motorists	Low	Low
7.1 Safety and Security	Low	Low
7.2 Employment opportunities	Moderate (Positive)	High (Positive)
8.1 Destruction of paleontological resources	High	Moderate
9.1 Waste	Low	Low
9.2 Existing infrastructure	Low	Low
10.1 Functional design	Low (Positive)	High (Positive)
CUMULATIVE IMPACT		
Transformation of natural habitat caused by the urban sprawl.	low	low

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

The following spatial development tools were applied and/or considered:

- SPLUMA Bylaws of COT
- The Gauteng Draft Red Data Policy
- The Gauteng Draft Ridges Policy
- Protection of Agricultural Land in Gauteng Revised Policy (June 2006)
- City of Tshwane Municipality Spatial Development Framework (SDF)
- City of Tshwane Metropolitan Municipality's Open Space Framework

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

YES	NO
-----	----

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

Not Applicable

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

It is recommended that the Proposed Activity is authorized.

The recommendations to include, if the authorisation of the Proposed Activity is granted, are amongst others:

General:

- The monitoring of the construction site must be carried out by a professionally qualified Environmental Compliance Officer (ECO) with proven expertise in the field so as to ensure compliance to the Environmental Management Programme (EMPr).
- Mitigation measures listed in the BAR as well as the EMPr must be implemented and adhered to rehabilitated as soon as possible and revegetated with indigenous species.
- Recommendations from the specialists must be implemented .
- The species should be indigenous to the specific area and the composition of the vegetation should reflect the natural vegetation.
- The species used in rehabilitation of the proposed development should be indigenous to lessen the impact of exotic plant species on existing fauna and flora systems.

9. THE NEEDS AND DESIRABILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

Need

Land as scare resource

Developed land inside the urban edge is a scare resource which should be put to its highest and best productive use. The forward planning policies for the municipality are clear on the need to look at Smart Growth along with intensification and densification in key locations, such as higher order roads and long public transport routes or key intersections. The site sponsors a high degree of accessibility in both regional and local context.

Market demand

In order to determine the need and necessity for a new shopping centre on the development site and the magnitude a market study was completed by Demacon Market Studies.

The findings of the study based on household surveys undertaken in the primary catchment area of the proposed new shopping centre revealed a host of information, the following deserves mention:

- 98% of respondents indicated that the retail offering in Ekangala is inadequate and 100% indicated that it is necessary for a new shopping centre.
- The research indicated that 83.3% of respondents did their shopping in Bronkhorstspuit with the main reasons for not shopping locally being that there are only Spaza shops, the Usave in Ekangala is small and overcrowded and that there is no shopping centre in Ekangala (i.e. there are very limited offerings locally).

Commercial / retail land-uses

The need for commercial land-use activities and motor-related workshops showrooms and dealerships is similarly closely related to business confidence and the stage of the economy in its growth cycle, as well as to allow for flexibility in terms of tenants that can be accommodated here.

Vehicle sales have recovered well post Covid 19, confirming a growing trend of demand increases, both in terms of family and commercial vehicles. The latter is indicative of an increase in commercial and related business activities which again supports the view of a need to provide for the spatial requirements of commercial land-use activities.

Retail returns are furthermore highest in rural and peri-urban areas such as Ekangala and retail activity has shown improvement in 2021 and so far in 2022. Landlords have been experiencing positive trends in small business interest as well as new business startups. Since 73% of Ekangala residents do not currently do their retail shopping locally most commute to Bronkhorstspuit, which is a travelling distance of approximately 11 – 30km for retail purposes, thus it is a necessary to provide for this need.

Employment opportunities

The dire need for employment in South Africa is not a new concept and has worsened in the last few years due to the negative effects of the Covid-19 pandemic. The creation of the opportunity for all sectors of society to find livelihoods. The creation of the opportunity for all sectors of society to find livelihoods in employment opportunity in proximity to their place of residence is undoubtedly high on the agenda in all sectors of Government policy. The proposed Shopping Centre will not only provide an anchor for economic growth in the area but will assist in the creation of no less than 634 jobs as indicated in the Demacon Market study.

Economic growth

The need for economic growth of the local economy of the City of Tshwane is crucial for its success and for the prosperity of its people. The proposed development is foreseen to be able to generate around R400 million turnover per annum and will contribute 2,3% to the City of Tshwane's economy, 0,6% to the Gauteng Province and 0,2% to the National economy. This is a substantial contribution in terms of a single development and the City of Tshwane Metropolitan Municipality cannot deny the dire need for such economic injection in the particular community the under the current post-Covid 19 economic climate.

Desirability

In terms of the City of Tshwane Metropolitan Municipality's Regional Spatial Development Framework (2018), the site is located in an area identified as a local node within the official Urban Edge. A local node is briefly defined as a place where both public and private investment tends to concentrate. Local Nodes are usually associated with major road intersections, or with public transport facilities such as railway stations and taxi ranks.

The proposed new shopping centre development at the north-eastern corner of the two high-order roads will serve to expand on the mixed-use nature of the development node. It will serve to strengthen the nodal concept which is currently anchored by the Ekandustria industrial township development located to the south west of Ekangala.

Local determinants**Accessibility**

The development site sponsors a high degree of accessibility in both regional and local context. This is facilitated by the following high-order roads in direct vicinity:

- The D670 /R568 /K175 Provincial Road abutting the township to its west, traversing the area in a north/south-direction, which serves as a link between Kwa-Mhlanga and Allemansdrift (both in Mpumalanga) further north and Rethabiseng, Zithobeni and Bronkhorstspuit, the N4 (National Road) and the R25 Provincial Road to the south.
- The R460 Provincial Road to the southwest which becomes municipal road Isitjiaba Street, which connects the site to the west of the R513 Provincial Road and then Cullinan and Ekangala towards the east of the Mpumalanga Border.

All roads are in a fair condition and entirely suitable for vehicular access to the erven in the township.

In terms on public transport the applicant has determined that the site is located along an existing taxi route which operates 7 days a week. This further enhances the accessibility of the site.

From a pedestrian and non-motorised transportation viewpoint, it is evident by the well worn tracks across the Property that the site is accessible to the wider area for pedestrians and cyclists.

Proximity

The proximity of the site to Ekangala and Ekandustria holds the advantage of agglomeration economies, whereby existing land-use activities in these areas and future land-use activities in the shopping centre which are functionally linked will enjoy economic rewards for being located close to each other. Proximity means short travelling distances at lower costs to business and households.

Exposure / Visibility

The success of a shopping centre and associated commercial activities is highly dependent on its exposure to prospective clientele. It is therefore important that it be visible from all major roads in the area for maximum enhancement of its economic viability and long-term sustainability.

In this regard the development site is well-situated and enjoys visibility / exposure from the adjacent D670 / R568 / K175 Provincial Road and Isitjiaba Street.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED (CONSIDER WHEN THE ACTIVITY IS EXPECTED TO BE CONCLUDED)

10 years

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMPr is to be attached to this report as an Appendix

EMPr attached

YES

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

- Annexure A1:** Location Map
- Annexure A2:** Site Development Plan
- Annexure B:** 8 Directional Photographs
- Annexure C:** Facility illustration(s) – Not Applicable
- Annexure D:** Route Position Information – Sewer Layout
- Annexure E:** Public Participation Report
- Annexure F:** Proof of other Authorisations- Not Applicable
- Annexure G:** Specialist Studies
- Annexure G1:** Geotechnical Assessment
- Annexure G2:** Geohydrology Impact Assessment
- Annexure G3:** Vegetation Ecological Assessment
- Annexure G4:** Vertebrate Habitat Assessment
- Annexure G5:** Wetland Assessment
- Annexure G6:** Heritage Impact Assessment
- Annexure H:** EMPr
- Annexure I:** Rehabilitation Plan
- Annexure J1:** Town Planning Motivational Memorandum
- Annexure J2a:** Bulk Services Report
- Annexure J2b:** Civil Engineering Designs and Details
- Annexure J2c:** Water Supply Confirmation Letter
- Annexure J3a:** Electrical Reticulation Layout
- Annexure J3b:** Eskom Confirmation Letter
- Annexure J4:** Traffic Impact Assessment
- Annexure J5:** Market Retail Study
- Annexure K:** Department of Forestry, Fisheries and Environment Screening Tool
- Annexure L:** EAP CV
- Annexure M:** A3 Plans

CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been complete