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**FINAL ENVIRONMENTAL IMPACT ASSESSMENT
 REPORT (EIA_r) FOR THE
 PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT
 ON ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
 EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
 UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN
 PROVINCE OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

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DEVELOPER:

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CLIENT:

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COMPETENT AUTHORITY:

	<p>EDTEA UMGUNGUNDLOVU REGION KZN 8 Warwick Road, Cascades Pietermaritzburg, 3202</p>
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May 2023

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EXECUTIVE SUMMARY

Sinohydro was appointed by Msunduzi Local Municipality through the EIAr developers Verern Builders to act as independent EAP's, thus managing the EIA process for the proposed Smero/Caluza Low-Cost Housing Development.

The site is located 21km south west of the Pietermaritzburg city center and is accessed via two different points as the site is split by an in accessible cliff edge. Access to the upper portion of the site is via Moses Mabhida Road, proceeding onto Selby Msimang Rd and at about 2.84km from Edendale Mall robots turning right into Caluza Road proceeding onto Sweetwaters main road till about 7.62km, then turning left on an unnamed road for about 2.9km leading to the project's northern boundary. Access to the lower portion of the project site is accessed through Moses Mabhida Road, proceeding into Selby Msimang Rd and at about 2.84km from Edendale Mall robots, turning right into Caluza Road and at about 0.77km turning, left into Mbanjwa road then proceeding for about 1.8km to the project's southern boundary. The project covers about 103.49Ha and will cater for about 2000 units

The National Environmental Management Act (NEMA), Environmental Impact Assessment (EIA) regulations of 2014 (as amended), identify two separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment process is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process is necessary for those activities, which are identified as having more significant negative detrimental impact on the environment.

The proposed Smero/Caluza Low-Cost Housing Development application follows the Scoping/EIA process as per the National Environmental Management Act (No: 107 of 1998), EIA Regulations of 2014 (as amended). The applicant for the proposed Low-Cost Housing Development is the Msunduzi Local Municipality. Please note that this project was being handled by SPHE Consulting Services (Pty) Ltd up to Final Environmental Impact Assessment Report (EIAr) stage that was submitted to EDTEA. The client decided to change the EAP from SPHE Consulting to Sinohydro to finalise the final EIAr. The following sections summarise the scoping and the EIA activities that have been undertaken. Please

note the activities include both activities done by SPHE Consulting and Sinohydro Consulting. Please also note that some of the information will be referred to the previous EIA report that was submitted to EDTA and circulated to interested and affected parties as well as other governmental departments. Most of the attachments that will be included in this document are those that were not included in the previous report.

PHASE 1: SCOPING PHASE/ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

As part of the EIA application process, an application was submitted to the Competent Authority on the 16th August 2022, the proposed Low-Cost Housing Development was allocated the EDTEA reference number: **DC22/0017/2022**.

A newspaper advertisement detailing information about the project and the EIA process as well as calling for the registration of I&AP's, was placed on the 15th of April 2022 in the Msunduzi Eyethu newspaper, which is the regional newspaper for the Midlands area. The advertisement provided I&APs 28 days to register and to submit their comments in writing to SPHE Consulting. The closing date for registration was therefore on the 26th of May 2022 See Appendix D of SPHE Consulting EIAr. An A2 size notice board detailing information about the project and the EIA process was erected on site at a recognised public area on 05th of June 2022.

PHASE 2: ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAr)

This report represents the EIAr for the project and builds on the findings of the Scoping Phase. The EIAr contains all information that is necessary for the competent authority to consider the application and to reach a decision. It details the process followed during the EIA Phase including details of the Public Participation Process and an assessment of each identified potentially significant impact. An Environmental Management Programme (EMPr) for the mitigation of impacts is provided within this EIAr. The EMPr will attempt to mitigate the construction and operational related impacts of the proposed housing project. The project public meeting was conducted on the 05th of June 2022. The EIAr was made available to registered I&APs for a 30-day comment period, beginning on 23rd of June 2022 and ending on the 03rd of August 2022. All comments received from I&APs during this public review period were included in the EIAr that was submitted to EDTEA, By SPHE

Consulting. This current process is aimed at addressing the gaps that were identified in the previous submitted EIAr.

Environmental Requirements

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. The Department of Environmental Affairs (DEA) is responsible for enforcing the national law known as the NEMA. KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA) is granted these authorities in KZN.

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation (in line with a full EIA) is required for the following listed activities for the proposed housing development:

Government Notice R327 (Listing Notice 1) listed activities:

9. The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;

- (i) with an internal diameter of 0,36 metres or more; or*
- (ii) with a peak throughput of 120 litres per second or more; excluding where;*
 - a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or*
 - b) where such development will occur within an urban area.*

10. The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge, or slimes

(iii) with an internal diameter of 0,36 metres or more; or

(iv) with a peak throughput of 120 litres per second or more; excluding where;

(a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or

(b) where such development will occur within an urban area.

19. The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse;

(a) will occur behind a development setback;

(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or

(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

27. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for;

(i) the undertaking of a linear activity; or

(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R325 (Listing notice 2) listed activities:

15. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;

- (i)) the undertaking of a linear activity; or*
- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.*

Government Notice R324 (Listing notice 3) listed activities:

- 4.** The development of a road wider than 4 metres with a reserve less than 13.5 metres

- 12.** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

Need and Desirability

Housing is a national need, including in the Msunduzi Local Municipality. The Municipality aims to promote socioeconomic development through the eradication of backlogs associated with housing, water and sanitation, and electricity, as well as improve basic services within Smero and Caluza areas. In order to meet the needs, the Council resolved that a project business plan be submitted to Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA) for this proposed development. As per the Msunduzi Integrated Development Plan key performance indicators includes the provision of infrastructure and basic service through securing suitable land for human settlement projects. The Municipality Spatial Development framework guides and inform all decisions made by the Municipal council on spatial development and land use management in the area to which it applies (Msunduzi Local Municipality, Spatial Development Framework 2009). The proposed development is located within an area that is already set aside and subdivided for low-cost housing in in line with the SDF. The provision of affordable housing remains a high priority for the Municipality which aims to restore the dignity of disadvantaged people by providing shelter and access to basic human rights as enshrined in the Constitution of South Africa. This low-cost housing will accommodate previously disadvantaged individuals who cannot afford houses; and it will create employment opportunities in both the construction and operational phases.:

Site Description

The Msunduzi Local Municipality is proposing a low-cost housing project, consisting of approximately 2000 houses on Remaining Extent of Erf 10 000 covering approximately 103.49ha in Pietermaritzburg, Msunduzi Local Municipality. The proposed site is situated on Municipal land, covering portions of Smero and Caluza areas. Approximately 29ha (28%) of the proposed site is still covered in indigenous vegetation although in a poor condition due to the impact of anthropogenic activities, whereas the remainder is transformed / disturbed as a result of informal settlements, in some areas already serviced with bulk services. Project center coordinates are 29°38'12.50"S, 30°17'32.06"E

Alternatives

Site Alternatives

The proposed site is the only viable site available at this stage and the only site that was investigated in this application. This is because of the limited land available for Msunduzi Municipality. The site alternatives were then scaled to development of areas which have house already and development of areas with houses and additional open areas which are suitable for development with minimal interference with the indigenous forest. The current land use, for both Smero and Caluza , is in line with the nature of the proposed development. Most sections of Smero and Caluza are already developed with residential settlement. The low-cost housing development would not only provide much needed housing, social services, and community facilities, but also enable the area to be serviced more economically.

Table 1: Candidate Sites Screening - Location

Item	Option	Size (Ha)	High visibility - Aesthetic (Public Acceptance)	Displacement of local inhabitants (Public Acceptance)	Accessibility & Transportation (Economic factor)	Adjacent Land use & (Public Acceptance)	General Environmental Sensitivity (Environmental factor)	Comments
1	Option 1 Preferred Area with households and additional open area	103.49 ha	It is in built up areas already with houses	No displacement will happen but more houses will be built	Area already linked with tarried roads to PMB CBD	Settlements and grazing	There is an indigenous vegetation at the core, this option encroaches more into the forest	The site has more space It will accommodate more house It will also leave some grazing space It encroaches more into the forest
3	Option 2 Area with households only	Less than 103.49 ha	It is in built up areas already with houses	No displacement but less houses will be built	Area already linked with tarried roads to PMB CBD	Settlements and grazing	There is an indigenous vegetation at the core, this option encroaches less into the forest	This option will leave a bigger buffer space from the forest, Will have less housing space It will also leave some grazing space
4	Option 3 No-Go Option	0	N/A	N/A	N/A	N/A	N/A	This is not preferred since it will not solve the housing shortage in Pietermaritzburg

RANKING OF CANDIDATE SITES

The site selection will be summarised into economic, environmental and public acceptance

Table 2: Summary of site selection

Item	Candidate site	Economic Criteria	Environmental Criteria	Public Acceptance Criteria
	Option 1 - Preferred	<ul style="list-style-type: none"> ➤ The size is 103,49ha with greater part already settled with some structure not habitable. ➤ 28% of the area is covered with indigenous forest and will not be built on. ➤ Will have more housing space meaning it will more impact on housing backlog reduction ➤ The site is linked to PMB CBD by tarred roads from all sides ➤ There are schools in the area and nearby areas ➤ The development will also help the surrounding areas get services 	<ul style="list-style-type: none"> ➤ Vegetation cover is both grass, and trees but there will be minimal interference with trees ➤ No animals of interest seen during site visit by Biodiversity specialist, big or small ➤ Groundwater -there were no signs of high-water table in the areas to be developed as indicated by aquatic studies although a wet land was identified in 500m radius ➤ Surface water- the place is on a ridge with two rivers outside the developmental boundary 	<ul style="list-style-type: none"> ➤ The site is in built up areas and is a housing project with will blend and in some areas upgrade the current housing outlook ➤ The indigenous forest will not be disturbed ➤ The housing shortage will make the development highly welcomed by residences

Option 2- Not preferred		<ul style="list-style-type: none"> ➤ The total area remains 103,49ha with houses built only on existing developed stands. ➤ Will have less housing space meaning it will less impact on housing backlog reduction ➤ The site is linked to PMB CBD by tarred roads from all sides ➤ There are schools in the area and nearby areas ➤ The development will also help the surrounding areas get services 	<ul style="list-style-type: none"> ➤ Vegetation cover is both grass, and trees but there will be no interference with trees ➤ No animals of interest seen during site visit by Biodiversity specialist, big or small ➤ Groundwater -there were no signs of high-water table in the areas to be developed as indicated by aquatic studies although a wet land was identified in 500m radius ➤ Surface water- the place is on a ridge with two rivers outside the developmental boundary 	<ul style="list-style-type: none"> ➤ The site is in built up areas and is a housing project with will blend and in some areas upgrade the current housing outlook ➤ The indigenous forest will not be disturbed ➤ The housing shortage will make the development highly welcomed by residences
Option 4 No Go option	N/A	N/A	N/A	N/A

NB: due to the facts summarised in the 3 tables above, option one (1) the preferred site especially considering its size. Therefore, all other investigations will be done on option 1 and the No-Go option not considered since it will not solve the housing problem in Pietermaritzburg which is a blow to the community of Smero/Caluza in Pietermaritzburg

Layout Alternatives

The layout alternatives are limited to the fact that the area is already settled as an informal settlement and the layout must follow the existing layout in most areas. This low-cost housing development will, in terms of the Municipality IDP redress the number of informal settlements and address the housing shortage within the Municipal area.

Activity Alternatives

Activity 1: Housing development

Alternatives are limited with few feasible alternatives besides residential development. Due to the need for housing in the Msunduzi Local Municipality, the housing development and associated infrastructure on the property is therefore the most activity considered.

Activity 2: Grazing Area

This was considered but outweighed by the housing development considering the site is in peri urban where most people are no longer keeping livestock but in need of accommodation. Please note that the steep and semi steep areas together with other areas unsuitable for housing development will be left as grazing areas for the few animals in the area.

Activity 3: Farming

Due to the terrain and also shift from farming to housing demand in peri urban areas, farming was outweighed by housing development

No-Go Alternative

This is the option of not developing the proposed housing development. Although the no-go alternative may result in no potential negative environmental impacts, the direct and indirect socio-economic benefits (such as housing shortages as well as

loss of potential employment and skills-development opportunities) associated with constructing residential developments will not be realised. The need for additional housing opportunities in the Msunduzi Local Municipality will not be realised. The No-go Alternative would also mean that the land would remain vacant. Vacant land may result in more un-serviced informal settlement development; illegal dumping; vegetation clearing for firewood; and alien plant invasion.

Tasks to be undertaken during the EIA Phase

- The following tasks must still be undertaken during the EIA phase of the process:
- Compile Draft EIAR for public comment based on specialist information;
- Distribute and/or make the Draft EIAR available to registered Interested and Affected Parties for viewing and comment;
- Receive comments on Draft EIAR.
- All comments received and responses to the comments will be incorporated into the Final EIAR; and
- Preparation of a Final EIAR for submission to EDTEA for consideration and decision-making.

Specialist Studies Summary

Although the DEA National Screening Tool may have indicated a number of specialist studies with 4 themes having a high sensitivity as shown in Table 2 below.

Table 3: DEA Screening Tool - Environmental Sensitivity Table

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme	X			
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X

Civil Aviation Theme			X	
Defence Theme				X
Paleontology Theme	X			
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

After a thorough ground truthing only specialist studies which were found necessary were carried out and these are discussed below.

Geo-technical Assessment (**Appendix D1**)

Biodiversity Impact Assessment (**Appendix D2**)

Paleontological Impact Assessment (**Appendix D3**)

Wetland Impact Assessment (**Appendix D4**)

Biodiversity Impact Assessment

A biodiversity study was carried out by Mondise Environmental Services. They found no species of conservation concern on site. Based on their findings and summary table of impacts, the impacts of the proposed project on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. The construction is recommended and mitigations as well as recommendations outlined in biodiversity report need to be adhered to. If the measures and recommendations are adhered to, then it is not expected that there will be any unacceptable impacts on the vegetation of the receiving environment.

Paleontological Impact Assessment

Based on the report produced by Prof JF Durand, The Heritage Act of South Africa stipulates that fossils and fossil sites may not be altered or destroyed. The report indicated that based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the covering soils and sands of the Quaternary. There is a small chance that fossils may occur below ground in the shales of the early Permian Vryheid Formation so a Fossil

Chance Find Protocol should be added to the EMP. If fossils are found by the developer, contractor, environmental officer, or other responsible person once excavations for amenities, roads and foundations have commenced then they should be rescued and a paleontologist called to assess and collect a representative sample. The impact on the paleontological heritage would be low so, as far as the paleontology is concerned, the project should be authorised

Wetland Impact Assessment

According to Wetland Identification and Assessment Specialist Study carried out by Zonhla Hydro & Enviro Consulting (Pty) Ltd, the impacts of the housing development on the HGM 1 wetland, Msunduze River and Mvubukazi Rive are Low risk. It is the opinion of the specialists that the project poses minimum flaws to the wetland and rivers. Therefore, the project should be authorised to allow for the construction of the Smero/Caluza Housing Development. Based on the low risk significant, it is the specialist opinion then that the project meets the requirements of the “General Authorisation (GA) in terms of Section 39 of the NWA No. 36 of 1998, Water Uses as defined in Section 21(c) and (i)”, Notice 509 of 2016. Therefore, a GA in terms of GN 509 is being applied for with the DWS for the proposed project.

Geotechnical Investigation

A desktop geotechnical investigation report was prepared by Geosure (Pty) LTD. Their findings were that according to the Council for Geoscience’s regional geological sheet “2930 Durban”, the site appears to be underlain by alluvium, Jurassic age dolerite, Vryheid Formation shale and sandstone and Pietermaritzburg Formation shale.

They also find out that on the basis of the desktop pre-feasibility appraisal, there do not appear to be any “fatal flaws” from a geotechnical slope stability perspective across the majority of the site, excluding areas of alluvium including river tributaries.

The site does however exhibit unfavourable topographical and subsoil features which are, discussed in Section 9.3 of this report:

In accordance with a planning document from the National Department of Housing, allowance should be made for conducting a Phase 1 Geotechnical Site Investigation and Phase 2 Geotechnical Site Investigation. These studies will inform the engineering design of the civil infrastructure and house foundations.

They also recommended that planning and engineering design of an appropriate toilet system should be based upon the positive findings of a Groundwater Protocol Evaluation.

Additional Studies

Traffic impact Studies

Traffic impact studies were requested by EDTEA as part of recommendations for final EIAr. The traffic impact assessments are being carried out (see appendix D5)

Engineering Feasibility Studies

Due to the nature and size of the proposed development, an investigation into the capacities and status of existing bulk services and future bulk services required to supply the development was needed and undertaken. Pangaea Consulting Engineer's compiled a feasibility studies report that include Bulk Services investigating the status of existing services and proposing recommendations relative to the construction and / or upgrade of existing infrastructure to service the proposed housing development. The bulk services for each category that require attention before the project can commence are summarized below: **(for more details see Feasibility Studies report – Appendix D6)**

Water

An existing network of reticulation exists on site that is feeding the existing houses. Houses are metered and the mains are marked on site. During preliminary

discussions between engineers and Municipal's Water and Sanitation Department Managers an indication was given that potable water supply is available for the project. Extension of the bulk reticulation will be necessary to bring the supply closer to the project extents. A letter of confirmation was written by the Municipality on capacity (see Feasibility Studies report)

Sewerage

Preliminary discussion were held with the Municipal Water and Sanitation Managers and project engineers in this regard. The sewer will be treated at the Darville Treatments and it is understood there is capacity at the treatment works to accommodate this project as its being accommodated in the overall master planning being undertaken by the municipality. The bulk outfall routes to serve this entire project is approximately 4.8km of new mains. The connections are at two points, one in Caluza Road structure code 39140 and the other at Georgetown 8 Street structure code 38897. Maximum pipe diameter will 160mm. The municipality has also written a confirmation letter on capacity.

Roads

The geometric design shall follow the standards of the guidelines articulated above and municipal minimum standards were appropriate. The roads will have maximum width of 5.5m. Where vehicular access is not possible due to the topography constraints, footpaths will be proposed to afford residents access to their erven.

Stormwater

The site is on steep terrain and drains into natural valley lines. The ultimate design will make use of these natural watercourses with the appropriate attenuation along the route before storm water enters the river water courses.

Solid waste removal

Waste Management Services department is responsible for removal of domestic refuse from the development as per normal practice across the city. In this regard timeous notification to the line department will be required for them to budget for the development to be included in their route. No burning or burying of solid waste will be allowed to take place on the site in accordance with Municipal by-laws

Electricity

Electrical supply is designed and installed by the Eskom for the bulk and street reticulation. Confirmation of availability of bulk services from Eskom is attached.

Conclusion

The specialist studies and the information provided within the EIA Report, indicates that the proposed Smero/Caluza Low-Cost Housing Development does not pose any significant impacts should the proposed mitigation measures be implemented. As per the specialist assessments, site visits, and comments received from registered I&APs, and confirmation letters for bulk services from Msunduzi Local Municipality and Eskom, the project can proceed with minimum pressure to the existing bulk services, environment, and current settlement setup. Proper mitigation on biodiversity as recommended by the specialist will be implemented. Water use licenses in form of GA is being applied for and water contamination avoidance mitigations as recommended by the specialist will be adhered to. The chance find procedures for paleontological heritage and other specialist mitigation will be implemented also.

It is therefore recommended that the proposed Smero/Caluza Low-Cost Housing Development be supported and be authorised with the necessary conditions of approval, along with the implementation of recommendations / mitigation measures proposed by Specialists and included in the EMPr.

LIST OF ABBREVIATIONS

- BID - Background Information Document
- DEA - Department of Environmental Affairs (national)
- EDTEA - Department of Economic Development, Tourism and Environmental Affairs (provincial)
- DWS - Department of Water and Sanitation
- EAP - Environmental Assessment Practitioner
- EIA - Environmental Impact Assessment
- EIAr - Environmental Assessment Impact Report
- EMPr - Environmental Management Programme
- EPWP - Expanded Public Works Programme
- GNR - General Notice Regulation
- I&APs - Interested and/or Affected Parties
- IDP - Integrated Development Plan
- NEMA - National Environmental Management Act (Act 107, 1998)
- PPP - Public Participation Process

DEFINITIONS

"Alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to property, activity, design or technology.

"Applicant" means a person (including juristic person) who has submitted or intends to submit an application;

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

"Environmental impact assessment", in relation to an application to which scoping must be applied, means the process of collecting, organizing, analyzing, interpreting, and communicating information that is relevant to the consideration of that application. A detailed study of the environmental consequences of a proposed course of the action, an environmental assessment or evaluation is a study of the environmental effects of a decision, project, undertaking or activity. It is most often used within an Integrated Environmental Management (IEM) planning process, as a decision support tool to compare different options" (DEAT, 1998)

"Environmental management plan" means an environmental management plan in relation to identified or specified activities envisaged in Chapter 5 of the Act and described in regulation 34;

"Guidelines" means any national guidelines and provincial guidelines issued in terms of Chapter 8 of these Regulations.

"hazardous waste" means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological of that waste, have a detrimental impact on health and the environment.

"Interested and Affected Party" means an interested and affected party contemplated in section 24(4) (d) of the Act, and which in terms of that section includes -

- a) any person, group of persons or organization interested in or affected by an activity; and
- b) any organ of state that may have jurisdiction over any aspect of the activity;

"Public Participation Process" means a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters;

"Registered Interested and Affected Party", in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 57.

"Significant impact" means an impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment;

"Stakeholder," refers to a group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities, and all I&APs.

"The Act" means the National Environmental Management Act, 1998 (Act No. 107 of 1998).

"Authority," refers to the national, provincial, or local authorities that have a decision-making role or interest in the proposal or activity. The term includes the lead authority, as well as other authorities.

"Waste treatment facility" means any site that is used to accumulate waste for the purpose of storage, recovery, treatment, reprocessing, recycling, or sorting of that waste.

"Recycle" means processing used materials into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration) water pollution from (Landfilling) by reducing the need

"Landfill" means a structure that is used for the inputting of waste, it is a site where waste materials are deposited for the purpose of final disposal and may be built on top of the ground or into the ground. It should be constructed in such a way that it minimizes contact between the environment and any water bodies that may be near the site, a landfill has many factors that may potentially harm the environment and

care should be taken to ensure that little to no contact takes place between the landfill and the environment.

1. INTRODUCTION

Msunduzi Municipality is proposing to establish a low-cost housing development called Smero/Caluza Low-Cost Housing Development in Pietermaritzburg. Msunduzi Local Municipality is proposing to establish a low-cost housing development in Smero and Caluza, consisting of approximately 2000 erven and associated infrastructure covering in Pietermaritzburg, ward 20 of Msunduzi Local Municipality, uMgungundlovu District Municipality, KZN Province. The proposed associated infrastructure include roads (5.5m wide), and water (0.375 to 0.9m diameter), stormwater, Sewer reticulation (0.16m diameter) and electricity reticulation. The total area to be developed measures approximately 103.49ha. The site is located approximately 21km north-west of Pietermaritzburg. Project center coordinates are 29°38'12.50"S, 30°17'32.06"E

The applicant is Msunduzi Local Municipality who will undertake the activity should it be approved. Sinohydro Consultant was appointed by Verern Builders (Pty) Ltd on behalf of Msunduzi Local Municipality as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The Application Form and Draft Scoping Report was submitted to the EDTEA by our predecessor (SPHE Consulting Services (Pty) Ltd). The Final Scoping Report and Plan of Study for this EIA was also submitted to the EDTEA and were approved by EDTEA on the 02nd November 2022 and SPHE Consulting Services (Pty) Ltd were advised to proceed with the EIA process (Appendix A1). The SPHE Consulting did the initial public participation, appointed specialist studies drafted some of the reports. The client then decided to change the EAP from SPHE Consulting Services (Pty) Ltd to Sinohydro Consulting.

1.1 PURPOSE OF STUDY

The EIA is a tool utilized to identify potential adverse impacts and positive impacts arising from various projects. The EIA is further used to provide information to

the Competent Authority to assist them in reaching decisions on proposed activities for a development. One important aspect that the EIA aims to achieve is ensuring that proposals and projects are carried out in a sustainable manner. The three sections that the EIA focuses on in relation to the project are the assessment of the Biophysical, Social and Economic environment.

The Scoping/EIA phases can be categorised into three sections being, the Scoping Phase; EIA phase and the Decision-making phase. Included in the three sections are the Public Participation Process and the decision-making process. An EMPr is developed with the aim to further manage and control potential adverse impacts of development on the environment. This is achieved by mitigation measures on potential impacts arising from the construction, operational and post-closure/closure, or rehabilitation phases of the project development.

1.2 PURPOSE OF EIAR REPORT

The sole purpose of this EIAR is to protect the environment by determining potential adverse impacts and positive impacts that may result from the proposed Smero/Caluza Low-Cost Housing Development activities. The public is further given the opportunity to give inputs, thus contributing to the decision-making process of the proposed development.

The EMPr outlines measures that should be taken to avoid, eliminate and minimise impacts from the planned activities associated with the proposed landfill site establishment. The EIA is the final stage of the Scoping/EIA process, thus this EIAR provides the following:

- ❖ Description of the proposed activity
- ❖ Description of environment that may be affected by the proposed activity
- ❖ Details on Public Participation process conducted, these are issues and concerns raised by Interested and Affected Parties (I&APs) during the public participation process.
- ❖ The need and desirability of the proposed activity
- ❖ Outline advantages and disadvantages of potential alternatives identified

- ❖ Impact assessment methodology for direct, indirect, and cumulative impacts
- ❖ Summaries and recommendations of specialist studies conducted for the proposed activity.

1.3 EIA FORMAT

In order to ensure that the I&APs and the competent authority are be able to go through the report without any hassles this report has been structured in accordance with Regulation 31 (2) of NEMA, EIA Regulations (2014 (as amended)), S 31(2) and contains the following:

- (a) details of—
 - (i) the EAP who compiled the report; and
 - (ii) the expertise of the EAP to carry out an environmental impact assessment;
- (b) a detailed description of the proposed activity;
- (c) a description of the property on which the activity is to be undertaken and the location of the activity on the property,
- (d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic, and cultural aspects of the environment may be affected by the proposed activity;
- (e) details of the public participation process conducted in terms of sub regulation (1), including—
 - (i) steps undertaken in accordance with the plan of study;
 - (ii) a list of persons, organisations and organs of state that were registered as interested and affected parties;
 - (iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and copies of any representations and comments received from registered interested and affected parties;
- (f) a description of the need and desirability of the proposed activity
- (g) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or

- alternatives may have on the environment and the community that may be affected by the activity;
- (h) an indication of the methodology used in determining the significance of potential environmental impacts;
 - (i) a description and comparative assessment of all alternatives identified during the environmental impact assessment process;
 - (j) a summary of the findings and recommendations of any specialist report or report on a specialised process;
 - (k) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
 - (l) an assessment of each identified potentially significant impact, including—
 - (i) cumulative impacts;
 - (ii) the nature of the impact;
 - (iii) the extent and duration of the impact;
 - (iv) the probability of the impact occurring;
 - (v) the degree to which the impact can be reversed;
 - (vi) the degree to which the impact may cause irreplaceable loss of resources; and
 - (vii) the degree to which the impact can be mitigated;
 - (m) a description of any assumptions, uncertainties, and gaps in knowledge;
 - (n) a reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
 - (o) an environmental impact statement which contains—
 - (i) a summary of the key findings of the environmental impact assessment; and
 - (ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
 - (p) an environmental management programme containing the aspects contemplated in regulation 33;
 - (q) copies of any specialist reports and reports on specialised processes complying with regulation 32;

- (r) any specific information that may be required by the competent authority;
- and (s) any other matters required in terms of sections 24(4)(a) and (b) of the Act.

1.2 SCOPE OF WORK

There was a brief given to Sinohydro by Pangaea Consulting who are the designers of the project who indicated that the project went to as far as the Final EIA but the client decided to change the EAP. It was further explained that activities carried out by the previous EAP were not to be done again which EDTEA confirmed through acceptance of the change in EAP and granting of extension of time (Appendix A2). However, the scope of the study has been determined with reference to the requirements of the relevant legislation and undertaken in terms of the Integrated Environmental Management Information Series on Environmental Impact Reporting (2004) issued by DEAT and the 2014 EIA regulations as amended in 2017.

The basic scope of work will include the following:

- Review of all information.
- Scoping (identification of significant issues).
- Assessment of anticipated impacts.
- Identification of suitable mitigation measures to reduce negative impacts and enhance positive impacts.
- Submission for decision.

One of the crucial aims of an EIA is to ensure that the demands of sustainable development are met on a project level, within the context of the greater area. The most common definition of sustainable development is development that meets the needs of the present while not compromising the needs of future generations.

This EIA is therefore being undertaken with sustainable development as a goal. The assessment will look at the impacts of the proposals on the environment and assess the significance of these, as well as propose mitigation measures, as required, to reduce anticipated impacts to acceptable levels.

1.3 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which the report is based (i.e., specialist studies, project information, information given by the applicant and client, their designers, and the previous EAP) is correct.

It is further assumed that the activities deemed done and completed by the previous EAP were done in accordance with the EIA regulations and best practice and were approved by EDTEA except the final EIAr stages which Sinohydro will finalise

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the EAP, specialists and EDTEA will be implemented on a long-term basis. This has a major bearing on the reliability of the predictions of significance of impact.

1.4 DETAILED DESCRIPTION OF THE PROPOSED ACTIVITY

1.4.1 Project Location

The site is located 21km south west of the Pietermaritzburg city center and is accessed via two different points as the site is split by an in accessible cliff edge. Access to the upper portion of the site is via Moses Mabhida Road, proceeding onto Selby Msimang Rd and at about 2.84km from Edendale Mall robots turning right into Caluza Road proceeding onto Sweetwaters main road till about 7.62km , then left on an unnamed road for about 2.9km leading to the project site at GPS co-ordinates 29°38'0.42"S, 30°17'30.80"E. Access to the lower portion of the project site is gained from Moses Mabhida Road, proceeding into Selby Msimang Rd and at about 2.84km from Edendale Mall robots, turning right into Caluza Road and at about 0.77km turning, left into Mbanjwa Rd proceeding for about 1.8km to the project area, with GPS co-ordinate point 29°38'32.55"S, 30°17'30.69"E closest to the site boundary. The project covers about 103.49Ha and about 2000 units

1.4.2 Project Coordinates

Table 4: Project Coordinates

Item	Description	Longitudes	Latitudes
1	Center	29°38'12.50"S	30°17'32.06"E
2	Point A	29°37'42.89"S	30°17'16.09"E
3	Point B	29°37'59.73"S	30°17'32.98"E
4	Point C	29°38'3.13"S	30°18'12.36"E
5	Point D	29°38'18.93"S	30°18'0.31"E
6	Point E	29°38'22.07"S	30°17'47.83"E
7	Point F	29°38'33.01"S	30°17'35.04"E
8	Point G	29°38'33.15"S	30°17'23.47"E
9	Point H	29°38'16.16"S	30°17'14.12"E

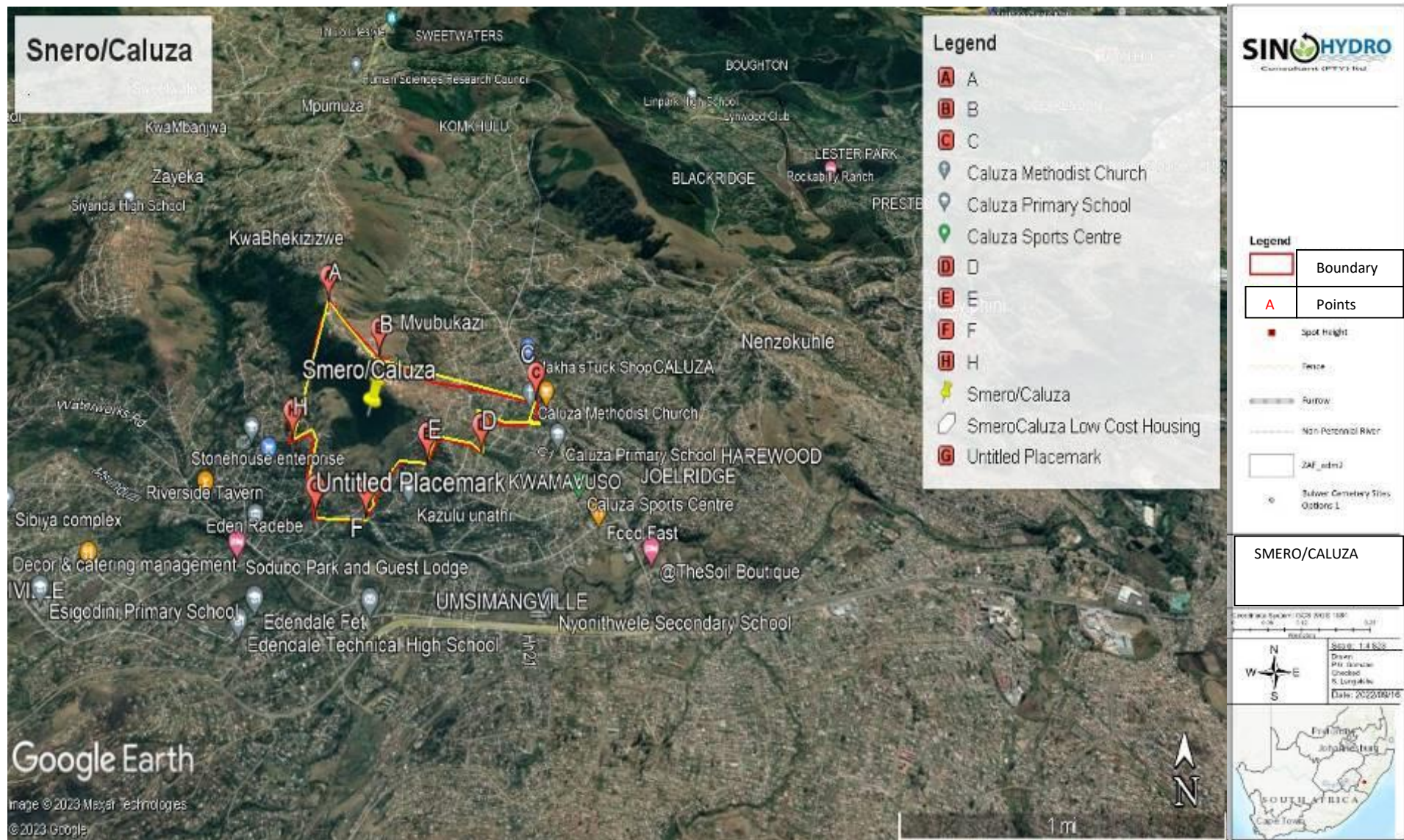


Figure 1: Smero/Caluza locality map

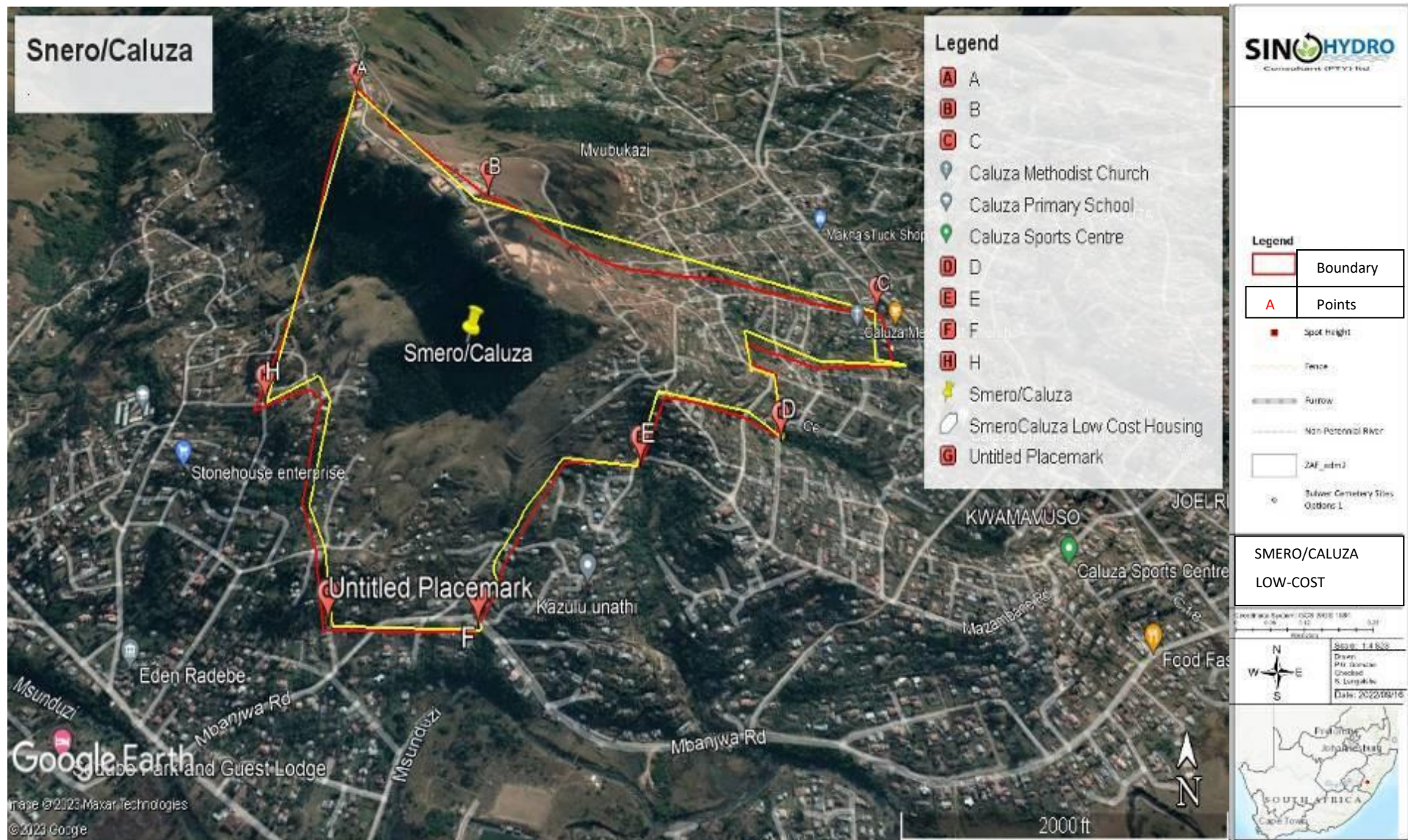


Figure 2: Smero/Caluza locality map

1.4.3 Project Scope of Work

It is proposed that the Low-Cost Housing Development will have the following facilities:

- ❖ 2000 houses structures
- ❖ Taxi routes and residential streets
- ❖ Sewer reticulation
- ❖ Potable water reticulation
- ❖ Storm water drainage
- ❖ Electricity connections

1.4.3. 1 Houses structures

The envisaged house would be 40m² and some will be 45m² for disabled persons, who are around 20. The sizes for those where there no restrictions of existing houses and platforms, the size will range between 250m² to 350m², dependent on terrain, steeper areas have bigger sites, etc. Where there are brick and tile and substantial structures, the town planning will try by all means to accommodate these into the layout, i.e., these will become part of the project. If a structure is informal then it will be demolished and a BNG (RDP) house will be built. No house hold will be left or even areas that has been settled on, if they are within the project boundary, they must be developed and get services, i.e., water, sanitation, road access and electricity.

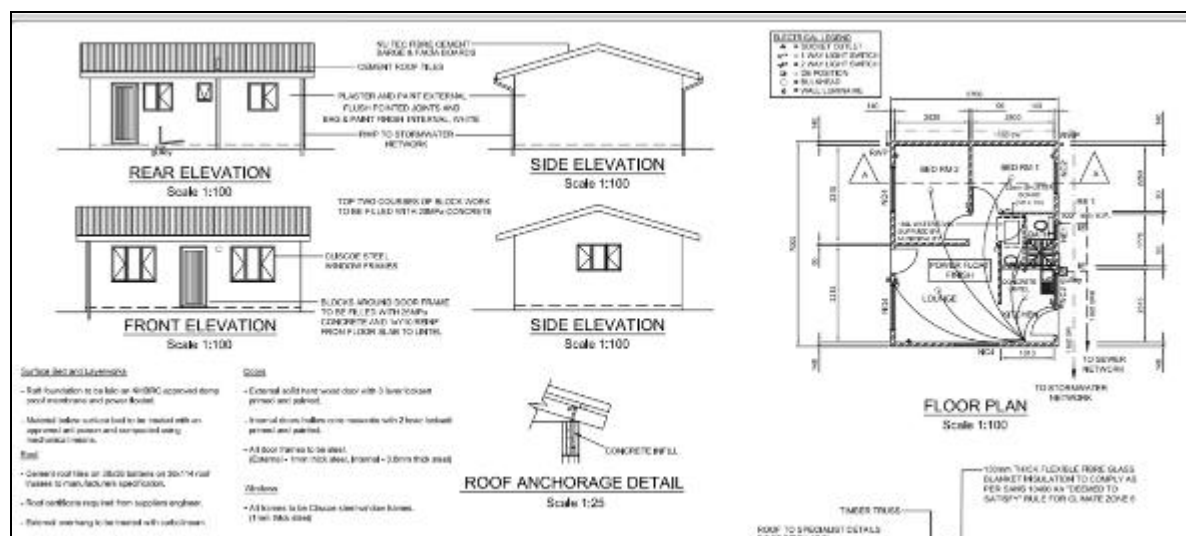


Figure 3: Low Cost Housing Structures that will be erected

1.4.3.2 Access Road

The roads design will be based on the guidelines of the above industry best practice guidelines and to municipal standards were available.

The road network shall comprise of the following hierarchy:

Taxi routes	:	5.5m wide
Residential streets	:	4.5m wide
Cul – de – sac	:	3.0m wide
Access ways	:	2.5m wide

All the above roads will be hardened with most roads being new and no widening of existing roads is envisaged. Where vehicular access is not possible due to the topography constraints, footpaths will be proposed to afford residents access to their erven



Figure 4: Existing gravel roads servicing existing houses

1.4.3.3 Sewer reticulation

The designers agreed with the Municipal Water and Sanitation Management and the sewer will be treated at the Darville Treatments and there is capacity at the treatment work to accommodate the project as its being accommodated in the overall master planning being undertaken by the municipality (Confirmation Letter from municipality attached – appendix. D6). The bulk outfall routes to serve the entire project is

approximately 4.8km of new mains. The connections are at two points, one in Caluza Road structure code 39140 and the other at Georgetown 8 Street structure code 38897. The provision of water borne sanitation will also allow other areas not previously connected to the system to now be accommodated as the mains now become accessible. All reticulation shall be through underground piped systems connected to concrete manholes. All lines shall be installed in servitudes and shall gravitate to the outfall lines.

The internal reticulation shall comprise of:

- 0.160m dia min. uPVC collection pipes from all units House connection points at each site
- 1m concrete manholes at all changes in grade and direction not more that 100m apart.
- The estimated discharge is 3.709ml/d.



Figure 5: Existing sewer reticulation on-site feeding the existing houses

1.4.3. 4 Potable water reticulation

There is an existing network of potable water reticulation on site that is feeding the existing houses. Houses are metered and the mains are marked on site. Preliminary discussion between designers and the Municipal Water and Sanitation Department Mangers indicated that there is capacity for potable water supply to the project (Confirmation letter attached Appendix D6). Extension of the bulk reticulation will be necessary to bring the supply closer to the project extents.



Figure 6: Existing network of reticulation on-site feeding the existing houses



Figure 7: Existing network of reticulation on-site feeding the existing houses

Internal Water Supply

The internal water supply will be fed of the existing bulk supply lines via the appropriate sized mPVC and HDPE pipe network. Application will be made to the municipality for meter connections for every site and the housing contractor will undertake the house connection after the meter. All water mains will be laid in the road and footpath servitudes.

The pipelines will have the following details

- The estimated demand is 2.77ml/d.
- Velocities in pipelines should not exceed 120l/s

1.4.3. 5 Storm water drainage

The site is on steep terrain and drains into natural valley lines. The ultimate design will make use of these natural watercourses with the appropriate attenuation along the route before storm water enters the river water courses.

Internal Stormwater

The internal storm water management system is based on the following principles:

- ❖ Stormwater will be directed along the road surfaces to either discharge through energy dissipaters directly into the valley lines or
- ❖ Collected by side inlets at strategic and critical points and directed into sub surface spigot pipe system, min.
- ❖ These pipe systems will then discharge through headwall outlets with the appropriate erosion protection systems into the natural watercourses.
- ❖ Surface runoff from the roads will be contained by the road crossfall and the kerbs.
- ❖ Road crossfalls where possible will fall towards the cut side of the roads in order to
- ❖ accommodate discharging of underground pipes onto the road surface through the kerb.
- ❖ Where this is not possible then kerbs shall be accommodated on both sides of the roads.
- ❖ Stormwater drainage from proposed sites will be discharged on to the road kerb via a piped system from the house roofs and the excess water from the paved and unpaved areas of the property.
- ❖ Where the property is below the road then midblock drains with S&D servitudes shall drain these properties to the road system.

Attenuation

Appropriately situated attenuation facilities will be positioned to delay the additional runoff generated between the post and pre development values from the project area. Due to the nature of the development and the site sizes to maximize densities, thereby reducing costs and containing the development cost within the available subsidy. The pipes will have the following details

- Pipes will be 0.375m to 0.900m diameter and length will be longer than 1000m not continuously but aggregated.
- Pipes will be both within a road reserve and in S & D servitudes.

1.4.3. 6 Electricity connections

Electrical supply is designed and installed by the Eskom for the bulk and street reticulation. (Confirmation of availability of bulk services is attached – Appendix ,D6).



Figure 8: Existing Eskom network feeding the existing houses

1.4.3. 7 Waste Management Services

Waste Management Services department is responsible for removal of domestic refuse from the development as per normal practice across the city. In this regard timeous notification to the line department will be required for them to budget for the development to be included in their route.

No burning or burying of solid waste will be allowed to take place on the site in accordance with Municipal by-laws

2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, as amended, EIA 2014 regulations the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

The need for and the desirability of a proposed development forms a key component of any EIA application. The consideration of proposed developments in context of the various spatial planning tools and policy applicable to the study area forms an integral part of the present environmental processes. The “need and desirability” will be determined by considering the broader community’s needs and interests as reflected in a credible IDP, SDF and EMF for the area.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e., is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e., the question of what the most sustainable use of land is. The impact of development on people’s health and well-being, as well as its impact on natural and cultural areas, and therefore its desirability, will also be assessed during the EIA phase.

The declaration of the Pietermaritzburg as the provincial capital saw an exodus of government officials from Ulundi to Pietermaritzburg, and subsequently the demand for residential accommodation. This is coupled by exodus of people from rural areas to urban areas in search of greener pastures. Most affordable areas like Imbali became overcrowded resulting in people moving into sweat waters and surrounding areas like Smero and Caluza. Before the declaration, the city was sitting with a surplus of residential accommodation and at present the city is not coping with the current demand, even though more people are expected. Access to affordable housing is identified as one of the key priorities in the Municipal IDP. Shelter is a basic need. Housing must provide shelter, but this alone is not enough. It is a key element in structuring the urban environment. Housing affects the form and performance of settlements across scales. Settlement should function as one whole workable system of integrated networks and hierarchical systems of interconnecting nodes.

Furthermore, in the MLM area of jurisdiction there is a need or demand for low-cost housing (particularly in the project area) to accommodate previously disadvantaged

individuals who cannot afford houses. This low-cost housing development will, in terms of the municipality IDP redress the number of informal settlements, address the current housing shortage, and could will create employment opportunities in both the construction and operational phases. Also, land currently lying vacant and

2.1 NEED

Housing is a national need, including in the Msunduzi Local Municipality. The Municipality's aims to promote socioeconomic development through the eradication of backlogs associated with water and sanitation, electricity, and housing, as well as improve basic services within Smero/Caluza. In order to meet the needs of the community within Smero/Caluza, the Council resolved that a project business plan be submitted to Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA) for the construction of Smero/Caluza Low-Cost Houses as per the Msunduzi Integrated Development Plan. The plan includes the provision of infrastructure and basic service through securing suitable land for human settlement projects. The provision of affordable housing units remains a high priority for the Municipality which will restore the dignity of poor people by providing shelter and access to basic human rights as enshrined in the Constitution of South Africa.

The demographic profile of the Msunduzi Local Municipality especially the city of Pietermaritzburg has an un even distribution of its population depending on areas affordability. This community requires formalized, state-instituted housing, and associated, infrastructure. The proposed development will re-distribute the density of the population, improve community member's standard of living, as well as access to essential services including roads, electricity, water supply, appropriate sewage disposal infrastructure, and environmental health in the area. Therefore, the proposed development will enable adequate housing to be constructed, thereby promoting access to basic service delivery as well as socioeconomic development in Smero/Caluza and its surroundings.

This will give community members a better standard of living, as well as access to essential services including roads, electricity, water supply, appropriate sewage disposal infrastructure, and environmental health in the area. Therefore, the

proposed development will enable adequate housing to be constructed, thereby promoting access to basic service delivery as well as socioeconomic development in the Smero/Caluza Township and its surroundings. Msunduzi Local Municipality is committed to the vision of the National Government of which it committed itself towards accelerating shared growth to halve poverty and unemployment and promote social inclusions. Housing is one of the social inclusions in this vision.

2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed residential development. As per the Needs and Desirability it is clear from the number of existing informal houses erected on the properties in Pietermaritzburg and the study, that this study area is indeed habitable and that there is an urgent need for residential erven within the sub-economic market.

2.2.1 LOCATION AND ACCESSIBILITY

The proposed location is considered to be a viable option. The proposed site is in built up areas with most people working in Pietermaritzburg town. The proposed site properly linked with both Sweatwaters main road and Caluza main road which also joins Selby Msimang Rd which feeds into Moses Mabhida Road, onto. Any upgrades or additional services infrastructure that will be required have been investigated, and are included in this EIAr.

Due to the existing settlement, namely the Smero/Caluza Settlement, the proposed development will expand the housing footprint in the immediate area. The proposed development will tie into existing services, reducing costs and environmental impact associated with the construction of a stand-alone development in an area where surrounding land uses are not in line with the nature of this project.

2.2.2 COMPATIBILITY WITH THE SURROUNDING AREA

The proposed site is directly adjacent to the existing residential area of Smero/Caluza with part of it in between houses or within informal or brick and

cement structures on them. As stated above, this would provide accessibility and allow the proposed development to link to the existing services infrastructure. Due to the close proximity of the existing Settlement to other developed settlements, costs, and environmental impacts, associated with the excavation and laying of new pipes, will be either avoided or limited as the proposed development will tie in with existing services.

3. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 24 (5): NEMA EIA Regulations 2014. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a nonthreatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

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

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed development:

Government Notice R327 (Listing Notice 1) listed activities:

9 The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;

- (i) with an internal diameter of 0,36 metres or more; or
- (ii) with a peak throughput of 120 litres per second or more; excluding where;
 - a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or
 - b) where such development will occur within an urban area.

10 The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge, or slimes

- (iii) with an internal diameter of 0,36 metres or more; or
- (iv) with a peak throughput of 120 litres per second or more;

excluding where;

- (c) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or

- (d) where such development will occur within an urban area.

12 The development of;

- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
- (ii) 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;

19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse;

- (a) will occur behind a development setback;
- (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
- (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

27 The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for; (i) the undertaking of a linear activity; or

- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

56 The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre;

- (i) where the existing reserve is wider than 13,5 meters; or
- (ii) where no reserve exists, where the existing road is wider than 8 metres;

excluding where widening or lengthening occur inside urban areas.

Government Notice R325 (Listing notice 2) listed activities:

15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for; (i) the undertaking of a linear activity; or

(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R324 (Listing notice 3) listed activities:

4 The development of a road wider than 4 metres with a reserve less than 13.5 metres

12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

14 The development of;

(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;

(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 exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

The environmental process is being undertaken in distinct phases, refer to **Figure 8**. An Application Form has been submitted to EDTE and acknowledged. The Scoping

Process was undertaken to identify potential issues. The Final Scoping Report and Plan of Study for EIA were submitted to the EDTEA. The Scoping Report and Plan of Study for EIA were approved on the **02nd November 2022** and SPHE was advised to proceed with the EIA process (**Appendix A1**). SPHE was later replaced by Sinohydro

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural, and social interests. The activity seeks to provide additional housing, employment, and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people, especially developmental and social benefits, as well providing additional housing, employment, and economic development opportunities.*

Development will be socially, environmentally, and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, they are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP.*

Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the Environmental Management Programme (EMPr) – the EMPr is included in the EIAr as *Appendix F*

The use of non-renewable natural resources will be responsible and equitable.

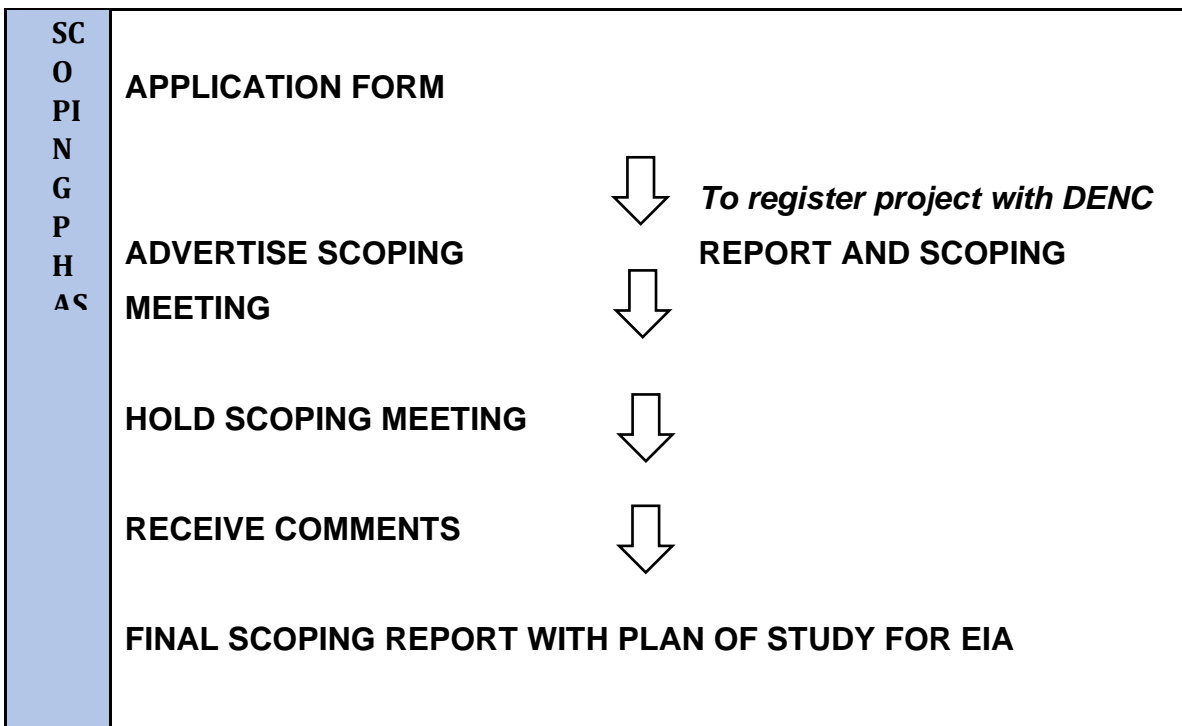
The negative impacts on the environment and on people's environmental rights will be anticipated, investigated, and prevented, and where they cannot be prevented, will be minimised and remedied – potential negative impacts have been identified

and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMPr.

The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process – *refer to Appendix C.*

The social, economic, and environmental impacts of the activity will be considered, assessed, and evaluated, including the disadvantages and benefits. The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

EIA (SCOPING AND EIAR(S&EIAR) PROCESS



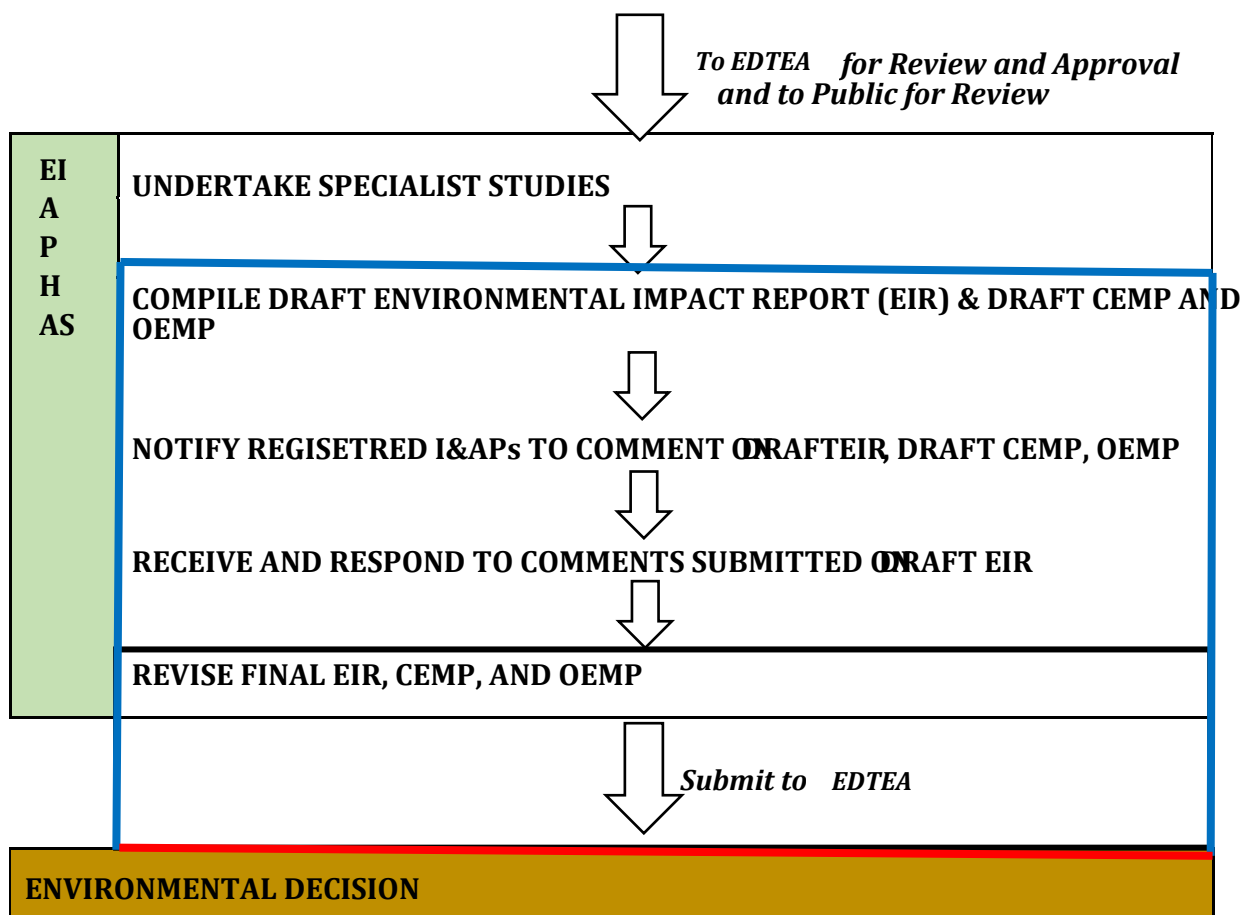


Figure 9: The EIA Process. Currently, this process is in the 'REVISE FINAL EIR, CEMP, AND OEMP,' as outlined in blue with red the process still to be done

3.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- any development or other activity which will change the character of a **site exceeding 5 000 m²** in extent;
- the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length

In accordance with the NHA, a Paleontological Heritage Impact Assessment (**Appendix D3**) was undertaken.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume, or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter, or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEA&DP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
 - *Guideline on Transitional Arrangements*
 - *Generic Terms of Reference for EAPs and Project Schedules*
 - *Guideline on Alternatives*
 - *Guideline on Public Participation*
 - *Guideline on Exemption Applications*

- *Guideline on Appeals*
 - *Guideline on Need and Desirability*
- Department of Environmental Affairs and Tourism (DEAT) *Integrated Environmental Management Information Series*.

3.5 NATIONAL WATER ACT

Besides the provisions of NEMA for this EIA process, the proposed development may also require authorizations under the National Water Act (Act N0. 36 of 1998). The Department of Water Affairs, who administer that Act, will be a leading role-player in the EIA.

According to the Aquatic Impact Assessment (**Appendix D4**), the NWA guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21 of the NWA), which may impact on water resources through the categorisation of 'listed water uses' encompassing water abstraction and flow attenuation within catchments as well as the potential contamination of water resources, where the DWS is the administering body in this regard.

Defined water use activities require the approval of DWS in the form of a General Authorisation or Water Use License authorisation. Government Notice No. 665 of 6 September 2013 provides for General Authorisations for certain specified water use activities in terms of the disposal of wastewater which then do not require a licensing process. There are restrictions on the extent and scale of listed activities for which General Authorisations apply.

Section 22(3) of the National Water Act allows for a responsible authority (DWS) to dispense with the requirement for a Water Use License if it is satisfied that the purpose of the Act will be met by the grant of a license, permit or authorisation under any other law.

Potential water use activities that are of relevance to the proposed Housing Development are:

- Section 21(c): Impeding or diverting the flow of water in a watercourse;
- Section 21(f): Discharge of waste or water containing waste into a water resource through a pipe, canal, sewer, or other conduit;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource; and
- Section 21(i): Altering the bed, banks, course, or characteristics of a watercourse.

3.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act, and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities.

3.7 NATIONAL FORESTS ACT

The National Forests Act, 1998 (Act 84 of 1998) (NFA) makes provisions for the management and conservation of public forests.

In terms of section 15(1) of the National Forests Act, 1998, no person may –

- (a) cut, disturb, damage or destroy any protected tree; or
- (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except-
 - (i) under a license granted by the Minister; or
 - (ii) in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

3.8 SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, ACT 16 OF 2013

The Spatial Planning and Land Use Management Act 16 of 2013 (**SPLUMA**) is a national law that was passed by Parliament in 2013. SPLUMA provides a framework for spatial planning and land use management in South Africa.

The subject area falls under the jurisdiction of the local municipality and the appropriate zoning and subdivision would need to be allocated in order to permit the development of the land for the intended purpose. Consideration of the KZN Provincial Development Spatial Development Framework and the KZN Provincial Growth and Development Strategy has been taken.

3.9 MSUNDUZI ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF)

The objectives of the Environment Management Framework (EMF) are to: identify areas both suitable and unsuitable for development; provide information to assist decision making (such as development applications) and thereby streamline the process; identify environmentally sensitive areas that require protection so as to ensure ecosystem service delivery; provide environmental goals and mechanisms to achieve the objectives as stated.

3.10 MSUNDUZI SPATIAL DEVELOPMENT FRAMEWORK (SDF)

The Spatial Development Plan for Msunduzi Local Municipality was approved in 2002. The Municipality Spatial Development framework has the status of a statutory plan, and serves to guide and inform all decisions made by the Municipal council on spatial development and land use management in the area to which it applies (Msunduzi Local Municipality, Spatial Development Framework 2009).

The proposed site for the development of the Smero/Caluza Low-Cost Housing (Southern Portion) is located within an area that is already set aside and subdivided for low-cost housing. MLM, in line with the SDF, has identified this site as an area that can be used for high-density settlement.

4 PUBLIC PARTICIPATION PROCESS

Sinohydro took over the EIA process from SPHE Consulting Services (Pty) Ltd. SPHE Consulting did the public participation process till to their final EIAR which was submitted to EDTEA. Sinohydro was brought in to finalise the EIA process in cooperating the specialist studies in the final EIAR and circulating it to stake holders for a 30-day comments period. This will culminate in consolidating the final EIAR for submission to EDTEA. This means that the greater part of the public participation was done by SPHE Consulting with Sinohydro concluding the process.

A Public Participation Process was undertaken in accordance with the requirements of the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series. Guidelines on Public Participation 2013 and the NEMA EIA Regulations 2014 (amended). Issues and concerns raised during the Scoping phase are dealt within this report. Please note that the proposed public participation processes are in line with the current Directions, published by the Department of Environment, Forestry, and Fisheries (DEFF). The EIA Regulations specify that a public participation process must be conducted as an integral part of the EIA. The public participation is following the process stipulated in Section 39 of the 2017 EIA Regulations. This chapter outlines the public participation process followed.

4.1 Notification of Interested and Affected Parties (I&AP's)

Section 39 of the EIA Regulations outlines the requirements for the notification of all potential I&AP's. These requirements typically include the following:

- Giving notification to:
 - The landowners and occupiers of the project site and those within 100m of the project site and alternative sites, or those directly influenced by the activity under consideration;
 - The municipality that has jurisdiction over the area;
 - The municipal councilors of the affected wards; and
 - Any organ of state having jurisdiction in respect of any aspect of the activity.

- Placing an advertisement in a local and a provincial newspaper; and
- Fixing a notice board at a conspicuous place on all alternative sites.

4.1.1 Notification of Landowners, Authorities, and Organs of State

At the commencement of the EIA, SPHE Consulting Services (Pty) Ltd notified and obtained written consent from Msunduzi Local Municipality (MLM), the landowner of the project site, (See **Appendix B of previously submitted EIAR** for a copy of the landowner consent form).

Surrounding landowners and occupiers of land within 100 metres of the proposed project site were notified by hand delivered letters of the applicant's intention to submit an application to the competent authority (See **Appendix G of previously submitted EIAR** for copies of the letter).

In addition, written notification via registered mail was sent to the Authorities and Organs of State that have jurisdiction over the activity as well as the relevant Ward Councilor (See **Appendix C of previously submitted EIAR** for the I&AP Register and **Appendix G of previously submitted EIAR** for copies of the letter).

4.1.2 Newspaper Advertisement

A newspaper advertisement detailing information about the project and the EIA process that has since been finalized, as well as calling for the registration of I&AP's, was placed on the 15th of April 2022 in the Msunduzi Eyethu newspaper, the regional newspaper for the Midlands area. The advertisement provided I&APs 28 days to register and to submit their comments in writing to SPHE Consulting. The closing date for registration was therefore on the 26th of May 2022 See **Appendix D of previously submitted EIAR** for a copy of the newspaper advertisement.

4.1.3 Notice Board

SPHE Consulting also erected an A2 size notice board detailing information about the project and the EIA process and this was erected on site at a recognized public area on 05th of June 2022.

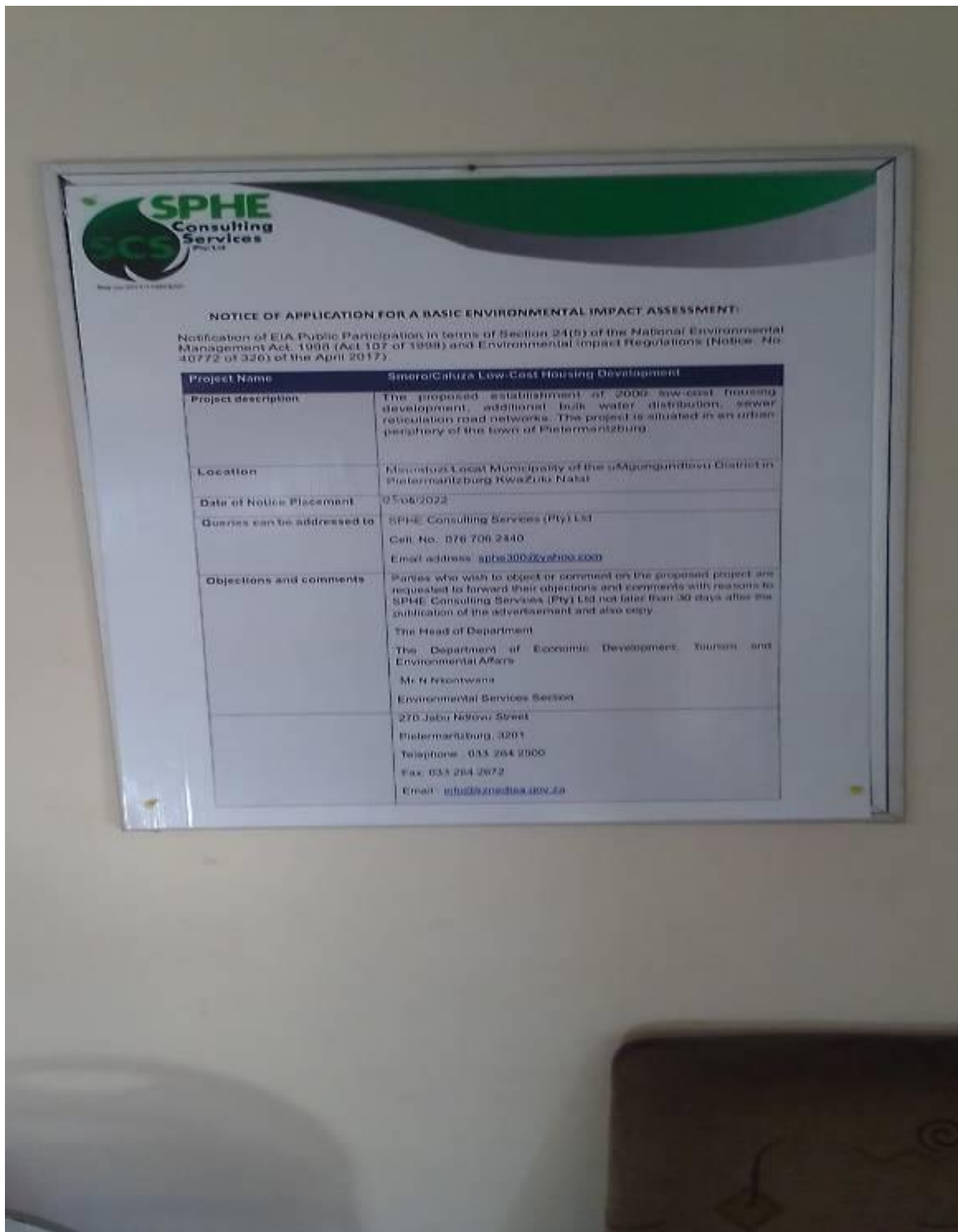


Figure 10: Notice board erected on site

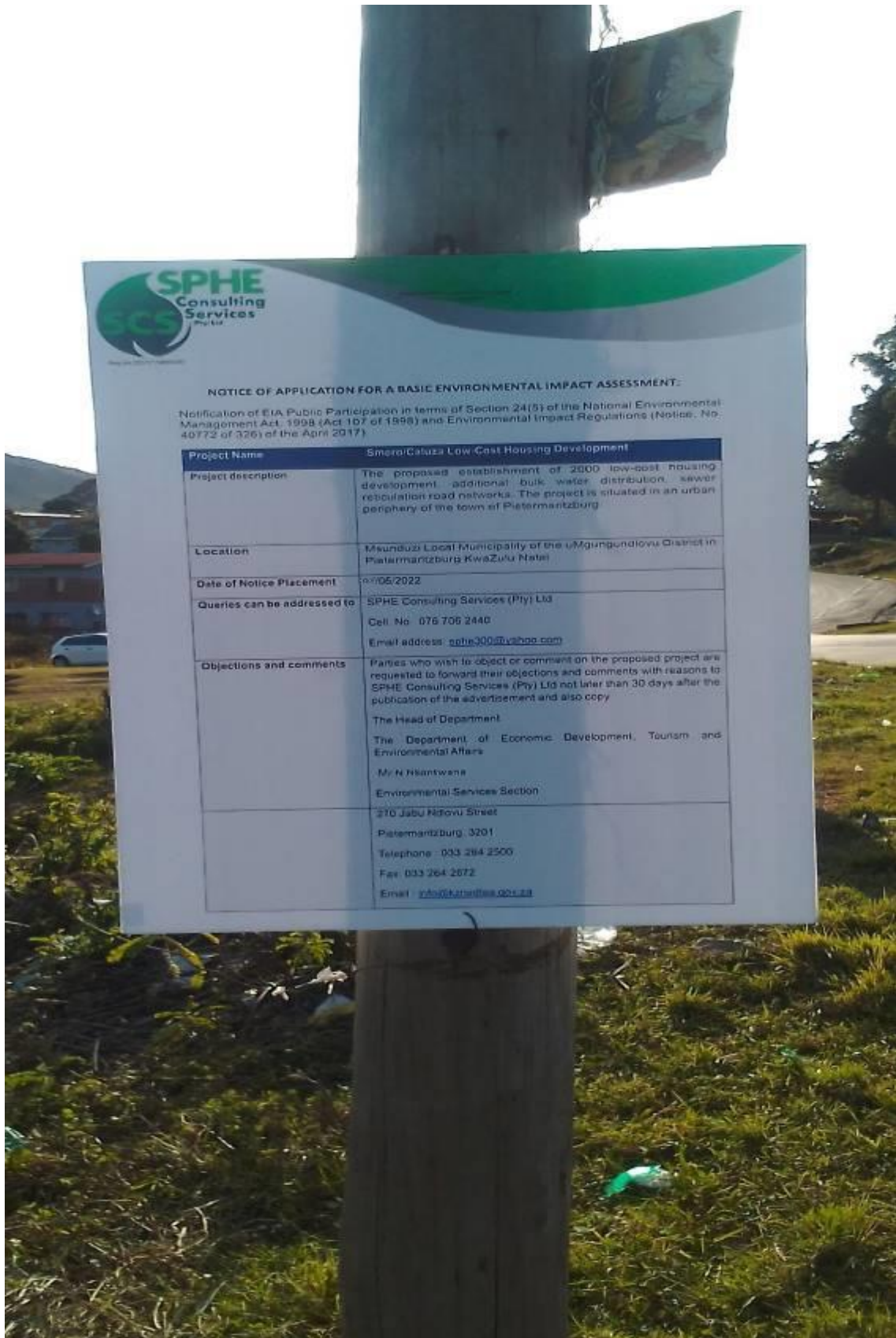


Figure 11: Notice board erected on site

4.1.4 Background Information Document

At commencement of the project a Background Information Document (BID) was prepared and sent to I&APs that provided a summary of the details of the proposed project as well as the EIA process that was to follow (See **Appendix E of previously submitted EIAr**).

4.2 Public Meeting

The project public meeting was conducted on the 05th of June 2022. See **Appendix I of previously submitted EIAr**

4.3 Register of Interested and Affected Parties (I&AP's)

As per the requirements of Regulation 42 of Government Notice No. R 326, a register of I&APs has been maintained and updated throughout this project. Kindly refer to **Appendix C of previously submitted EIAr** for a copy of the register.

4.4 Comments Register

Kindly refer to **Appendix F of previously submitted EIAr** for a copy of the Comments Register. The key issues have been documented in **Section 8** of the previously submitted document.

4.5 Public review of the draft Scoping Report

The draft Scoping Report was made available to I&APs for a 30-day comment period. Kindly refer to **Appendix F of previously submitted EIAr** for a copy of the Comments Register.

4.6 Public Review of the EIAr

SPHE Consulting made the EIAr available to registered I&APs for a 30-day comment period, beginning on 23rd of June 2022 and ending on the 03rd of August 2022. All

comments received from I&AP's during this public review period were included in the Final EIAr that was submitted to EDTEA (see previously submitted EIAr).

Sinohydro Consulting have recirculated the EIAr that has incorporated the specialist reports recommendations and no comments were received from this second review of the EIAr document except acknowledgement of receipt from Human settlement Department and Amafa application which is under way (see Appendix c) also a newspaper advert was placed in The Mercury for English adverts and Isolezwe for isiZulu adverts on 27 March 2023

Figure 12: isiZulu Newspaper advert in the Isolezwe on 27-03-2023 (see appendix C)

Figure 13: English Newspaper advert in the Mercury on 27-03-2023 (see appendix C)

5. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED

Continual expansion of human settlement is the great ganger to the bio-physical environment. The principle of sustainable development needs to applied whenever the is a proposal for a development. The EIA aims to adequately identify and mitigate these impacts so that the any development coexists with nature and the physical, biological, social, economic, and cultural aspects of the environment.

This section focuses on the receiving environment where the proposed Low-Cost Housing Development will be constructed and how the receiving environment will be affected by the proposed activity.

5.1 Climate

The climate and local weather in Msunduzi are strongly influenced by topography; the higher lying areas in the north and west of the Municipality are cooler and receive more rainfall. Average annual temperature varies between 16.3°C and 17.9°C. Msunduzi falls within a summer rainfall area, characterized by dry winters and wet summers, with thunderstorms being very common in summer. The mean annual precipitation in Pietermaritzburg is 966 mm per year. The rainfall in Pietermaritzburg is significant, with precipitation even during the driest month. Pietermaritzburg receives the lowest rainfall (23 mm) in June and the highest (140 mm) in January (Figure 4.1 of Biodiversity report). The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Pietermaritzburg range from 11.9 °C in July to 20.6 °C in February (Figure 4.1 Figure 4.1 of Biodiversity report). The climate data was taken from <https://en.climatedata.org/africa/south-africa/kwazulu-natal/pietermaritzburg-634/> / accessed 19 October 2021.

On clear winter nights, katabatic flow occurs, resulting in the movement of air from upslope areas down to the city bowl, much like water. This fills the valley floor with cold, dense air, creating an inversion that does not allow pollutants to escape. This air movement also brings pollutants from the entire Municipality into the

valley, where it remains trapped by the inversion layer. The majority of industrial development within Msunduzi has been established within this inversion layer, as this land is both flat and in close proximity to both road and rail transport routes. Data taken from IDP (2020/21).



Figure 14: Monthly average rainfall (mm) and the monthly average temperatures (°C) of Pietermaritzburg, KwaZulu-Natal accessed from <https://en.climate-data.org/africa/south-africa/kwazulu-natal/pietermaritzburg-634> 19 October 2021

5.2 Topography

The study area is dominated by shale, best defined as a horizon above which the sand is to shale ratio is greater than 0.5 (Mucina & Rutherford 2012). The proposed activity is a housing development that will take place in a landscape that is characterized by being uneven and steep landscape. The site highest point is 1004 meters above sea-level and the lowest is 738 meters above sea level.



Figure 15: Site Topography

5.3 Geology and Soils

The geology of the study area is Mainly sandstone siltstone and shale of the Vryheid Formation, Ecca Group with small areas of dolerite Thus the project lies in the south-eastern part of the Karoo Basin, within the Ab119 and Ac222 land types where the Ecca Group rocks are well exposed. Much younger alluvium and landslip rubble occurs on the hillsides and valleys.

(a) Geology

The underlying geology of the region consists of a sequence of clastic or fragmented sedimentary rock strata, consisting of sandy and clayey sales, sandstones and tillites, overlaying a bedrock composed of granite and gneisis. Significant areas of intruded dolerite are found throughout the region (Msunduzi SDF, 2009).

(b) Soils

The soils found in most parts of the metropolitan region have a high clay content and are considered to be generally active in that they expand in relation to changes in their moisture content. The degree to which these soils expand and contract is dependent upon the thickness and depth of the clay layer and the climatic conditions and drainage characteristics of the area (Msunduzi SDF, 2009). Thus, the soil forms within this landscape position are the Gs1716/Gs18 Glenrosa soil form and has soil texture of Sandy Clay Loam (SaCILm).

5.4 Hydrology (Rivers and Wetlands)

The study area is located in the Quaternary Catchments U20J, within the Pongola to Mtamvuna Water Management Area (WMA) 4. The Mean Annual Precipitation (MAP) of the study area is 840mm and the Mean Annual Evaporation (MAE) of the study area is 1 400mm (WR 2012).



Figure 16: Nine water management areas of South Africa

The extent of wetlands within Msunduzi has declined significantly in recent years, particularly in developed areas. Wetlands have been transformed and most of the remaining wetlands are degraded. Wetlands provide a number of ecosystem goods and services critical for the realization of social and economic development goals. (Msunduzi, EMF:2010).

Zonhla Hydro & Enviro Consulting (Pty) Ltd were appointed by Sphe Consulting Services (Pty) Ltd to conduct a Wetland Identification and Assessment Specialist Study for the activities associated with the proposed Smero/Caluza Low-Cost Housing Development. This was to support environmental approvals in terms of the requirements of the environmental authorisation as per the NEMA No. 107 of 1998, EIA Regulations of 2014, as amended on 7 April 2017, as well as to support the Water Use License Application (WULA) processes as per Section 21 of the NWA No. 36 of 1998.

The initial wetland identification process was conducted at a desktop level during which the available SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands dataset were interrogated to determine the presence of any wetland areas that has been determined in the past, within the 500m radius of the project boundary. The SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands database showed a presence of three wetlands area within a 500m radius of the proposed project boundary.

During the site visit, two wetlands areas identified at the desktop level were observed to be utilised as cemetery sites, therefore, these were not assessed and were excluded from this study. The site visit yielded one wetland and two rivers. The identified wetland as classified as per SANBI guidelines (Ollis et al., 2013) as the Channelled Valley Bottom wetland (HGM 1). The wetland was assessed to have a PES range between Category D (Largely Modified), owing to the transformed nature of the surrounding land use and its influence on the wetland systems. The EIS of the wetland was assessed as being of 'High (B class).'

The wetland habitat risk assessment determined that the project may have the potential to impact the identified wetland and rivers. The impacts to the identified wetland and rivers would be from incorrect construction methods and operational activities of the proposed construction activities. The impacts on the wetland and rivers were assessed to be low significant. Prior to undertaking the proposed activities, construction method statements and emergency response plans must be developed, with specific consideration given to the environment, including wetland and river habitats. It is envisaged that the implementation of these would provide sufficient mitigation measures in order to reduce the environmental impact.

The proposed housing development site boundary is outside of the regulated 32 m buffer of the delineated wetland (HGM 1, Msunduze River and Mvubuzi River. Therefore, the proposed housing development being outside of the 32m buffer of the delineated wetland and river, may not trigger the NEMA No. 107 of 1998, EIA Regulations 2014, Government Notice 327 (GNR.327) Listing Notice 1, Activity 12., requiring exemption from environmental authorisation (See Fig: 11).

Owing to the section of the proposed housing development site boundary being within the regulated 500m radius of the delineated wetland and outside 100m buffer on the Msunduze and Mvubukazi River, it is therefore the specialist understanding that the proposed activities may trigger the Section 21 (c) and (i) of the NWA No. 36 of 1998, namely:

- Section 21 (c)- Impeding or diverting the flow of water in a watercourse; and
- Section 21 (i) - Altering the bed, banks, course, or characteristics of a watercourse

Zonhla Hydro & Enviro Consulting (Pty) Ltd.'s Environmental Statement and Opinion was that the impacts of the housing development on the HGM 1 wetland, Msunduze River and Mvubukazi Rive are Low risk. It is the opinion of the specialists that the project poses minimum flaws to the wetland and rivers. Therefore, the project should be authorised to allow for the construction of the Smero Housing Development. Base d on the low risk significant, it is the specialist opinion then that the project meets the requirements of the "General Authorisation (GA) in terms of Section 39 of the NWA No. 36 of 1998, Water Uses as defined in Section 21(c) and (i)", Notice 509 of 2016. Therefore, a GA in terms of GN 509 should be applied for with the DHSWS for the proposed project.

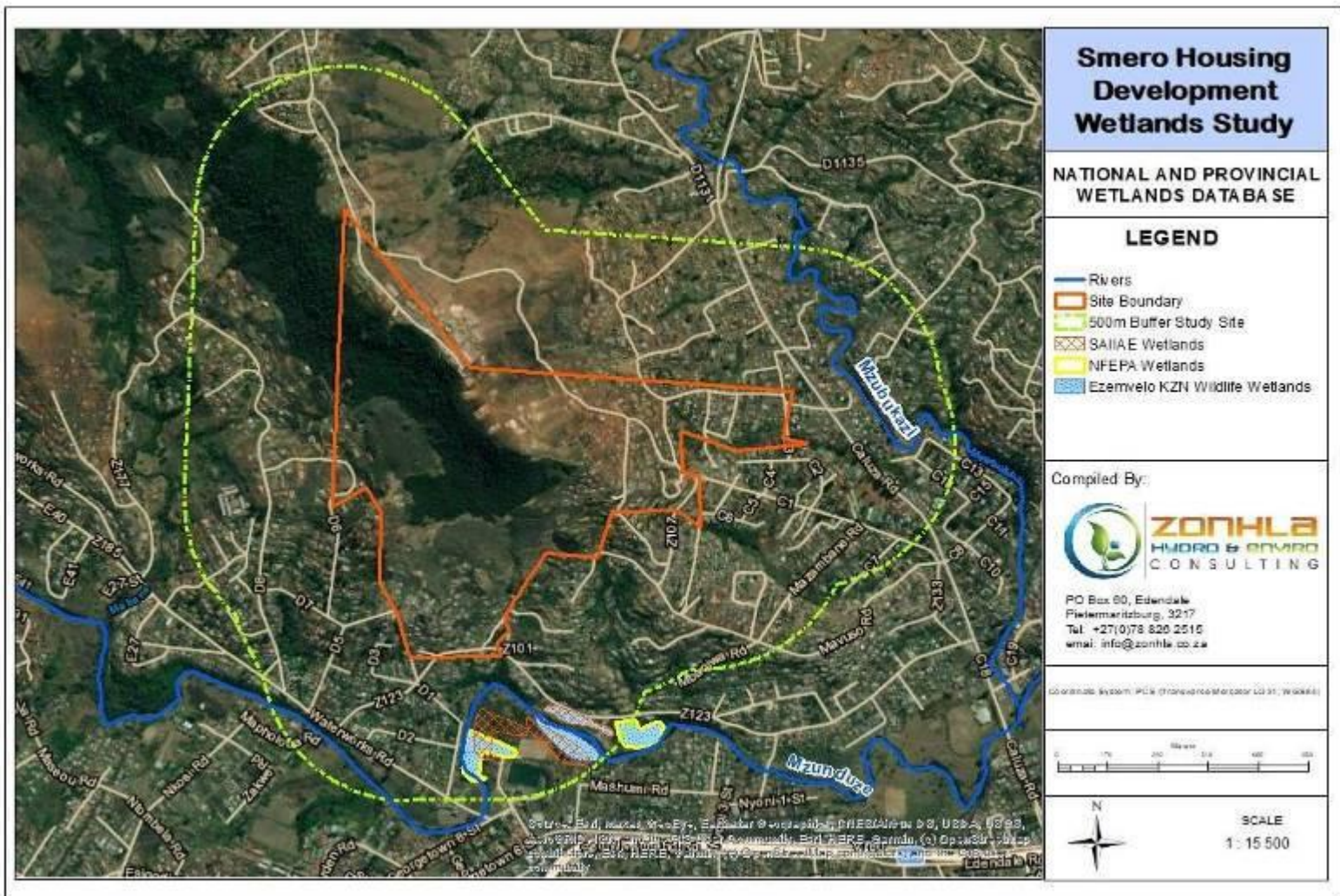


Figure 17: Wet Deliniation Map

5.5 Biological Environment

Vegetation

As described by Mondise Environmental Services (Pty) Ltd, the vegetation of the study area is described by three vegetation types; Moist Coast Hinterland Grassland vegetation type (Gs20), Midlands Mistbelt Grassland (Gs9) and Eastern Mistbelt Forest and their regional conservation status is Endangered (Mucina and Rutherford 2006). Moist Coast Hinterland Grassland is distributed in KwaZulu-Natal and Eastern Cape Provinces, generally occurring at 450 -900 m (Mucina & Rutherford 2012). The vegetation occurs on a hilly landscape and comprise of dense tall sour grassland dominated by unpalatable Ngongoni grass (*Aristida*

junciformis) associated with low species diversity, when in good condition dominated by *Themeda triandra* and *Tristachya leucothrix* (Mucina & Rutherford 2012).

Midlands Mistbelt Grassland (Gs9) is scattered in a broad belt in the form of several major patches including Melmoth-Babanango area, Kranskop and Greytown, Howick Lions River, Karkloof, Balgowan, Cedara, Edendale, Hilton, Richmond, the Ixopo-Highflats area, Mount Malowe in the Umzimkhulu enclave of the Eastern Cape Province and the Harding-Weza area. The vegetation of Midlands Mistbelt grassland is dominated by forb-rich, tall, sour *Themeda triandra* grasslands transformed by the invasion of native 'Ngongoni grass (*Aristida junciformis* subsp. *junciformis*) on hilly and rolling landscapes. Only a few patches of the original speciesrich grasslands remain (Mucina & Rutherford 2012).

Eastern Mistbelt Forest occurs in fire-shadow habitats on south and southeast facing slopes from Somerset East and the Amathole Mountains in the Eastern Cape to the KwaZulu-Natal Midlands and as far east as Ulundi (Mucina and Rutherford 2006). These forests occur at altitudes ranging from 850 to 1,600m but most patches are found between 1,000 and 1,400m. They are dominated by emergent trees of *Podocarpus falcatus* (*Outeniqua* yellowwood) with *Podocarpus henkelii* (Henkel's yellowwood) being prominent in the canopy layer together with a range of deciduous and semideciduous species such as *Celtis africana* (white stinkwood), *Calodendrum capense* (Cape chestnut), *Vepris lanceolata* (white ironwood) and *Zanthoxylum davyi* (forest knobwood).

Based on the provincial KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) for terrestrial areas, the current study site mainly falls under the Critical Biodiversity Area: Irreplaceable (CBA 1) which represents areas of high biodiversity value. Another portion falls under the Critical Biodiversity Area: Optimal (CBA 3) which has been identified as a Biodiversity Priority area with a lower irreplaceability score compared to CBA 1 and CBA 2. It is important to note that although these areas are critical biodiversity areas but they have already been transformed as residential built-up areas (referring to the areas that were previously a grassland). Another

portion is 100% transformed into a residential area. Small portions of the study area fall under the biodiversity area. These are areas that were not selected as critical biodiversity areas.

Based on Mondise Environmental Services (Pty) Ltd.'s overall findings and the nature of the proposed development (which is the development of housing), limited constraints to the proposed activity exist provided that the recommendations made on this report are adhered to. This does not suggest that the activity would be free from ecological impacts; hence a net loss of biodiversity would inevitably result. It is important to note that the study area is in endangered vegetation cover in terms of conservation status regionally. The high sensitive natural forest is recommended as a no-go area with a 50 m buffer around it to be maintained. Additionally, extra care needs to be taken on the developmental activities that will take place on the sloping areas of the study site to ensure that the disturbances are kept at a minimum. Moreover, sites that would be disturbed during the development and operational phases of the project would need to be rehabilitated so as not to cause accelerated soil erosion. It is recommended that construction activities should be restricted to areas demarcated by the project plans (except where there is a natural forest patch which is recommended as a no-go area) to minimise impacts on the sensitive biodiversity areas. The impacts of the proposed expansion of Smero Housing Development on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. Therefore, although the commencement of the proposed construction activities is recommended, the mitigation measures and recommendations outlined in this report need to be adhered to in order to minimize the overall impact of the project. If the outlined measures and recommendations are adhered to, then it is not expected that there will be any unacceptable impacts on the vegetation of the receiving environment. The figure below shows vegetation distribution on the proposed site (Figure prepared by Mondise Environmental Services (Pty) Ltd)

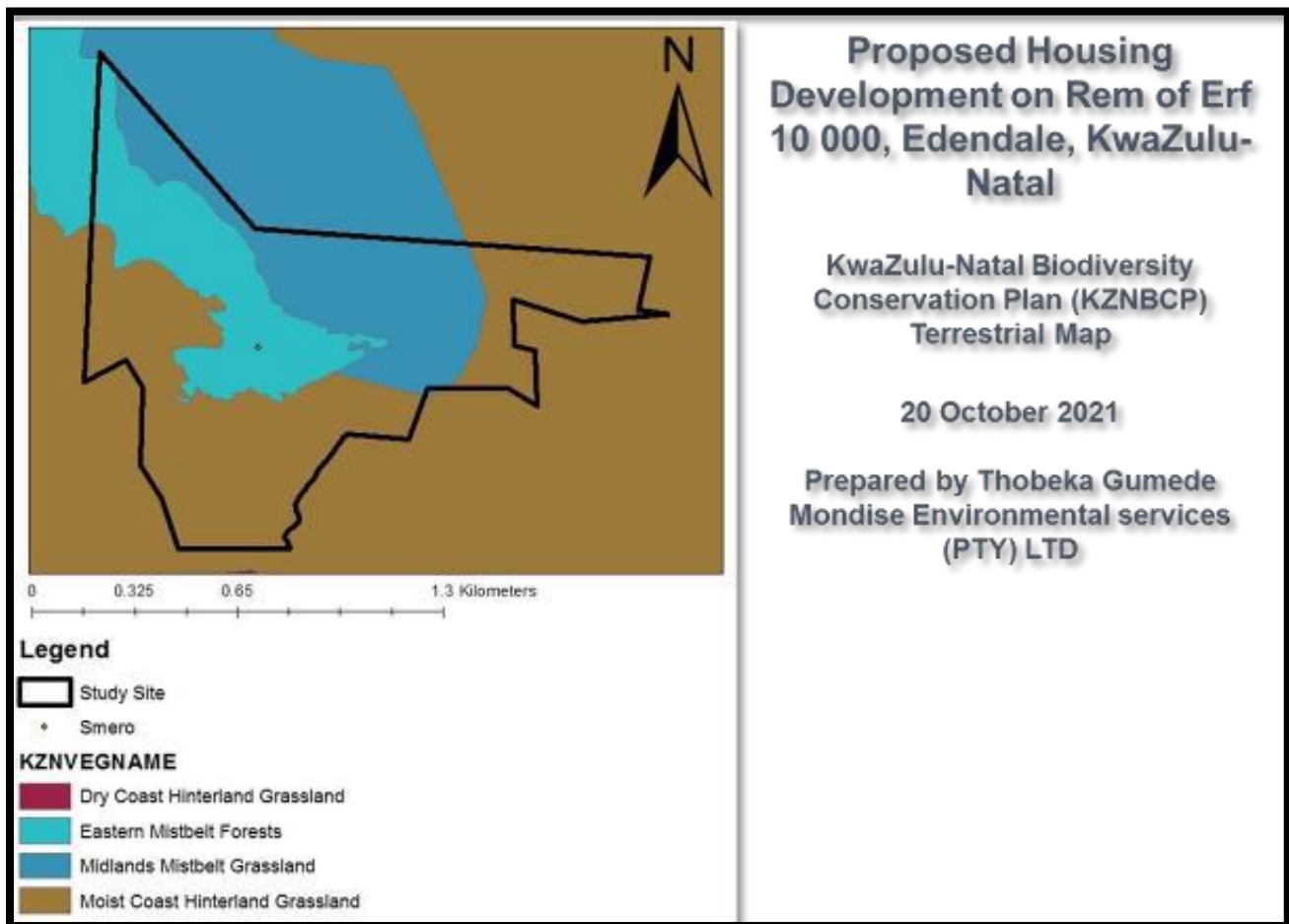


Figure 18: South African National Biodiversity Institute (SANBI) vegetation map of the region shows the study area at Rem of Erf 10 000, Edendale, KwaZulu-Natal within the Moist Coast Hinterland Grassland, Midlands Mistbelt Grassland and Eastern Mistbelt Forests.

Animals.

Animal species of conservation concern in terms of the project area were defined as threatened species if the species were listed in the Endangered or Vulnerable categories in the revised South African Red Data Books and/or species included in other international lists (e.g., 2017 International Union for Conservation of Nature (IUCN) Red List of Threatened Animals).

As per Mondise Environmental Services (Pty) Ltd the SCC animal species predicted to occur on site as per the DFFE Screening Report tool were not located on site. Additionally, there were no other wild animals observed on site during the site visit. Small mammals such as rodents, ground squirrels, bats and a variety of insects,

amphibians and reptiles are expected to occur on site. This was expected since the area is in built up area.

5.6 Paleontological and archeological issues

The Paleontological and heritage investigations were carried out by Professor Marion Bamford, of the University of the Witwatersrand. This was to comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Paleontological Impact Assessment (PIA) was completed for the proposed development.

His findings were that the proposed site lies on non-fossiliferous dolerite and Quaternary alluvium, and on the Pietermaritzburg Formation that rarely has trace fossils. Part of the area is on potentially fossiliferous shales of the Vryheid Formation (Ecca Group, Karoo Supergroup). The area is already very disturbed and covered by soils and vegetation so it is unlikely to find fossils until the ground is broken. Therefore, a Fossil Chance Find Protocol procedure should be applied and will be added to the EMPr. Based on this information it is recommended that no further paleontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer, or any other designated responsible person once excavations for foundations, amenities and roads have commenced. As far as the paleontology is concerned, the project should be authorised.

5.6.1 The Chance Find Protocol

Monitoring Programme for Paleontology – to commence once the excavations begin.

1. The following procedure is only required if fossils are seen on the surface and when excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales

and mudstones (for example see Figure 5). This information will be built into the EMP's training and awareness plan and procedures.

4. Photographs of the putative fossils can be sent to the paleontologist for a preliminary assessment.

5. If there is any possible fossil material found by the developer/environmental officer then the qualified paleontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.

6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the paleontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site an AMAFA or SAHRA permit must be obtained. Annual reports must be submitted to Amafa and SAHRA as required by the relevant permits.

7. If no good fossil material is recovered then no site inspections by the paleontologist will be necessary. A final report by the paleontologist must be sent to AMAFA and SAHRA once the project has been completed and only if there are fossils.

8. If no fossils are found and the excavations have finished then no further monitoring is required.

5.7 Socio-Economic Environment

Smero/Caluza project is strategically placed on the urban periphery of one of the largest economic hub in KZN (Pietermaritzburg). Pietermaritzburg is the thriving modern capital of KZN and the administrative seat of uMgungundlovu district. The city is a dynamic commercial and industrial center, and is the base for the manufacturing of products such as aluminum, chemicals, furniture, timber, and leather products. Temporary jobs will be created during the construction phase on this project. 75 unskilled and 20 skilled jobs will be created during the project construction phase.

Smero/Caluza informal settlements are characterized, economically, by more than 70% of households that earn less than R1 600 per month. These high levels of poverty exist in all areas within PMB; however, it is more concentrated in the informal settlement areas. There needs to be a focus on developing the economic sectors within these areas to offer more opportunities for people. A large part of this area is

used for residential purposes even though it is largely under-serviced. This area has been identified as one of the city's areas of priority spending (Msunduzi Consolidated SDF, 2009).

The socio-economic condition in Smero/Caluza encourages the intervention of the government in housing delivery. One of the ways to reduce the burden of housing on the population is for the Department of Human Settlement to deliver formal houses. With the provision of additional housing, the ward is able to accommodate the population commuting between the two economic hubs, provide a sense of entitlement and promote economic sustenance.

5.7.1 Educational Facilities

Smero/Caluza has a number of schools that service this informal settlement. So, the new development will not struggle to get educational facilities. The project will therefore provide local people with the much needed decent accommodation while in close proximity to school for their kids.

5.7.2 Social and Economic Facilities

The surrounding residential areas have a number of social facilities such as churches and pre-schools that provide a service to the surrounding neighborhoods. Residential neighborhoods also have economic facilities that provide a service and employment to the surrounding population. Therefore, there is no need to provide additional social and economic facilities within Smero/Caluza for the surrounding area.

5.7.3 Health

The low-cost housing project will not have potentially negative impacts on the health of the communities and the surrounding areas. It is anticipated that the health impacts with regards to the Low-Cost Housing Development will be positive as they communities will get services including the communities outside the project boundary will also benefit since bulk services will be extended and they will also be connected. The communities inside the project area will get better houses and the beneficial

communities together with nearby communities will get water borne sewer system, municipal potable water, electricity, refuse collection by municipality. All this will reduce health risks. There is no need for an additional health facility since the clinics in the surroundings are enough coupled with the area's close proximity to Edendale Hospital. The improved access roads will improve accessibility of the area by ambulances and other transport systems in case of need

5.8 Land Use Zoning

The property for the proposed Low-Cost Housing Development is in an already settled area that was settled many years ago. In order for the Low-Cost Housing Development and the current settlements to be official recognised for planning purposes, the area's zoning rights are being changed. The SPLUMA application is being done to the relevant Competent Authority. This process is running concurrently with the EIA phase.

5.9 AGRICULTURAL POTENTIAL

The site occurs to have been used historically for grazing activities. Currently the grazing activities are limited since most people in the area are no longer keeping animals but working in town. The need for houses is superseding the agricultural needs. The few cattle that are in the area will still have grazing areas since part of the developmental areas has houses already and only part of the indicated hectareage will be utilized due to the terrain.

5.10 Visual Aesthetics

Since the area is already a settled area for many years, and surrounded with settled areas, the housing development will not differ from the current aesthetics. The existing development both on the proposed site and the surrounding is haphazard with no uniformity from layout to types of structures, the uniform houses will not poss. any aesthetic issues

6. METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS;

The following significance rating method will be used to rate impacts emanating from the proposed Smero/Caluza Low-Cost Housing Development activities:

Significance of the Impact(s):

Each category will be assigned points. These points will be computed by using the equation below and each potential impact will be assigned a significance rating (S).

Therefore: $S = (E+D+M) * P$

Table 5: The significance ratings:

Rating	Description
(<30) low	The impact will not have a direct influence on the decision to develop in the area
(30-60) medium	The impact can influence the decision to develop in the area unless it is effectively mitigated
(>60) high	The impact should have an influence on the decision process to develop in the area

Significance Method (Equation)

Nature of the Impact – Refers to the description of the activity impacting the environment.

Rating	Description
Positive	In most cases this would be a benefit
Negative	Could be a cost
Neutral	No implications on either cost or benefit

Extent of The Impact (E) – Refers to the area which the activity will have an impact on (Geographic area).

Rating	Description
1	Site – impact extends to site only
2	Local – impact extends as far as the boundary of site and immediate surroundings
3	Regional
4	Provincial
5	National

Duration of the Impact (D) (The length of time that the impact will last)

Rating	Description
1	Immediate – less than one year
2	Short term – between one year & five years
3	Medium Term – between five years & 15 years
4	Long term – impact ceases after operational life span of the project
5	Permanent

Probability (P) – Refers to the likelihood that the impact will occur.

Rating	Description
0	None – impact will not occur
Rating	Description
1	Improbable – probability very low due to design or experience
2	Low – unlikely to occur
3	Medium – distinct probability that the impact will occur
4	High – most likely to occur
5	Definite

Severity/Magnitude (M) - Refers to degree at which the impact will occur.

Rating	Description
--------	-------------

10	Very High – an irreversible and permanent change that cannot be mitigated
8	High – impacts that could be mitigated, however this mitigation would be costly
6	Medium – medium term impacts that could be mitigated
4	Low – short term impacts with very easy mitigation
0	No effect – the proposed development would have no impact

For the purposes of this study, only two alternatives were considered during the impact assessment phase in addition to the no-go option. These alternatives include the technology and design alternatives.

No go alternative: The no-go option would entail maintaining the status quo. This is not considered a viable alternative as Msunduzi Municipality has a back log on housing. The area is also already settled so no go alternative will deprive the already settled communities of bulk services

Technology alternative: Since the development in already settled with haphazard pattern, with different types of building technologies used, the best environmentally friendly green building technology will be applied.

Design alternative: : Since the development in already settled with haphazard pattern, and differently designs used, the designs that is going to be used is best suitable for this type of low-cost housing development due to its funding capping.

7. DETAILED FINDINGS AND RECOMMENDATIONS OF ANY SPECIALIST REPORT OR REPORT ON A SPECIALISED PROCESS

This section of the report focuses on specialist studies conducted during the Scoping phase of the project. Furthermore, the findings and recommendations of each study

conducted are summarised. Recommendations or mitigation measures will be incorporated into the EMPr.

The following studies were completed for the Scoping

- ❖ Geotechnical Assessment
- ❖ Biodiversity Studies
- ❖ Wetland Identification and Assessment Specialist Study
- ❖ Paleontological Impact Assessment

7.1 GEOTECHNICAL ASSESSMENT

7.1.1 Key Assessment Objectives

The Geotechnical Investigation for the proposed Smero/Caluza Low-Cost Housing Development was conducted by Geosure Pty (Ltd), after being requested by Mr. S. Sathnarayan from Pangaea Consulting on behalf of Verern Builders cc to carry out a geotechnical desktop appraisal of the proposed development.

The main objective of this geotech report was to set out the results of a Desktop Geotechnical Appraisal carried out for the proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu- Natal.

The appraisal was carried out in accordance with the guidelines set down in the National Department of Housing (DoH) document titled “Geotechnical Site Investigations for Housing Development,” referenced GFSH-2 and dated September 2002.

7.1.2 Method of Assessment

The main objective for the Geotechnical investigation was to determine the Sub-soil conditions of the proposed Low-Cost Housing Development . In determining the sub-soil conditions, the report or investigation further determines the viability to establish the proposed Low-Cost Housing Development at the proposed site. The

following method was used for the investigation (as per the Geotechnical Investigation):

- The investigation was carried out generally according to standard practice codes and guidelines, including:
 - Minimum guidelines for the Department of Housing GSFH-2: Phase 1 Geotechnical Site Investigation; and
 - National Home Builders Registration Council (NHBRC) Home Builders Manual (HBM).
- ❖ The nature of geotechnical engineering is such that variations in soil conditions may occur even where sites seem to be consistent. Variations in what is reported here may become evident during construction and it is thus imperative that a Competent Person inspects all excavations to ensure that conditions at variance with those predicted do not occur and to undertake an interpretation of the facts supplied in this report.

7.1.3 Key Findings

7.1.3.1 Suitability of the Site in Terms of Terrain Classification Units

The suitability of the site was evaluated by classifying the site into major geotechnical zones in accordance with the “Terrain Classification System for Geotechnical Constraints on Development¹”. The results of this classification are tabled overleaf.

7.1.3.2 Slope Stability

On the basis of the desktop pre-feasibility appraisal, there do not appear to be any “fatal flaws” from a geotechnical perspective across the majority of the site, excluding oversteep and/or rugged terrain and areas of alluvium associated with the stream/and other major drainage courses.

Accordingly, the greater majority of the site is considered at this stage from a slope stability perspective to be generally suitable for the macro planning of RDP-type housing development as proposed.

Suitable detailed geotechnical site investigations will be finalised during final designs when project budget is released. This also applies to final groundwater protocol evaluation to inform final planning and civil engineering design in line with the requirements of the national and provincial government agencies i.e., Department of Human Settlements and Department of Water and Sanitation.

The site does, however, exhibit unfavourable topographical and subsoil features discussed below as follows:

- Development of any areas steeper than 1 vertical in 3 horizontal ($>18^\circ$) will present practical engineering and costing challenges for low income RDP housing. A low-income development along slopes steeper than 18° is thus generally not considered economically feasible and should either not be planned or alternatively limited in extent.
- Valley terrain exhibits an adverse geotechnical character including slope instability permanent shallow groundwater activity including ground saturation, potential areas of flooding and / or wetland environs. For these reasons, development of valley bottoms for the purposes of the proposed development is to be avoided.
- Similarly, heads of valleys generally exhibit unfavourable geotechnical features including weakly drained concave slopes with a risk of shallow groundwater activity and thicker soil profiles. As such, valley head slopes are classified as potentially unstable i.e., slopes presently stable yet at a real risk of instability. Accordingly, development of valley head slopes for rural low-cost housing is only considered feasible provided suitable and potentially costly development controls are put in place.
- On even, relatively compact stands, earthworks along slopes steeper than 1 vertical (v) in 5 horizontal (h) (12°) have the potential to generate high cuts and fills. From economical and practical consideration, housing development

should be planned along non-wetland slopes grades preferably less than approximately 1v:5h.

- There is a higher risk of slope instability associated with earthworks in areas underlain by bedded sedimentary bedrocks such as shale and sandstone. It is thus recommended that Geosure be intimately involved in the earthworks stage of development to ensure that no unfavourably orientated bedding planes will affect the long-term integrity of the development.
- Good site drainage, including the provision of stormwater control facilities such as retention structures, interceptors, subsoil drainage and similar such measures, is strongly advised to reduce concentrated overland flows, particularly along slopes underlain by erodible subsoils. In this regard, although not observed at desktop level, localised landslides may form along steep slopes, usually mobilisation of the soil cover if it becomes saturated. The need for subsoil drainage to manage this feature will depend on the proposed development and should be assessed on site during the construction phase.
- The natural soils occurring on the site are considered susceptible to sloughing by stormwater and it is important that adequate erosion controls to engineer's detail are put in place.
- The yield of the site based on areas suitable for development in terms of stable slopes requires to be established by conducting a Phase 1 Geotechnical Site Investigation and specialist environmental studies.

7.1.4 Mitigation Measures

Geotechnical and geohydrological guidelines are set down below to guide the macro planning and conceptual civil engineering design of a low-income housing project at the site.

7.1.4.1 Sanitation

As per geotechnical recommendation, if a waterborne connection facility is unavailable, on-site sanitation systems that are usually considered for low-income projects of this nature comprise the following options to engineer's detail

- Ventilated Improved Pit (V.I.P.) toilet;
- Low flush “aqua-privy” toilet discharging into a septic/digester tank and soakaway.

But however there will be a water borne systems and there, this recommendation will not be considered

It is considered at a desktop level that the inferred geotechnical site conditions away from wetland habitat should generally suit the use, in principle, of a V.I.P. toilet system to engineer’s detail.

7.1.4.2 Inferred Founding Conditions

At desktop level, the range of inferred founding materials and properties inferred at the site are outlined below in Table 2 of the geotechnical report, as “Site Class Designations”, reproduced from the NHBRC Home Building Manual (Part 1, Section 2, Table 1 refers).

Taking the inferred founding conditions from the table into due consideration, it is considered that all foundations and surface bed floor slabs are constructed and certified in accordance with structural engineers’ details, taking the results of detailed geotechnical design recommendations arising from an appropriate subsurface investigation into due consideration.

7.1.4.3 Geotechnical and Geohydrological Site Investigations

The geotechnical report states that as part of the urban planning exercise for a low-income housing development, it is national policy that provision be made for conducting the following stages of geotechnical and geohydrological investigations as described in documents by the National Department of Housing² and DWA.

7.1.4.3.1 Phase 1 Geotechnical Site Investigation

This is both a feasibility and detailed geotechnical design report to guide detailed planning and engineering design of civil infrastructure and foundation.

It is important that engineering design is based on geotechnical recommendations arising from Phase 1 Geotechnical Site Investigation.

7.1.4.3.2 Groundwater Protocol

For the purpose of this report, the geotechnical report included assumptions of disposal of human waste effluent by means of a VIP toilet. Should there be a requirement for VIPs, then the geotechnical and geohydrological planning requirements to define and manage the potential of groundwater contamination for a rural VIP toilet programme should be determined by means of conducting a “Groundwater Protocol Evaluation³” in accordance with DWS requirements.

7.1.4.3.3 Phase 2 Geotechnical Site Investigation

The report also recommend that a Phase 2 geotechnical investigation must follow on from a Phase 1 Site Investigation to enable verification of soil classes as assessed from platform earthworks and, referencing guidelines set down by the NHBC.

This verification exercise is usually carried out once a building contractor commences with site earthworks and installing infrastructure.

7.1.4.3.4 Overstep and Rugged Slopes

As a rule, economic development of land steeper than 1 vertical: 3 horizontal (>18°) for low-income housing purposes is general not cost-effective.

Although there are steep terrain from aerial imagery over the north western portions of the site. The extent of oversteep terrain across the entire site should, however, be determined on the basis of a slope analysis by the urban planner.

A rugged landscape may also preclude low-income housing from practical and engineering constraints.

7.1.5 Recommendations

The following recommendations are made as per the Geotechnical Investigation report:

- ❖ This report sets out the results of a Geotechnical Desktop Appraisal carried out for the proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu- Natal.
- ❖ The nature and general scope of the investigation is in accordance with guidelines set down in the National Department of Housing (DOH) document titled “Geotechnical Site Investigations for Housing Development” referenced GFSH-2 dated September 2002.
- ❖ According to the Council for Geoscience’s regional geological sheet “2930 Durban”, the site appears to be underlain by alluvium, Jurassic age dolerite, Vryheid Formation shale and sandstone and Pietermaritzburg Formation shale.
- ❖ On the basis of the desktop pre-feasibility appraisal, there do not appear to be any “fatal flaws” from a geotechnical slope stability perspective across the majority of the site, excluding areas of alluvium including river tributaries.
- ❖ The site does however exhibit unfavourable topographical and subsoil features which are, discussed in Section 9.3 of the Geotech/ report:
- ❖ In accordance with a planning document from the National Department of Housing, allowance should be made for conducting a Phase 1 Geotechnical Site Investigation and Phase 2 Geotechnical Site Investigation. These studies will inform the engineering design of the civil infrastructure and house foundations.

7.2 Biodiversity Studies

7.2.1 Key Assessment Objectives

Biodiversity studies were conducted by a team of professionals from Mondise Environmental Services (Pty) Ltd. Their prime objective was to identify potential impacts on biodiversity associated with the proposed activity. In order to achieve this and to accurately assess the ecological integrity of the area, emphasis was placed on the following aspects:

- Identification of the Environmental Sensitivity of the site using desktop and online resources.
- Identification of the existing vegetation units and the floristic composition of this vegetation within the study area.
- Determine the extent to which the vegetation types represent the 'natural state' vegetation as described in the national classification of vegetation by Mucina and Rutherford (2006).
- Determine the threat status of the vegetation assessed according to the South African National Biodiversity Institute (SANBI) and KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP).
- Detection and identification of red list and/or protected plant species which may occur within the proposed footprint area so that provision may be made to safeguard these.
- Also of importance is the potential presence of protected habitat/s at the site.
- Describe the level of degradation of the vegetation on site
- Assess the impact of the proposed development on the vegetation of the site.
- Provide recommendations to mitigate the negative environmental impacts of the proposed development.
- Lastly, the objectives above will be used to determine sites that should not be subjected to development activities.

7.2.2 Method of Assessment

The following approach for the assessment was adopted:

- ❖ A survey of the vegetation units found on the site;
- ❖ An indication of the presence of any Red Data flora and faunal species on the site or in the vicinity of the site;
- ❖ An assessment of the conservation status of the site as well as major habitat concerns should habitats of exceptional value be recorded.

- ❖ Determination of the Site Ecological Importance (SEI) of the sensitive receptors (vegetation types, plant SCCs animal SCCs) on site.
- ❖ Determination of the environmental impact of the project on the biodiversity features, vegetation and plant and animal SCCs of the site.
- ❖ Make recommendations to mitigate the negative environmental impacts of the project on the vegetation of the site.
- ❖ Prepare a report indicating the current environmental sensitivities and Land Uses on the site.

7.2.3 Key Findings

The significant biodiversity concerns identified at the proposed Smero/Caluza Housing development project in Pietermaritzburg Msunduzi Municipality was that the conservation status of the vegetation is endangered. Additionally, the natural forest patch, which is not easily accessible, likely had species of conservation concern identified by the screening report i.e., forest invertebrates and it was recommended as a no-go area with a 50 m buffer on its boundary. There were no species of conservation concern identified during the site visit. There were no NFEPA rivers and wetlands but the catchment area has been earmarked for conservation by the KZNBCP. Based on the overall findings and if the recommendations in this report are adhered to, limited constraints to the proposed activity exist. This does not suggest that the activity would be free from ecological impacts, and a net loss of biodiversity would inevitably result. In order to mitigate against such impacts and minimize the adverse effects to biodiversity, the application of the following measures is strongly advised.

7.2.4 Mitigation Measures

During the Planning and Design, construction and Post-Construction Phases of the proposed project, all mitigations outlined below need to be adhered to.

7.2.4.1 Planning and design phase

- ❖ An Environmental Control Officer (ECO) must be appointed to oversee construction activities.
- ❖ A plan to actively rehabilitate the area used for construction post-construction needs to be developed.
- ❖ Construction activities must be limited to the designated footprint of the project area.
- ❖ Where vegetation has been cleared, site rehabilitation in terms of soil stabilization and re-vegetation must be undertaken.

7.2.4.2 Construction phase

- ❖ Construction activities need to be restricted to the areas demarcated by the project plans.
- ❖ No indigenous vegetation outside the demarcated project boundaries must be removed.
- ❖ Only the approved haul road must be used and vehicles must not traverse virgin land.
- ❖ There should be minimal disturbance to areas in the immediate vicinity as successful vegetation recovery will depend on the remaining vegetation.
- ❖ Construction boundary must be demarcated and vegetation clearing and top soil removal limited to these areas.
- ❖ Construction activities must be limited to the designated development footprint.
- ❖ No poaching of any wild animals will be allowed.
- ❖ The development area must again be surveyed prior to construction in order to locate and capture any SCC and relocate them.

7.2.4.3 Operational phase

- ❖ All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.

- ❖ Disturbed areas must be re-vegetated by seeding with plants that are natural to the area.
- ❖ An alien removal plan must be implemented and run during operational phase.
- ❖ A Rehabilitation Management Plan must be implemented.

7.2.5 Recommendations

Based on findings and summary table of impacts, the impacts of the proposed project on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. The construction is recommended and mitigations as well as recommendations outlined in this report need to be adhered to. If the above measures and recommendations are adhered to, then it is not expected that there will be any unacceptable impacts on the vegetation of the receiving environment. The mitigation in the biodiversity report will be included in the EIAr.

7.3 Wetland Identification and Assessment Specialist Study

7.3.1 Key Assessment Objectives

Zonhla Hydro & Enviro Consulting (Pty) Ltd were appointed by Sphe Consulting Services (Pty) Ltd to conduct a Wetland Identification and Assessment Specialist Study for the activities associated with the proposed Smero/Caluza Low-Cost Housing Development. The focus of the assessment was to undertake a specialist wetland assessment of the wetlands that could potentially be impacted by the proposed activities associated with the housing development.

The aim and objectives of this study were as follows:

- ❖ Identification and classification of any wetlands that are located within a 500m radius from the boundary of the project sites;
- ❖ Assessment of the identified wetlands within the boundaries of the project;

- ❖ Modelling of the identified wetlands and other aquatic features that may be directly impacted by the proposed activities;
- ❖ Identification of potential impacts on the wetlands; and
- ❖ Management and mitigation measures to be implemented to limit or mitigate these impacts.

7.3.2 Method of Assessment

This Wetland Assessment Study was undertaken as a specialist study for the proposed project to support the required environmental authorisation under the NEWA No. 107 of 1998, EIA Regulation of 2014 as amended on 7 April 2017 and WULA processes as per Section 21 of the NWA No. 36 of 1998.

In brief, the following methodology was applied to achieve the outcome:

- A methodology of the site visit and the techniques used to assess the specific aspect of the site;
- Classification of wetlands and assessment of conservation significance based on available datasets;
- Classification of wetlands functionality;
- Assessment of PES (Present Ecological State/Condition) and EIS (Ecological Importance and Sensitivity) of wetlands;
- Details of an assessment of the specific identified sensitivity of the wetlands areas related to the proposed activity or activities and its associated structures and infrastructure;
- An identification of any areas that are to be avoided;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity;
- Any mitigation measures for inclusion in the Environmental Management Programme Report (EMPr);
- Any conditions for inclusion in the rehabilitation plan;
- Any monitoring requirements for inclusion in the EMPr; and

- A reasoned opinion whether the activity should be authorised based on the findings of the study.

7.3.3 Key Findings

The aim of this study was to conduct the Wetland Identification and Assessment Specialist assessment for the activities associated with the proposed Smero Housing Development Scheme within the Msunduzi Local Municipality, KwaZulu-Natal. The wetlands specialist study was to support environmental approvals in terms of the requirements of the environmental authorisation as per the NEMA No. 107 of 1998, EIA Regulations of 2014, as amended on 7 April 2017, as well as to support the Water Use License Application (WULA) processes as per Section 21 of the NWA No. 36 of 1998.

The initial wetland identification process was conducted at a desktop level during which the available SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands dataset were interrogated to determine the presence of any wetland areas that has been determined in the past, within the 500m radius of the project boundary. The SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands database showed a presence of three wetlands area within a 500m radius of the proposed project boundary.

During the site visit, two wetlands areas identified at the desktop level were observed to be utilised as cemetery sites, therefore, these were not assessed and were excluded from this study. The site visit yielded one wetland and two rivers. The identified wetland as classified as per SANBI guidelines (Ollis et al., 2013) as the Channelled Valley Bottom wetland (HGM 1). The wetland was assessed to have a PES range between Category D (Largely Modified), owing to the transformed nature of the surrounding land use and its influence on the wetland systems. The EIS of the wetland was assessed as being of 'High (B class).'

The wetland habitat risk assessment determined that the project may have the potential to impact the identified wetland and rivers. The impacts to the identified wetland and rivers would be from incorrect construction methods and operational activities of the proposed construction activities. The impacts on the wetland and

rivers were assessed to be low significant. Prior to undertaking the proposed activities, construction method statements and emergency response plans must be developed, with specific consideration given to the environment, including wetland and river habitats. It is envisaged that the implementation of these would provide sufficient mitigation measures in order to reduce the environmental impact.

The proposed housing development site boundary is outside of the regulated 32 m buffer of the delineated wetland (HGM 1, Msunduze River and Mvubuzi River. Therefore, the proposed housing development being outside of the 32m buffer of the delineated wetland and river, may not trigger the NEMA No. 107 of 1998, EIA Regulations 2014, Government Notice 327 (GNR.327) Listing Notice 1, Activity 12., requiring exemption from environmental authorisation.

Owing to the section of the proposed housing development site boundary being within the regulated 500m radius of the delineated wetland and outside 100m buffer on the Msunduze and Mvubukazi River, it is therefore the specialist understanding that the proposed activities may trigger the Section 21 (c) and (i) of the NWA No. 36 of 1998, namely:

- Section 21 (c)- Impeding or diverting the flow of water in a watercourse; and
- Section 21 (i) - Altering the bed, banks, course, or characteristics of a watercourse

7.3.4 Mitigation Measures

The following mitigative measure were recommended in order to minimise any potential impact from the project on the wetlands:

- Best practice standards must be followed for the construction of the proposed low-cost housing;
- Construction method statements are to be adhered to. These method statements should consider the environmental facets associated with the wetland and rivers such as hydrological flow regimes, flora, and fauna. These should be approved by the relevant departments (i.e., EDTEA and DWS);

- Existing access routes must be utilised and heavy machinery should not be allowed to enter the delineated wetland areas;
- The identified wetland areas must be demarcated as a no-go area during construction.
- A site layout plan must be compiled indicating the limits of disturbance associated with the proposed development in relation to the identified sensitive areas (i.e., wetland). No-go areas and any stormwater infrastructure must be indicated on this plan;
- During construction, sediment control measures must be adopted in order to prevent sediments entering the wetland and rivers;
- Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur within the plant site (i.e., outside of the wetland and rivers buffer zones);
- Machinery used during the construction must be parked on the designated bunded areas and dip trays must be placed under the machinery when not used to capture any possible oil leaks;
- Should there be plans to store petrol, oil, and diesel on site (construction site boundary), all petrochemical storage tanks must be enclosed in a bunded area that makes provision for 110% of the total volume of tanks that they contain. All these bunded areas must be supplied with a closable valve through which any spillage can be safely removed;
- A Spill Response Plan must be available for any spills that occur during construction phase;
- It is recommended that education of workers is key to establishing good pollution prevention practices. Training programs must provide information on material handling and spill prevention and response to better prepare employees in case of an emergency.
- Stormwater management measures should be implemented in order to minimise the impacts of the disturbed areas. The stormwater management plan should include measures to minimise the transport of sediment from the site; and
- The activities should be licensed so as to avoid any legal issues (i.e. any activity triggering the NEMA No. 107 of 1998 EIA Regulation of 2014, as amended on 07 April 2017 amended, and Section 21 of the NWA No 36 of

1998, WULA). Where activities have already commenced, the required legislation procedure should be followed (i.e., Section 24G rectification application under NEMA) in order to ensure compliance. An Environmental expert should be consulted to advise if any of the activities (existing or proposed) may need authorisation from EDTEA or DWS).

7.3.5 Recommendations

Based on the specialist findings, the impacts of the housing development on the HGM 1 wetland, Msunduze and Mvubukazi Rivers are Low risk. It is the opinion of the specialists that the project poses minimum flaws to the wetland and rivers. Therefore, the project should be authorised. Based on the low risk significant, it is the specialist opinion then that the project meets the requirements of the “General Authorisation (GA) in terms of Section 39 of the NWA No. 36 of 1998, Water Uses as defined in Section 21(c) and (i)”, Notice 509 of 2016. This GA application with the DHSWS in terms of GN 509 is being undertaken.

7.4 PALAEOLOGICAL/HERITAGE IMPACT ASSESSMENT

7.4.1 Key Assessment Objectives

The Paleontological Impact Assessment was conducted by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by JLB Consulting, Durban, South Africa.

The main objective for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA. The main purpose of the PIA is to provide comments and recommendations on the potential impacts including mitigation/conservation measures on the fossil heritage of the area where the proposed disposal site will be located. Only Paleontological studies were done, Heritage was not done after doing ground truthing and based on Paleontological assessment recommendation. Ground truthing shows that the area was already settled long back and most areas that are going to be developed have houses and services already. Based on the Chance Find Procedure recommended

for fossil heritage, other heritage issues will use the same protocol to over fruitless expenditures on the project.

7.3.2 Method of Assessment

The following approach was taken for the PIA study:

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

7.4.3 Key Findings

The PIA indicates the following findings:

- Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint.
- The geological structures suggest that the rocks are the right age to contain fossils but these would only be below ground or in rocky outcrops, not in the soil cover.
- Since there is a small chance that fossils from the Vryheid Formation may be disturbed a Fossil Chance Find Protocol has been added to this report.

- Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low. .
- Based on the geology of the area and the paleontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales, and sands are typical for the country and some might contain fossil plant material.
- The covering sands and soils of the Quaternary period would not preserve fossils.
- The area is highly disturbed and any intact fossils would be underground.
- A surface survey would not reveal fossils. Only excavations would reveal fossils.

7.4.4 Mitigation Measures

Since the Chance Find Protocol was recommended by the specialist, the Monitoring Programme for Paleontology will commence once the excavations begin.

The following procedure will be followed

1. The following procedure is only required if fossils are seen on the surface and when excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 5). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the paleontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified paleontologist sub-contracted for this project, should

visit the site to inspect the selected material and check the dumps where feasible.

6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the paleontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site an AMAFA or SAHRA permit must be obtained. Annual reports must be submitted to Amafa and SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the paleontologist will be necessary. A final report by the paleontologist must be sent to AMAFA and SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

7.4.5 Recommendations

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the covering soils and sands. of the Quaternary. There is a small chance that fossils may occur below ground in the shales of the early Permian Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the developer, contractor, environmental officer, or other responsible person once excavations for amenities, roads and foundations have commenced then they should be rescued and a paleontologist called to assess and collect a representative sample. The impact on the paleontological heritage would be low so, as far as the paleontology is concerned, the project should be authorised (see Appendix G).

8. DESCRIPTION OF ALL ENVIRONMENTAL ISSUES, INCLUDING THEIR SIGNIFICANCE RATINGS AND MITIGATION MEASURES

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the Scoping & EIA. Based on the requirements of the impact assessment, and the approved Plan of Study of EIA,

Impacts identified and issues and concerns raised are assessed with regard to their significance.

The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigatory measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their nature, extent, duration, intensity and probability. In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision unless they can be effectively mitigated to a low significance, whereas impacts with a high significance despite mitigation would influence the decision to proceed with the proposed development. The impacts listed in this section were identified by the EIA Project Team (including specialists) and were augmented by input from the I&APs during the public review of the Environmental Impact Report.

8.1 IMPACT ASSESSMENT METHODOLOGY

Activities within the framework of the proposed development and its construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into phases from which impacting activities can be identified, namely:

A. Status Quo

The site as it currently stands taking cognisance of the disturbance and the impacts remaining, while operating.

B. Pre-construction phase

All activities on site up to the start of the construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts, which would be associated with planning.

C. Construction phase

All the construction and construction related activities on site, until the contractor leaves the site.

D. Operational phase

All activities, including the operation and maintenance of the proposed development. The activities arising from each of the relevant phases have been included in the tables contained in this chapter. The assessment endeavors to identify activities that require certain environmental management actions to mitigate the impacts arising from them.

8.2 ASSESSMENT CRITERIA

A. Nature of impact

This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how

B. Extent

The physical and spatial size of the impact. This is classified as:

I) Site

The impact could affect the whole, or a measurable portion of the above-mentioned properties.

II) Local

The impacted area extends only as far as the activity, e.g., a footprint.

III) Regional

The impact could affect the area including the neighboring farms the transport routes and the adjoining towns

C. Duration

The lifetime of the impact. This is measured in the context of the lifetime of the propose Low-Cost Housing Development .

I) Short term

The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.

II) Medium term

The impact will last up to the end of the phases, where after it will be entirely negated.

III) Long term

The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.

IV) Permanent

The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

D. Intensity

Is the impact destructive or benign? Does it destroy the impacted environment alter its functioning, or slightly alter it? This is rated as:

I) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

II) Medium

The affected environment is altered, but function and process continue, albeit in a modified way.

III) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

E. Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.

The classes are rated as follows:

I) Improbable

The possibility of the impact occurring is very low, due either to the circumstances, design, or experience.

II) Probable

There is a possibility that the impact will occur to the extent that provisions must be made therefore.

III) Highly probable

It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.

IV) Definite

The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect

F. Determination of significance

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

I) No significance

The impact is not substantial and does not require any mitigatory action.

II) Low

The impact is of little importance, but may require limited mitigation.

III) Medium

The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

IV) High

The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels could render the entire development option or entire

project proposal unacceptable. Mitigation is therefore essential. In order to maintain consistency, all potential impacts that have been identified during the EIA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.

8.3 Potential impacts and key issues identified during the Scoping Phase and as per the specialists investigations:

8.3.1 Bulk Services Capacity

Msunduzi Local Municipality in an attempt to meet housing shortages will cause significant stress on bulk water services. According to the Engineering report, bulk services will be extended and be brought to the project extend. The proposed housing development will have to share the same bulk services with existing and neighbouring communities, therefore, increasing the demand and stressing the currently servicing.

8.3.2 Geotechnical suitability

The geotechnical investigation indicates different stabilities due the terrain of the area. The potential impact as a result is soil erosion, thus eroded soil been carried into storm water drains or water bodies. Furthermore, the stability of the structure maybe impaired by the soil strata. The final recommendations is that the land is suitable for the establishment of a General Low-Cost Housing Development.

8.3.3 Disturbance of floral and faunal species

The proposed housing project has a potential in to impact the habitat on site, which in turn affects the biodiversity within the area. Furthermore, the indigenous forest within the site poses a major concern as it may contain species of ecological importance as it may have scarcer plant species that survived the human activities that have been taking place around the site. Indirect impacts such as forest

harvesting and animal trapping associated with the proposed low-cost housing could impact on the surrounding habitats.

8.3.4 Drainage system and soil erosion

As per engineering report, the terrain may cause soil terrain both during construction and operation due to storm water issues. However, the with proper designs and management, this can be managed.

8.3.5 Wetlands loss, ground, and surface water contamination

The proposed housing development site boundary is outside of the regulated 32 m buffer of the delineated wetland (HGM 1, Msunduze River and Mvubuzi River but within the regulated 500m radius of the delineated wetland and outside 100m buffer on the Msunduze and Mvubukazi River. In the short term, surface and ground water may be polluted by construction activities, such as the contamination from fuels, cement, oils, and other liquid waste. A potential impact on water quality may also arise from the risk of soil erosion and poor storm water management during both construction and operational phases. Recommendations from wetland specialist and EMPr and engineering designs must be adhered to.

8.3.6 Paleontology/Heritage impacts

The proposed housing project has a potential of causing damage or loss of fossils/artefacts that are of cultural heritage significance. The Paleontological/Heritage Impact Assessment conducted together with ground truthing indicates that the proposed disposal site will not have any impact on heritage resources, and fossils could not be identified before excavations since they are buried. However, the Chance Find Protocol should be applied and during excavations any object encountered or exposed should be reported to the KZN Heritage Resource Agency and all activities on site should stop.

8.3.7 Air Pollution (Noise and Dust Nuisance)

Construction activities and plant will have both air pollution through noise and dust pollution. The project location adjacent to a residential area and therefore the construction will cause noise and dust pollution to the existing settlements. Construction activities that cause noise include vehicle trafficking, generator noise, pressure hammers and construction worker's voices, etc.

The clearing of vegetation in preparation for construction exposes the soil which will cause dust problems together with plant movement and exhaust emissions. This will increase the Particulate Matter (PM) concentration in the atmosphere. Increase in dust and noise will be a nuisance to the surrounding environment

8.3.8 Land Use and Aesthetics

Smero/Caluza Low-Cost Housing Development will result in a change in land use, with some loss of grazing taking place. However, it will impact positively on the current housing shortage within the Msunduzi Local Municipality at the same time addressing the number of informal settlements as well as providing housing to previously disadvantaged individuals who cannot afford houses. Grazing is no longer a priority to the communities who want houses. Furthermore, most sections are already settled with informal houses.

On the visual impact's aspects, the project, the site is adjacent to residential areas and therefore the construction of the development will disturb the landscape to a limited extent but will not be great since the project is already settled haphazardly with non-uniform structures, the low-cost housing will bring some uniformity to the area.

8.3.9 Solid Waste Issues

Both construction and operation phases of the development will generate waste ranging from clearing of vegetation, builder's rubble, general construction refuse, general house hold waste and minor hazardous waste including paint tins, cleaning acids, asphalts, and oils. The contractor and developer should ensure that all the waste generated by the development is appropriately disposed of at the

recommended waste disposal sites close to the area. The waste management procedures in the EMPr and EA must be adhered to. During the operations phase, Municipal waste management section will service the proposed residential area.

8.3.10 Social, Health and safety Issues

Smero/Caluza will have a number of social and health and safety impacts both negative and positive. These will include increase in number of people staying in the area, people from other areas may move in bringing safety issues in the area, issues with graves in people's yards, pressure on schools and health care centers. These can be addressed by strict work ethics, marking, and making any grave a no-go area, and there are enough schools and health centers to cater for the development. There will be cumulative positive impacts on the number of informal settlements, addressing the current housing shortage at the same time creating jobs throughout the construction and operation phases. The short-term employment for casual labourers and skills transfer also. There will be a ripple effect from employment ranging from buying power, rentals, food vendors.

The proposed development has minimal short term negative impacts on health and safety. These include accidents through reckless driving, assaults through migrant workers who will visit drinking areas, dust from construction and ills of bad social behaviour that is leaves fatherless children. This can be addressed by strict ethics, workshopping contractor's staff, and continuous talks with them.

9. ASSESSMENT OF IMPACTS

In this EIAR, **mitigation** measures will refer to the **precautionary measures** that can be **implemented in the planning stage** in order to avoid, reduce or remedy the impacts of activities from the proposed project. An EMPr, specifying the methods and procedures for managing the environmental aspects of the proposed development, during the construction and operational phase is attached in Appendix I.

Table 6: ENVIRONMENTAL IMPACT – BIOPHYSICAL ENVIRONMENT

PLANNING/CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Bulk Services – Sewer and Potable water Development will increase pressure on existing bulk services resulting in, 1. Sewer spillages. 2. Use of un approved water sources resulting in contamination and depletion	Extent	2	1. Sewer and potable water will be connected to existing municipal system (Letters from Municipality confirming capacity attached) 2. Designs to upgrade, extend and connect existing services to new and existing houses to bulk services	Extent	2
	Duration	1		Duration	1
	Magnitude	4		Magnitude	1
	x Probability	4		x Probability	1
	Calculation	2+1+4 x 4		Calculation	2+1+1x 1
	= Score	28		= Score	4
	Nature	Negative		Nature	Positive
	Significance	Low	Significance	Low	
Bulk Services - Electricity Supply Stressed electricity supply system resulting in use of 1. coal, 2. paraffin and 3. firewood harvesting from nearby forest all leading to climate issues	Extent	5	1. Use of electricity supplied by municipality. 2 Implementation of green buildings technology 3. Use of alternative renewable energy	Extent	2
	Duration	5		Duration	1
	Magnitude	8		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	5+5+8x 3		Calculation	2+1+0 x 2
	= Score	54		=Score	6
	Nature	Negative		Nature	Negative
	Significance	Medium	Significance	Low	

PLANNING/CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Loss of Flora Site clearance for the purpose of construction of the proposed Low-Cost Housing Development and associated infrastructure; including construction camp may result in the loss of flora.	Extent	3	1. Limit clearance to developmental foot print 2. Adhere to specialist recommendations 3. Only about 28% of the developmental area in not settled with the remainder settled with houses.	Extent	2
	Duration	1		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	4		x Probability	2
	Calculation	2+1+4 x 4		Calculation	2+1+4 x 2
	= Score	28		= Score	14
	Nature	Negative		Nature	Negative
Significance	Low	Significance	Low		
Loss of Fauna Site clearance for the purpose of construction of the proposed Low-Cost Housing Development and associated infrastructure; including construction camp may result in the loss of fauna habitats.	Extent	2.	1. Limit clearance to developmental foot print 2. Adhere to specialist recommendations 3. Only about 28% of the developmental area in not settled with the remainder settled with houses.	Extent	2
	Duration	5		Duration	1
	Magnitude	6		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+5+6 x 3		Calculation	2+1+0 x 2
	= Score	39		=Score	6
	Nature	Negative		Nature	Negative
Significance	Medium	Significance	Low		

PLANNING/CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Socio – Economic Issues - Influx of new people, for work and settling will resulting in, 1. social conflict	Extent	2	1. Contractor to implement good ethics and conduct to hi skilled workers brought in from outside the area 2. Local labour employment to be done through a local community leader’s employment desk 3. allocation of house to be done by municipality through their local traditional and political structures	Extent	2
	Duration	2		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+2+4 x 4		Calculation	2+1+4 x 2
	= Score	32		= Score	14
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Socio – Economic Issues - Influx of new people, for work and settling will resulting in, 1. Increase in Crime	Extent	2	1. Contractor to implement good ethics and conduct to hi skilled workers brought in from outside the area 2. Local labour employment to be done through a local community leader’s employment desk 3. allocation of house to be done by municipality through their local traditional and political structures	Extent	2
	Duration	2		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+2+4 x 4		Calculation	2+1+4 x 2
	= Score	32		=Score	14
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low

PLANNING/CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Social Services Low-Cost Housing Development may result 1. increased pressure on schools and health cares	Extent	2	1. There are enough schools and health cares to cater for the development 2. Most of the people are already staying there and therefore the increase in population will not be very steep	Extent	2
	Duration	5		Duration	1
	Magnitude	8		Magnitude	4
	x Probability	4		x Probability	2
	Calculation	2+5+8 x 4		Calculation	2+1+4 x 2
	= Score	60		= Score	14
	Nature	Negative		Nature	Negative
	Significance	Medium	Significance	Low	
Socio-Economic The development may result in increased business competition through influx of business people	Extent	2	1. Municipal bylaw on business regulation to be enforced 2. Different business sections to be encourage to reduce competition 3. Local legal business forums to be involved to avoid conflicts	Extent	2
	Duration	5		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+5+6 x 3		Calculation	2+1+0 x 2
	= Score	33		=Score	6
	Nature	Negative		Nature	Negative
	Significance	Medium	Significance	Low	

CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<p>Geology and Soil</p> <p>1. The surface geology of the proposed site will be disturbed by earthworks and excavation activities required during the construction of the site.</p> <p>2. Top soil reduction/loss</p>	Extent	2	<p>1. proper design, monitoring, and management. An installation of a leachate management</p> <p>2. Proper sub-soil drainage systems should be constructed due to the presence of a perch water level on site.</p> <p>3. Building foundations must be reinforced</p> <p>4. Topsoil removed must not be used for building or maintaining access roads.</p> <p>5. Recommendations from Geotech report and proper designs including storm water designs must be implemented</p>	Extent	2
	Duration	1		Duration	1
	Magnitude	8		Magnitude	6
	x Probability	3		x Probability	3
	Calculation	2+1+8 x 3		Calculation	2+1+6 x 3
	= Score	33		= Score	27
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low

CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Surface and Groundwater Surface water pollution as a result of fuel leaks and lubricants. Riverine pollution as a result of surface water run-off.	Extent	3	1. Construction vehicles must be serviced to avoid leakages of fuels and lubricants to the soil. No servicing of construction vehicles must take place within the site, to avoid soil contamination with hydrocarbons or oils. 2. Chemical portable toilets provided by contractors must be maintained for the duration of the construction phase. 3. Mixing of cement must take place on impervious surfaces and the areas for mixing must be controlled by berms. 4. Recommendations from the wetland specialist report must be implemented	Extent	2
	Duration	1		Duration	1
	Magnitude	8		Magnitude	4
	x Probability	2		x Probability	2
	Calculation	3+1+8 x 2		Calculation	2+1+4 x 2
	Score	24		Score	14
	Nature	Negative		Nature	Negative
Significance	Low	Significance	Low		
Air Quality The generation of dust due to construction activities, thus vehicular movements.	Extent	2	1. All surfaces that are not paved and generate dust should be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit the generation of dust	Extent	2
	Duration	4		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	4		x Probability	2

CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Construction vehicles may generate vehicular emissions resulting in air pollution.	Calculation		2+4+4 x 4	2. Vehicular speed to the construction site should be regulated, in order to limit the generation of dust on houses along the access route to site. 3. Dust monitoring process needs to be undertaken during the construction phase.
Score		40	Score	14	
Nature		Negative	Nature	Negative	
Significance		Medium	Significance	Low	
Wetlands Construction activities may impact on wetlands and the 2 identified rivers	Extent	2	1. DWS/NWA Section 21 regulation must be adhered to 2. Recommendations from the wetland specialist report must be implemented	Extent	1
	Duration	1		Duration	1
	Magnitude	6		Magnitude	1
	x Probability	2		x Probability	2
	Calculation	2+1+6 x 2		Calculation	1+1+1 x 2
	Score	18		Score	6
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Noise Noise nuisance due to construction and operational	Extent	1	1. Construction activities must be limited to working hours (from 7am to 5p.m) during the week, not including public holidays. Shall it happen that construction will take place after working hours the neighbors/IAPs need to be	Extent	1
	Duration	4		Duration	1

activities.			notified. The immediate surrounding areas of the proposed Low-Cost Housing		
	Magnitude	4	<p>2. In terms of noise complaints, a complaints register must be maintained with the corrective action under taken.</p> <p>3. Noise generated on site must be limited to a range as provided in the National and local laws and bylaws.</p> <p>4. On site personnel should be provided with PPE to assist in reducing noise levels that may be emanating from construction activities.</p>	Magnitude	4
	x Probability	2		x Probability	2
	Calculation	1+4+4 x 2		Calculation	1+1+4 x 2
	Score	18		Score	12
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low

CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Generation of Waste Construction will produce general waste both construction rubble and domestic waste	Extent	1	<p>1 Some of the construction waste (Excavated material) can be used as fill material at other sites where required or disposed of the licensed Low-Cost Housing Development .</p> <p>2 Construction waste, for instance unused concrete must be disposed of at a licensed Waste disposal facility/Low-Cost Housing Development .</p> <p>3 No construction phase waste to be stockpiled on site.</p> <p>4 Litter bins must be provided at the site for waste generated by construction personnel.</p>	Extent	1
	Duration	1		Duration	1
	Magnitude	6		Magnitude	4
	x Probability	4		x Probability	2
	Calculation	1+1+6 x 4		Calculation	1+1+4 x 2
	= Score	32		= Score	12
	Nature	Negative		Nature	Negative
Significance	Medium	Significance	Low		
Visual Change of visual and aesthetic aspects due to altered	Extent	2	1 Construction activities must observe good housekeeping principles and the site must be kept neat at all times.	Extent	2
	Duration	5		Duration	3
	Magnitude	8		Magnitude	6

landscapes, houses construction, and associated construction activities.	x Probability	4	2 The site is already disturbed and settled with houses in place. There will not be much aesthetic changes	x Probability	2
	Calculation	2+5+8 x 4		Calculation	2+3+6 x 2
	Score	60		Score	22
	Nature	Negative		Nature	Negative
CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Significance	High		Significance	Low
Heritage Resources Loss of heritage resources/objects as a result of the Low-Cost Housing Development and its associated infrastructure.	Extent	5	1. A Paleontological/Heritage Impact Assessment was done. 2. The report recommendations must be implemented 3. Report recommends Chance Find Procedure to be implemented.	Extent	2
	Duration	5		Duration	1
	Magnitude	8		Magnitude	8
	x Probability	3		x Probability	2
	Calculation	5+5+8 x 3		Calculation	2+1+8 x 2
	= Score	54		= Score	22
	Nature	Negative		Nature	Negative
	Significance	Medium	Significance	Low	

OPERATIONAL PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Loss of Flora Continued loss of flora through firewood and poles harvesting and other human activities	Extent	2	<ul style="list-style-type: none"> - Any landscaping implemented in the development must make use of indigenous vegetation in order to limit or eliminate the introduction of alien and/or invasive species. -Provision of electricity to avoid firewood harvesting -Environmental education and development of environmental parks, conservation area on the steep/cliff area -Biodiversity report recommendations on operational phase must be implemented 	Extent	2
	Duration	5		Duration	5
	Magnitude	6		Magnitude	2
	x Probability	2		x Probability	2
	Calculation	2+5+6 x 2		Calculation	2+5+2 x 2
	= Score	26		= Score	18
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Loss of Fauna Continued loss of fauna through poaching, habitat loss and other human activities	Extent	2	<ul style="list-style-type: none"> - There are no large animal except rodents , reptiles, and other invertebrates' organisms - Limit the vegetation removal to construction footprint 	Extent	2
	Duration	5		Duration	1
	Magnitude	6		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+5+6 x 3		Calculation	2+1+0 x 2
= Score	39	=Score	6		

	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
Geology and Soil Loss of soil and change in the geology of the area	Extent	2	1 Storm water management system with attenuation facilities must be implemented on site, so as to avoid erosion and sedimentation. 2 The maintenance of storm water system must be done regularly.	Extent	2
	Duration	4		Duration	4
	Magnitude	8		Magnitude	6
	x Probability	3		x Probability	2
	Calculation	2+4+8 x 3		Calculation	2+4+6 x 2
	= Score	42		= Score	24
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
Topography The proposed Low-Cost Housing Development will negatively impact the topography of the area as it will alter the landscape during the operational phase.	Extent	1	The topography is already settled so there is minimum disturbances to the current topography accept in areas where landscaping needs to be done	Extent	1
	Duration	5		Duration	5
	Magnitude	6		Magnitude	6
	x Probability	4		x Probability	2
	Calculation	1+5+6 x 4		Calculation	1+5+6 x 2
	= Score	48		= Score	24
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low

Surface and Groundwater Surface and ground water pollution as a result of leachate.	Extent	2	1 Storm water management system with attenuation facilities must be implemented on site, so as to avoid erosion and sedimentation. 2 The maintenance of storm water system must be done regularly.	Extent	2
	Duration	8		Duration	4
	Magnitude	6		Magnitude	6
	x Probability	4		x Probability	1
	Calculation	2+8+6 x 4		Calculation	2+4+6 x 1
	Score	64		Score	12
	Nature	Negative		Nature	Negative
	Significance	High		Significance	Low

OPERATIONAL PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Air Quality Gaseous emissions from use of firewood and coal Increased traffic to the site on un-surfaced access routes will	Extent	2	-Provision of electricity to limit use of firewood and coal. -All surfaces that are not paved and generate dust must be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit the generation of dust.	Extent	2

result in increased generation of dust.	Duration	4
	Magnitude	4
	x Probability	4
	Calculation	2+4+4 x 4
	Score	40
	Nature	Negative
	Significance	Medium

-Vehicular speed limits and control mechanism must be installed in order to limit the amount of dust generated by vehicular movement.
 -Dust monitoring process must be undertaken during the operational phase.

Duration	1
Magnitude	4
x Probability	2
Calculation	2+1+4 x 2
Score	14
Nature	Negative
Significance	Low

OPERATIONAL PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Wetlands Illegal extraction of water and water and other activities that will disturb flow of water such as sand mining	Extent	2	-un interrupted water supply to the community -maintaining buffer zones as recommended by the aquatic report. -enforcing activities in wetlands, rivers and streams	Extent	2
	Duration	5		Duration	2
	Magnitude	6		Magnitude	4
	x Probability	2		x Probability	2
	Calculation	2+5+6 x 2		Calculation	2+2+4 x 2
	Score	26		Score	8

	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Noise Noise nuisance due to operation activities. (traffic, music and other human activities)	Extent	1	-Municipal bylaws on noise and nuisance must be implemented. Operation hours for outlets such as taverns must be monitored.	Extent	1
	Duration	4		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	2		x Probability	2
	Calculation	1+4+4 x 2		Calculation	1+1+4 x 2
	Score	18		Score	12
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Visual Change of visual and aesthetic aspect as a result of houses activities	Extent	2	-no major impacts since the area is already developed.	Extent	2
	Duration	4		Duration	3
	Magnitude	6		Magnitude	6
	x Probability	1		x Probability	1
	Calculation	2+4+6 x 1		Calculation	2+3+6 x 1
	Score	12		Score	11
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low

8.3.2 SOCIO-ECONOMIC

CONSTRUCTION AND OPERATIONAL PHASES					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Traffic Increase I vehicles may impact the current road users and increase vehicle accidents and pedestrians being hit by cars	Extent	2	<input type="checkbox"/> During construction safe points for pedestrian and vehicular crossing at designated points must be erected and controlled. <input type="checkbox"/> Orange safety fencing must be used in order to indicate to pedestrians about the any maintenance work area. <input type="checkbox"/> Road markings, signage, traffic control signs or mechanism must be in place	Extent	2
	Duration	1		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	3		x Probability	2
	Calculation	2+1+4 x 3		Calculation	2+1+4 x 2
	= Score	21		= Score	14
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Infrastructure	Extent	2		Extent	2
	Duration	4		Duration	4

CONSTRUCTION AND OPERATIONAL PHASES					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Magnitude	8	<input type="checkbox"/> The development will assist in improving housing and other services within the Msunduzi Local Municipality.	Magnitude	8
	x Probability	4		x Probability	4
	Calculation	2+4+8 x 4		Calculation	2+4+8 x 4
	= Score	56		= Score	56
	Nature	Positive		Nature	Positive
	Significance	Medium		Significance	Medium
Employment	Extent	2	<input type="checkbox"/> The proposed Low-Cost Housing Development will result in job creation during the construction and operational phase. <input type="checkbox"/> Indirect jobs will also be created increase business activities in the area	Extent	2
	Duration	4		Duration	4
	Magnitude	8		Magnitude	8
	x Probability	4		x Probability	4
	Calculation	2+4+6 x 4		Calculation	2+4+6 x 4
	= Score	48		= Score	48
	Nature	Positive		Nature	Positive
	Significance	Low		Significance	Low
Safety & Security	Extent	2	<input type="checkbox"/> During construction safe points for	Extent	2

During the construction phase the safety of residence and employees must be taken to account.	Duration	4	pedestrian and vehicular crossing at designated points must be erected and controlled. <input type="checkbox"/> Orange safety fencing must be used in order to indicate to pedestrians about the any maintenance work area. <input type="checkbox"/> Road markings, signage, traffic control signs or mechanism must be in place	Duration	4
	Magnitude	6		Magnitude	6
	x Probability	3		x Probability	2
Safety of general public must be compromised during construction and operational phases.	Calculation	2+4+6 x 3		Calculation	2+4+6 x 2
	= Score	36		= Score	24
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
Health Vermin and Disease vectors	Extent	2	Municipality must timeously collect waste to avoid attraction of vermin `Health and hygiene campaigns to be done	Extent	2
	Duration	4		Duration	4
	Magnitude	6		Magnitude	4

x Probability	4	from time to time to the residence There are health facilities to help people -Bulk services supply will also reduce risk of diseases	x Probability	2
Calculation	2+4+6 x 4		Calculation	2+4+4 x 2
= Score	48		= Score	20
Nature	Negative		Nature	Positive
Significance	Medium		Significance	Low

Table 7: IMPACT SUMMARY

The potential impacts of the proposed Low-Cost Housing Development are summarised below:

Aspect	CONSTRUCTION PHASE		OPERATIONAL PHASE		Overall
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Loss of Flora	Low	Low	Low	Low	Low
Loss of Fauna	Medium	Low	Medium	Low	Medium-Low
Bulk Services	Medium	Low	Medium	Low	Medium-Low
Geology and Soil	Medium	Low	Medium	Low	Medium-Low
Surface and Groundwater	Low	Low	Medium	Low	Medium-Low

Air Quality	Medium	Low	Medium	Low	Medium-Low
Noise	Low	Low	Low	Low	Low
Generation of Waste	Medium	Low	Low	Low	Medium - Low
Visual Aesthetics	Medium	Low	Medium	Low	Medium-Low
Heritage Resources	Medium	Low			Medium-Low
Aspect	CONSTRUCTION PHASE		OPERATIONAL PHASE		Overall
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Traffic	Low	Low	Low	Low	Low
Infrastructure	Medium Positive	Medium Positive	Medium Positive	Medium Positive	Medium
Employment	Low Positive	Low Positive	Low Positive	Low Positive	Low
Safety and Security	Medium	Low	Medium	Low	Medium-Low
Health	Medium	Low	Medium	Low Positive	Medium-Low

In summary the potential impacts associated with the proposed Low-Cost Housing Development are rated from medium to low. Taking into consideration all the mitigation measures proposed, potential impacts will be reduced to be of low significance.

9.3 CUMULATIVE IMPACTS

In brief cumulative impacts refer to impacts that may be of low significance on their own, but become of high significance when added to similar impacts emanating from various sources in the surrounding area where an activity is undertaken. The activities may be from identified and discussed. In line with the proposed Smero/Caluza Low-Cost Housing Development , possible cumulative impacts that may result are as follows:

- ❖ The release of methane gas into the atmosphere as a greenhouse gas will contribute to the ambient air quality of the Smero/Caluza area, thus contributing to climate change.
- ❖ Possible increased pressure or rather use of bulk services within the area. This will be further assessed during the EIA phase.
- ❖ Increased traffic on roads due to movement of trucks during operations.
- ❖ Other cumulative impacts that may be anticipated relate to water pollution.

The impacts mentioned above do not only affect the environment within the proposed site or surrounding area in terms of the Biophysical environment, but may also impact on the health of communities.

10. A DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

Assumptions

The assumption is made that the information on which the report is based (i.e., information collected from previous EAP, specialist studies, project information, information given by the applicant and client, as well as mapping tools) is correct.

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the specialists will be implemented on a long-term basis. This has a major bearing on the reliability of the predictions of significance of impact.

Uncertainties

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the specialists will be implemented on a long-term basis. This is a major **Uncertainty** since most site management staff lack knowledge of risk assessment, predictions of significance of impact and mitigation implementations thereof.

Gaps in knowledge

It is unknown whether the contractor will get competent staff to implement the EMPr, Specialist recommendations, EA and WUL conditions. We therefore recommend that the contractor gets a qualified ECO and client also gets a Qualified external ECO.

11. EAP OPINION ON PROPOSED

Taking into consideration the findings and recommendations of the studies conducted, the EAP is of the view that the proposed Low-Cost Housing Development will:

- Improve service delivery and enhance the quality of life within the study area.
- Address the housing backlog in Msunduzi Municipality
- Improve bulk services delivery to the area
- Create indirect job opportunities through business opportunities
- Meet relevant legislative requirements as proposed in the preliminary design as well as the EMPr, if all the design specifications and mitigation measures are implemented.

It is prudent that an independent Environmental Control Officer is appointed to monitor compliance with the conditions of the EA, WUL, and EMPr.

With the above consideration, the EAP has the opinion that the project be granted a positive EA

12. AN ENVIRONMENTAL IMPACT STATEMENT

The geotechnical investigation conducted reveals that the proposed location of the Low-Cost Housing Development is suitable for the establishment of Low-Cost

Housing Development, as the impact are low if all the recommendations proposed are implemented.

In terms the flora on site, the proposed Low-Cost Housing Development will not impact any habitat negatively, as the habitat already disturbed. With implementation of recommendations from specialist studies, the impacts will be reduced to low. The design report for the proposed Low-Cost Housing Development should serve as reference document and should ensure compliance with construction, health and safety and environmental standards. All mitigation measures proposed in the design report and the EMPr should be implemented.

Looking at other social aspects such as noise and health, access roads and other bulk services, the impacts are rated to be medium and lowered with implementation of mitigation. The resultant will be positive in nature.

13. A COMPARATIVE ASSESSMENT IF THE POSITIVE AND NEGATIVE IMPLICATIONS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

Houses backlog is a national issue. Addressing the housing backlog of national importance and is also a constitutional obligation. Providing houses to disadvantaged people is paramount to providing dignity to them.

From the specialist reports and balance of weighs in comparison, the negative impacts are outweighed by the positive impacts after mitigations. Therefore, with proper implementation of mitigations, the project will have positive impacts both to human beings and to the environment

14. ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr forms part of the EIAr process and is attached in Appendix F. The aim of the EMPr is to address the impacts and guide with the implementation of the mitigation measures, including monitoring measures to be undertaken for the proposed Low-Cost Housing Development. The EMPr outlines the impacts and

associated mitigation measures for the construction, operational and rehabilitation phases of the proposed Low-Cost Housing Development. This includes the integration of the recommendations as per the specialist studies conducted.

15. RECOMMENDATIONS AND CONCLUSION

It is recommended that the environmental authorities authorise the development subject to the following conditions:

- ❖ The appointed contractor must appoint an internal Environmental Control Officer (ECO), to oversee the implementation of the Environmental Authorization, Water Use License and the EMP conditions
 - ❖ Appropriate measures must be implemented to ensure that the Smero/Caluza Development is within the approved jurisdiction Environmental Authorization as per site plan submitted
 - ❖ No cement should be mixed direct on the grass; a water proof platform must be used.
 - ❖ The recommendations from specialist reports and from engineers must be followed.
 - ❖ It is recommended that proper workmanship should be observed during Smero/Caluza Low-Cost Housing Development
 - ❖ The project must be executed for social equity in addition to environmental and financial sustainability.
 - ❖ The main beneficiaries of the project must be the residents/ community
 - ❖ Method statements must be compiled for all activities listed in the Environmental Management Plan as required.
 - ❖ The Chancee Find Procedure must be applied in Paleontology and Heritage management
 - ❖ The traffic impact studies, final designs, Amafa approval, and WUL must be finalised and forwarded to the competent authority for approval before construction can start
 - ❖ A 32m buffer must be maintained from all the non-perennial streams and major drainage lines
- ▲ Greening innovations must be employed during construction to blend the development with the surroundings
- ▲ Green technology innovations must be included during designs to save energy
- ▲ A strict code of ethics, must be considered mandatory in this development

▲The recommendations in this document, EMPr, EA and WUL and any other relevant document must form part of the contract document

- ❖ It is essential that all applicable regulatory requirements are adhered to ensure that Msunduzi Local Municipality meets all the necessary legal requirements for the construction and operation of such a housing project. :

16 DETAILS OF EAP WHO COMPILED THE REPORT

EAP DETAILS

Sinohydro brings together a team of dedicated professionals, scientists, environmental managers, and practitioners who have many years of combined experience in environmental services, including EIA, WULA and waste management licenses. Sinohydro provides comprehensive Integrated Environmental Management services to a broad range of clients throughout South Africa

ROLE	KEY PERSONNEL	YEARS EXPERIENCE
		Total
EAP	Mr. Hebert Nemato Pr. Sci. Nat. (EAPASA Reg EAP) MSc: Water Resources Management (UP) MPhil: Environmental Management (Stellenbosch) BSc (Hon) Applied Sciences (NUST) Dipl: Project Management (Varsity College) Cert: Construction Management (UCT) Management Systems NQF Level 6, Different Environmental Management Certificates (NWU) SAMTRAC -NOSA	20
EAP,	Miss Silindile Phungula BSoc Sc: Geography and Environmental Management (UKZN) BSc Hons: Environmental Management (UNISA) SAMTRAC - NOSA	5
Project Leader, Document Reviewer	Mr. Ntuthuko I.Z. Mlambo B Arts: Environmental Management (UKZN)	15

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Municipality	TYPE	PROJECT NAME	APPROVED BY	MAP CONTACT	TELEPHONE
Maluti-A-Pofung (MAP) LM	Regional Landfill Site	Design and Construct	DEA-National	Mr. Steve Nhlapo	082 307 9893
		New Landfill Site in QwaQwa			
Municipality	TYPE	PROJECT NAME	APPROVED BY	DEDEAT CONTACT	TELEPHONE
Mbashe and Mnquma LMs	Road and bridge	Cunsula to Nihana A/R	DEAEAT-EL (Amatole Region)	Mr T. Sigaba	043 701 4000
		Ncihana to Xuba AR			
		Nobulala AR			
		Cwebeni –Mgobozweni-Tyindirha AR			
		Booi farm AR			
Nkonkobe LM	Solid waste Transfer stations	Seymour Solid Waste Transfer Station	DEAEAT-EL (Amatole Region)	Ms. N. Tshabeni	043 701 4000
		Hogsback Solid waste Transfer Station			
Alfred Nzo DM	Water		DEAEAT-Maluti (Alfred Nzo Region)	Mr L Mali	039 256 0548 076 141 4841
		Siqhingeni water supply			
Great Kei LM	Solid Waste Transfer Stations	Cintsa Solid Waste Transfer Station	DEAEAT-Maluti (Alfred Nzo Region)	Ms N. Tshabeni	043 701 4000
		Kei Mouth Solid Waste Transfer Station			
Mbhashe LM	Low-Cost Housing	Extension 3 Township Development	DEAEAT-Amathole Region	Ms Nshutsha	043 701 4000

Mbhashe LM	Low-Cost Housing	Extension 7 Township Development	DEAEAT-Amathole Region	Ms Nsthutsha	043 701 4000
Mbhashe LM	Low-Cost Housing	Zone 14 Township Development	DEAEAT-Amathole Region	Ms Nsthutsha	043 701 4000

DETAILS OF OTHER SPECIALIST

i. Wetlands Specialist (Zonhla Hydro & Enviro Consulting)

Company Address : 92 Collage Road
 Pietermaritzburg
 3245

Tel : 078 826 2515

Fax : 086 689 5506

Email : nhlaka@zonhla.co.za

ii. Geotechnical specialist (Geosure (Pty) Ltd)

Company Address : PO Box 1461
 Westville
 3630

Tel : 031 266 0458

Fax : 086 689 5506

Email : geosure@africa.com

iii. Traffic Impact Assessment (Emaan Traffic Engineers (Pty) Ltd)

Company Address : 34 Essex Terrac
 Westville
 Durban
 3629

Tel : 015 291 3699

Email : info@Emaan.co.za

iv. Ecological specialist (Mondise Environmental Services (Pty) Ltd)

Company Address : 11 Avocado Place
Eastwood
Pietermaritzburg
3201

Tel : 082 525 1733

Fax : -

Email : sindiso.chamane@gmail.com

v. Engineering Specialist (Pangaea Consulting)

Company Address : PO Box 2289
Pinetown
3600

Tel : 031 267 2185

Fax : 031 267 0292

Email : info@pangaeahe.co.za

vi. Paleontologist (Prof Marion Bamford JLB Consulting)

Company Address : P.Bag 652
Wits
2050

Tel : 011 717 6690

Fax : 011 717 6694

Email : Marion.bamford@wits.ac.za

APPLICANT DETAILS

Name of Applicant : Verern Builders CC

Contact Person : Mr. Sanjay Sathnarayan

Physical Address : 19 Madeleine Road, Ballito, 4399

Contact : 083 792 8333/ 031 267 2185

Email : sanjay@pangaeahe.co.za

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KWAZULU-NATAL PROVINCE

ECONOMIC DEVELOPMENT, TOURISM
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www.kznded.gov.za

Programme/Sub-Programme:7

Enquiries: Mavis Padayachee

Reference: DC22/0017/2022

Email: Mavis.Padayachee@kznedtea.gov.za

Date: 02 November 2022

Email / Fax Transmission

SPHE Consulting Services (Pty) Ltd
78 Sutherland Street
Newcastle
2940

Attention: Mr Sipehelele Dlamini
Cell: (076) 706 2440

Email: dlamini@speconsulting.co.za
Fax No: (086) 5677 760

Dear Madam/Sir

RE: DC22/0017/2022: ACCEPTANCE OF THE FINAL SCOPING REPORT FOR THE PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON ERF 770 EDENDALE RR, REGISTRATION DIVISION FT, IN WARD 20, EDENDALE, LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY.

1. The Final Scoping Report (FSR) for the abovementioned activity, submitted in terms of the requirements of Regulation 21(1) of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), was received by the Department of Economic Development, Tourism and Environmental Affairs (herein referred to as "this Department") on 20 September 2022.
2. Following a review of the Final Scoping Report (FSR) and Plan of Study for an Environmental Impact Assessment; this Department advises in terms of Regulation 22 (a) of the EIA Regulations, 2014 (as amended) **that the FSR is accepted** and you may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations 2014 (as amended) subject to the following conditions:
 - 2.1. A detailed assessment on the need and desirability of the proposed activity, in the context of the preferred location must be included in the final Environmental Impact Report.
 - 2.2. Site alternatives must be explored through a detailed site selection process, which includes identification of impacts and inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment.



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- 2.3. The Biodiversity Impact Assessment to be compiled by a reputable specialist must be informed by Ezemvelo KwaZulu-Natal Wildlife Biodiversity Impact Assessment Guideline.
- 2.4. Given that there proposed site and area has limited infrastructure to service the proposed development, it must be documented in the Environmental Impact Report there is an assured supply of potable water, sanitation and electricity to the site identified for the proposed development.
- 2.5. Additional public participation is required therefore, a notice through a comprehensive public participation process as per Regulation 40 and 41(2)(e) of the EIA Regulations 2014 (as amended) must be given to all interested and affected parties by placing an advertisement in a local newspaper conspicuous to the local language viz. English and isiZulu.
- 2.6. All relevant specified listed activities must be included and the application form must be amended accordingly viz. LN1 activity 56.
- 2.7. Kindly confirm who signed the landowner consent in the application form on behalf of Neliswe Ngcobo?
- 2.8. A Traffic Impact Assessment must be compiled and ensure that consideration is given for public transport infrastructure such as taxi/bus stops.
- 2.9. Comments must be obtained from all units within the Msunduzi Local Municipality.
- 2.10. A comprehensive storm water management plan must be included in the Environmental Impact Report to ensure storm water is attenuated adequately.
- 2.11. A Green Design Study must be undertaken in order to inform the proposed development and layout (viz. stormwater management considerations incorporative of aspects such as Sustainable Urban Drainage Systems; energy efficiency and renewable energy considerations incorporative of aspects such as solar panels and rainwater harvesting).
- 2.12. A Heritage Impact Assessment must be undertaken to assess for any heritage artifacts or resources.
- 2.13. The Departments correspondence dated 18 October 2022 (request for additional information) must be fully addressed in the final Environmental Impact Report.
- 2.14. Vulnerable areas viz. biodiversity and wetlands must be cited and included in the property description and on the Layout Plan. The relevant specialists must be appointed to undertaken the specific studies.
- 2.15. A comprehensive Engineering and Geotechnical reports must be included in the Environmental Impact Report for bulk services and site suitability.
- 2.16. All specialist studies undertaken must meet the requirements of Appendix 6 of the EIA Regulations, 2014 (as amended) and the final Environmental Impact Report must meet the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended).
- 2.17. The layout plans; locality maps and facility illustrations must be legible; in colour; and, at an appropriate scale with clear legend.



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3. The final EIA must meet the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended).
4. This Department looks forward to the submission of a Final EIA (inclusive of the 30 day public participation period) that meets the above requirements **within 106 days of acceptance of the Scoping Report**. As such, the final EIA is expected to be submitted to this Department for review by 10 **March 2023**.
5. Please note that the activities applied for may not commence (including site preparation and other action on the site) prior to an Environmental Authorisation being granted by this Department.
6. All enquiries regarding this application may be directed to **Mrs. Mavis Padayachee/Shawn Janneker/Ms Nombasa Kama**.

Yours faithfully

for: Mr. N. Nkontwana

Head of Department: KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

Signed by: Ms. Nombasa Kama

Designation: Control Environmental Officer

Cc: Mr. Nelisiwe Ngcobo, Tel: (033) 392 2002, Email: Nelisiwe.ngcobo@munduzi.gov.za
Mr. Simphiwe Mbanjwa, Cell: 062 449 9157, Email: Simphiwe.Mbanjwa@msunduzi.gov.za



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Programme/Sub-Programme: 7
Enquiries: DC22/0017/2022
Telephone: 033 3471820
Email: mavis.padayachee@kznedtea.gov.za
Date: 16 February 2023

Email / Transmission

Directorate: Environmental Services: uMgungundlovu District

Sin Hydro Consultant (Pty) Ltd
Office No: 105/106
49 Chapel Street
Pietermaritzburg
3201

ATTENTION: Mr Herbert
Telephone : 033 940 9635

Email: info@amathongagroup.co.za
Cellphone: 076 262 9420

Cc: Nelisiwe Ngcobo, Msunduzi Local Municipality, Email: nelisiwe.ngcobo@msunduzi.gov.za

RE: DC22/0017/2022: REQUEST FOR EXTENSION OF TIME TO SUBMIT THE FINAL ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED SMEROICALUZA LOW-COST HOUSING PROJECT WHICH IS LOCATED WITHIN ERF 770 IN WARD 20 OF EDENDALE IN THE PIETERMARITZBURG AREA UNDER MSUNDUZI LOCAL MUNICIPALITY.

1. Your letter dated **08 March 2023** was received by this Department in respect of an extension of timeframe to submit the final Environmental Impact Report (EIR) for the above mentioned application, refers.
2. According to regulation 23 (1) (b) of GNR 326 dated 07 April 2017 ***"Where environmental impact report must be applied to an application, the applicant must, within 106 days of receipt of the application by the competent authority, submit to the competent authority - (a) an environmental impact assessment report inclusive of any specialist reports, and an EMPr, which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority; or (b) a notification in writing that the reports, and an EMPr, will be submitted within 156 days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the environmental impact assessment report or EMPr, which changes or information was not contained in the reports consulted on during the initial public participation process contemplated in subregulation (1)(a), and that the revised environmental impact assessment report or EMPr will be subjected to another public participation process of at least 30 days.***



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3. As such and in accordance with this, it is noted that the Final EIR was due within 106 days of receipt of the application viz. 10 March 2023.
4. From your letter dated 08 March 2023, it is noted that Sin Hydro Consultants (Pty) Ltd requests for an extension of time to complete all specialist studies and to circulate to Interested and Affected Parties to comment.
5. In lieu of the above, and in accordance with Regulation 23 (1)(b), **the Department extends the timeframe to submit the final EIR by an additional 50 (fifty) calendar days to the 03 May 2023.** This is inclusive of the public participation process of 30 (thirty) days.
6. Should the EAP not be able to fulfill any such obligations arising out of the public consultation process or any specialist reports within this 50 (fifty) day timeframe, the application will be lapsed and withdrawn as no further extensions will be permitted and the applicant will be required to reapply to this Department. The Department requires a written response by the **03 May 2023** so as to confirm whether the applicant and EAP are able to adhere to the 50 (fifty) day extension timeframe or to confirm whether it is preferable to withdraw the application at present.
7. Please note that the activities applied for in the Environmental Authorisation application may not commence (including site preparation and other action on the site) prior to an Environmental Authorisation being granted by this Department. All enquiries regarding this application may be directed to Ms Mavis Padayachee/Shawn Janneker/Nombasa Kama.

Should you have any queries or wish to discuss the points raised above, please do not hesitate to contact the writer.
Yours sincerely,

Yours faithfully

For: Head of Department:
KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs

Date: 10 March 2023

Signed by: Mr. Shawn Janneker
Designation: Control Environmental Officer: Environmental Management
EAPASA Registration No.: 2019/1455

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Pietermaritzburg, 3202

www.kznded.gov.za

Programme/Sub-Programme:7

Enquiries: Mavis Padayachee

Reference: DC22/0017/2022

Email: Mavis.Padayachee@kzndedtea.gov.za

Date: 02 November 2022

Email FaxTransmission

SPHE Consulting Services (Pty) Ltd

78 Sutherland Street

Newcastle

2940

Attention: Mr Sipehelele Dlamini

Email:

dlamini@spheconsulting.co.za

Cell: (076) 706 2440

Fax No: (086) 5677 760

Dear Madam/Sir

RE: DC22/0017/2022: ACCEPTANCE OF THE FINAL SCOPING REPORT FOR THE PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON ERF 770 EDENDALE RR, REGISTRATION DIVISION FT IN WARD 20 EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY.

1. The Final Scoping Report (FSR) for the abovementioned activity, submitted in terms of the requirements of Regulation 21 (1) of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), was received by the Department of Economic Development, Tourism and Environmental Affairs (herein referred to as "this Department") on 20 September 2022.
2. Following a review of the Final Scoping Report (FSR) and Plan of Study for an Environmental Impact Assessment; this Department advises in terms of Regulation 22 (a) of the EIA Regulations, 2014 (as amended) that the FSR is accepted and you may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations 2014 (as amended) subject to the following conditions:
 - 2.1. A detailed assessment on the need and desirability of the proposed activity, in the context of the preferred location must be included in the final Environmental Impact Report.

Corrected

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- 2.2. Site alternatives must be explored through a detailed site selection process, which includes identification of impacts and inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment.

[Noted and corrected](#)

- 2.3. The Biodiversity Impact Assessment to be compiled by a reputable specialist must be informed by Ezemvelo KwaZulu-Natal Wildlife Biodiversity Impact Assessment Guideline.

[Biodiversity report is attached in this submitted EISr](#)

- 2.4. Given that there proposed site and area has limited infrastructure to service the proposed development, it must be documented in the Environmental Impact Report there is an assured supply of potable water, sanitation and electricity to the site identified for the proposed development.

[Confirmation letters from municipality and Eskom are attached in the engineering report attached as appendix D6 of the draft EIAR submitted](#)

- 2.5. Additional public participation is required therefore, a notice through a comprehensive public participation process as per Regulation 40 and 41 (2)(e) of the EIA Regulations 2014 (as amended) must be given to all interested and affected parties by placing an advertisement in a local newspaper conspicuous to the local language viz. English and isiZulu.

[This has been corrected \(see Appendix C2 of this Final EIAR submitted](#)

- 2.6. All relevant specified listed activities must be included and the application form must be amended accordingly viz. LNI activity 56.

[After making a through regulations screening exercise, the additional regulations were identified and will be discussed with EDTEA before amending the application form](#)

- 2.7. Kindly confirm who signed the landowner consent in the application form on behalf of Neliswe Ngcobo?

[The response for the above question was replied by our client as indicated in the extract below](#)

Sanjay Sathnarayan

Fri, Mar 31,
5:03 PM

to me

It was signed by the General Manager who had delegated authority from the Municipal Manager.

Regards



KWAZULU-NATAL PROVINCE

E
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REPUBLIC OF SOUTH AFRICA

Sanjay Sathnarayan

PANGAEA CONSULTING

Tel: 031 267 2185 | Cell: 083 792 8333 | Fax: 031 267 0292

Email: sanjay@pangaeahe.co.za

Legal Disclaime

- 2.8. A Traffic Impact Assessment must be compiled and ensure that consideration is given for public transport infrastructure such as taxi/bus stops.

This is being undertaken as per Appendix D5

- 2.9. Comments must be obtained from all units within the Msunduzi Local Municipality.

The Draft BAR was circulated and we got no response from an dept accept Amafa and Human settlement (see responses state organs)

- 2.10. A comprehensive storm water management plan must be included in the Environmental Impact Report to ensure storm water is attenuated adequately.

See Appendix D6 engineering report (Annexure D6.1) and D1 geotech reports

- 2.1 1. A Green Design Study must be undertaken in order to inform the proposed development and layout (viz. stormwater management considerations incorporative of aspects such as Sustainable Urban Drainage Systems; energy efficiency and renewable energy considerations incorporative of aspects such as solar panels and rainwater harvesting).

See Appendix D6 engineering report (Annexure D6.2)

- 2.12. A Heritage Impact Assessment must be undertaken to assess for any heritage artifacts or resources.

*This was done as part of Palaeontological studies where the **Chance Find Protocol** was recommended since the area is already in development/settled area disturbed by human anthropogenic*

- 2.13. The Departments correspondence dated 18 October 2022 (request for additional information) must be fully addressed in the final Environmental Impact Report.

Assumed addressed in the Final EIA report

- 2.14. Vulnerable areas viz. biodiversity and wetlands must be cited and included in the property description and on the Layout Plan. The relevant specialists must be appointed to undertaken the specific studies.

Final Layout plans are attached in appendix B3 (B3.2 and B3.3)



- 2.15. A comprehensive Engineering and Geotechnical reports must be included in the Environmental Impact Report for bulk services and site suitability.

[See Appendix D1 and D6](#)

- 2.16. All specialist studies undertaken must meet the requirements of Appendix 6 of the EIA Regulations, 2014 (as amended) and the final Environmental Impact Report must meet the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended).

[This was done and specialist declarations forms submitted](#)

- 2.17. The layout plans; locality maps and facility illustrations must be legible; in colour; and, at an appropriate scale with clear legend.

[Noted and corrected](#)

3. The final EIAR must meet the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended).

[Noted and corrected](#)

4. This Department looks forward to the submission of a Final EIAR (inclusive of the 30 day public participation period) that meets the above requirements within 106 days of acceptance of the Scoping Report. As such, the final EIAR is expected to be submitted to this Department for review by 10 March 2023.

[Noted and done \(see Appendix C\)](#)

5. Please note that the activities applied for may not commence (including site preparation and other action on the site) prior to an Environmental Authorisation being granted by this Department.

[Client has been advised](#)

6. All enquiries regarding this application may be directed to Mrs. Mavis Padayachee/Shawn Janneker/Ms Nombasa Kama.

Yours faithfully

for. Mr. N. Nkontwana Head of Department: KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

Signed by: Ms. Nombasa Kama
Designation: Control Environmental Officer

KWAZULU-NATAL PROVINCE

ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

Cc: Mr. Nelisiwe Ngcobo, Tel: (033) 392 2002, Email: Nelisiwe.ngcobo@munduzi.gov.za

Mr. Simphiwe Mbanjwa, Cell: 062 449 9157, Email: Simphiwe.Mbanjwa@msunduzi.gov.za



VAT: 4910274481
Tax no. 9221522197
Reg.no 2015/009313/07
UIF.no. 2504928/9

No. 49 Peter Kertch hoff (Chapel Str.)
No. 49 Peter Kertch hoff (Chapel Str.)
Office no. 105/106/119
Pietermaritzburg
3201
Email: info@amathongagroup.co.za
Tell: 033 940 9635 or 0736292617

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
REPORT (EIAR) FOR THE
PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON
ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN PROVINCE
OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

The logo for SINOHYDRO Consultant (PTY) Ltd features the word "SINO" in black and "HYDRO" in blue, with a green leaf icon inside a circular arrow. Below the name, the text "Consultant (PTY) Ltd" is written in a smaller font.	<p>Sinohydro Consultants (PTY) Ltd. No. 49 Peter Kertch hoff (Chapel Str.) Office no. 105/106/119 Pietermaritzburg, 3201 Email: info@amathongagroup.co.za Tell: 033 940 9635 or 0736292617</p>
--	--

APPENDIX B1: SNERO/CALUZA LOCALITY PLANS

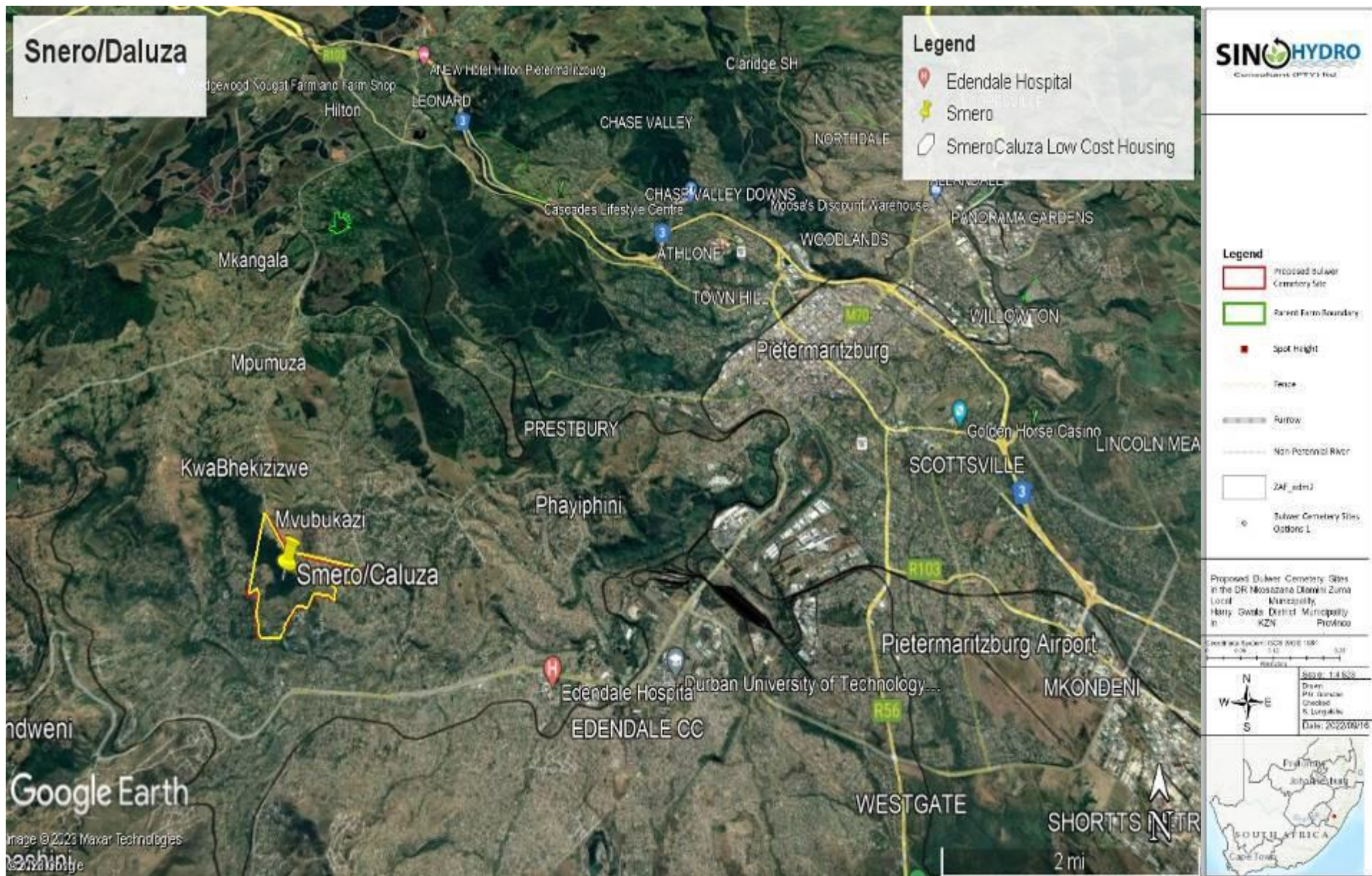


Fig 1 : Snero/Caluza locality map

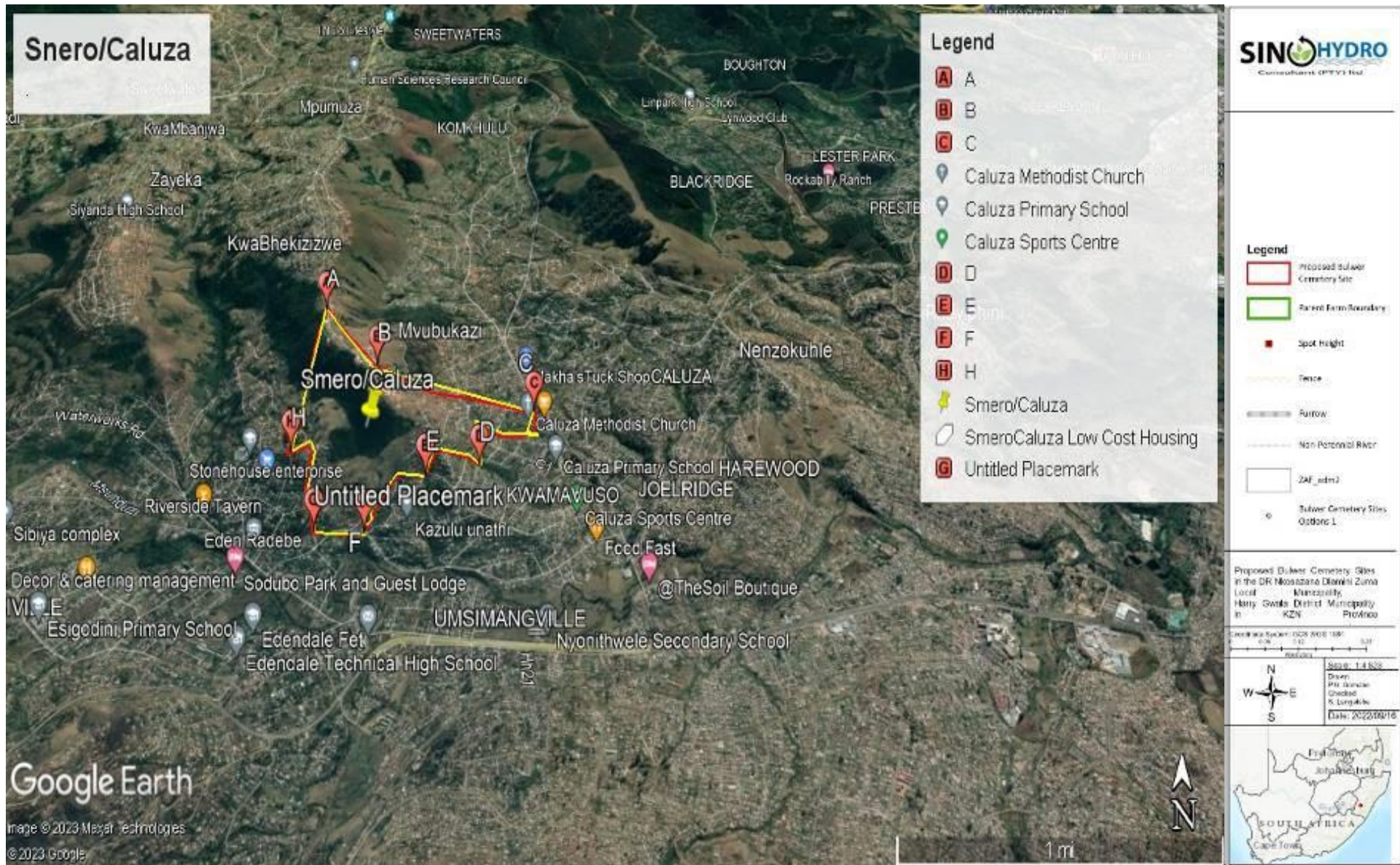


Fig 2 : Snero/Caluza Locality Map



VAT: 4910274481
Tax no. 9221522197
Reg.no 2015/009313/07
UIF.no. 2504928/9

No. 49 Peter Kertch hoff (Chapel Str.)
No. 49 Peter Kertch hoff (Chapel Str.)
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Email: info@amathongagroup.co.za
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**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
REPORT (EIAR) FOR THE
PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON
ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN PROVINCE
OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

The logo for SINOHYDRO Consultant (PTY) Ltd, identical to the one at the top of the page.	<p>Sinohydro Consultants (PTY) Ltd. No. 49 Peter Kertch hoff (Chapel Str.) Office no. 105/106/119 Pietermaritzburg, 3201 Email: info@amathongagroup.co.za Tell: 033 940 9635 or 0736292617</p>
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APPENDIX B2: SNERO/CALUZA LAYOUT PLANS

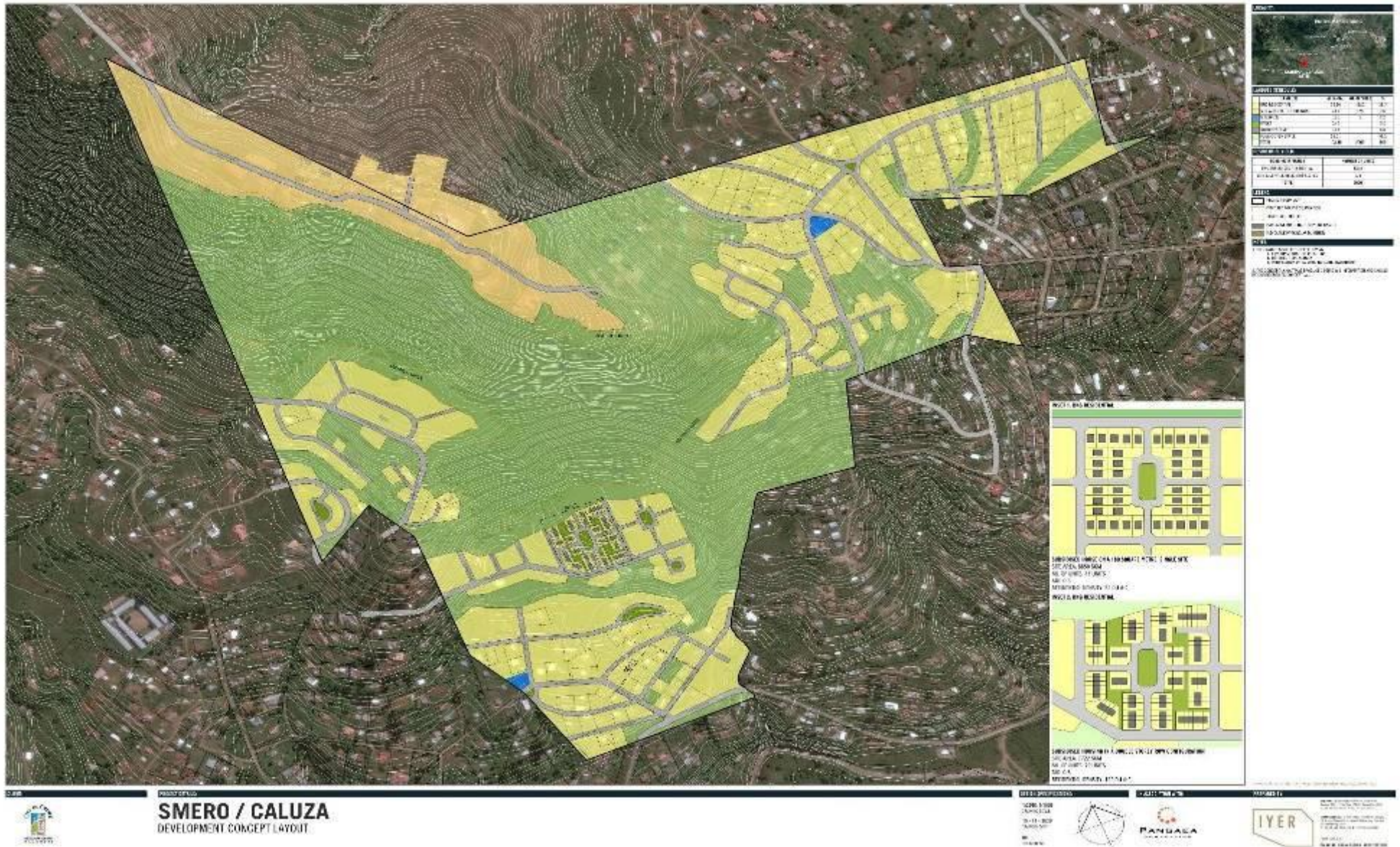


Fig 1 : Snero/Caluza layout map



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Tax no. 9221522197
Reg.no 2015/009313/07
UIF.no. 2504928/9

No. 49 Peter Kertch hoff (Chapel Str.)
No. 49 Peter Kertch hoff (Chapel Str.)
Office no. 105/106/119
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3201
Email: info@amathongagroup.co.za
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**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
REPORT (EIAR) FOR THE
PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON
ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN PROVINCE
OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

The logo for SINOHYDRO Consultant (PTY) Ltd features the word "SINO" in black, "HYDRO" in blue, and a green circular icon with a leaf and a water drop. Below the name, "Consultant (PTY) Ltd" is written in a smaller black font.	<p>Sinohydro Consultants (PTY) Ltd. No. 49 Peter Kertch hoff (Chapel Str.) Office no. 105/106/119 Pietermaritzburg, 3201 Email: info@amathongagroup.co.za Tell: 033 940 9635 or 0736292617</p>
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ANNEXURE B3 SNERO/CALUZA SENSITIVITY MAPS

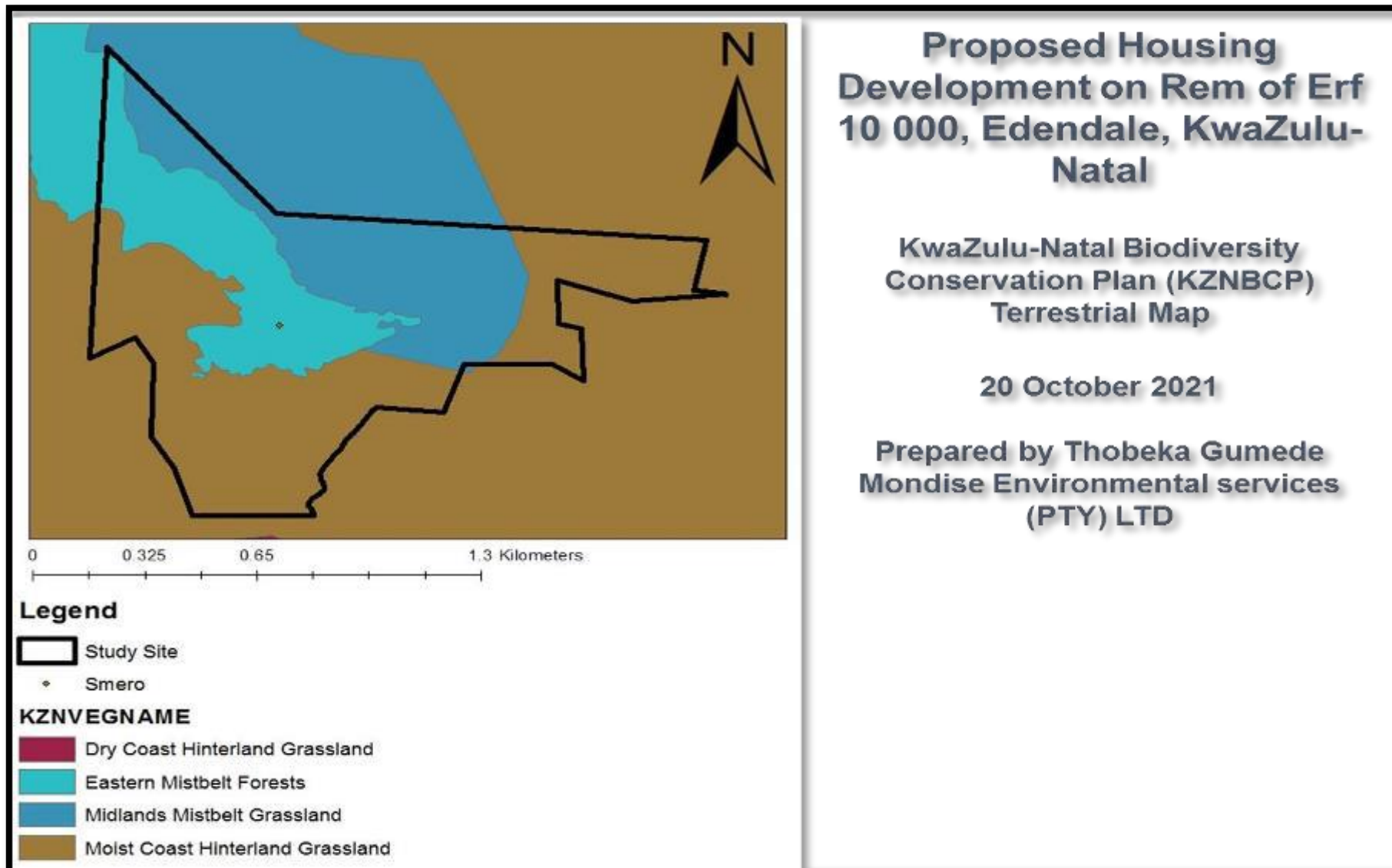


Figure 1: South African National Biodiversity Institute (SANBI) vegetation map of the region shows the study area at Rem of Erf 10 000, Edendale, KwaZulu-Natal within the Moist Coast Hinterland Grassland, Midlands Mistbelt Grassland and Eastern Mistbelt Forests.

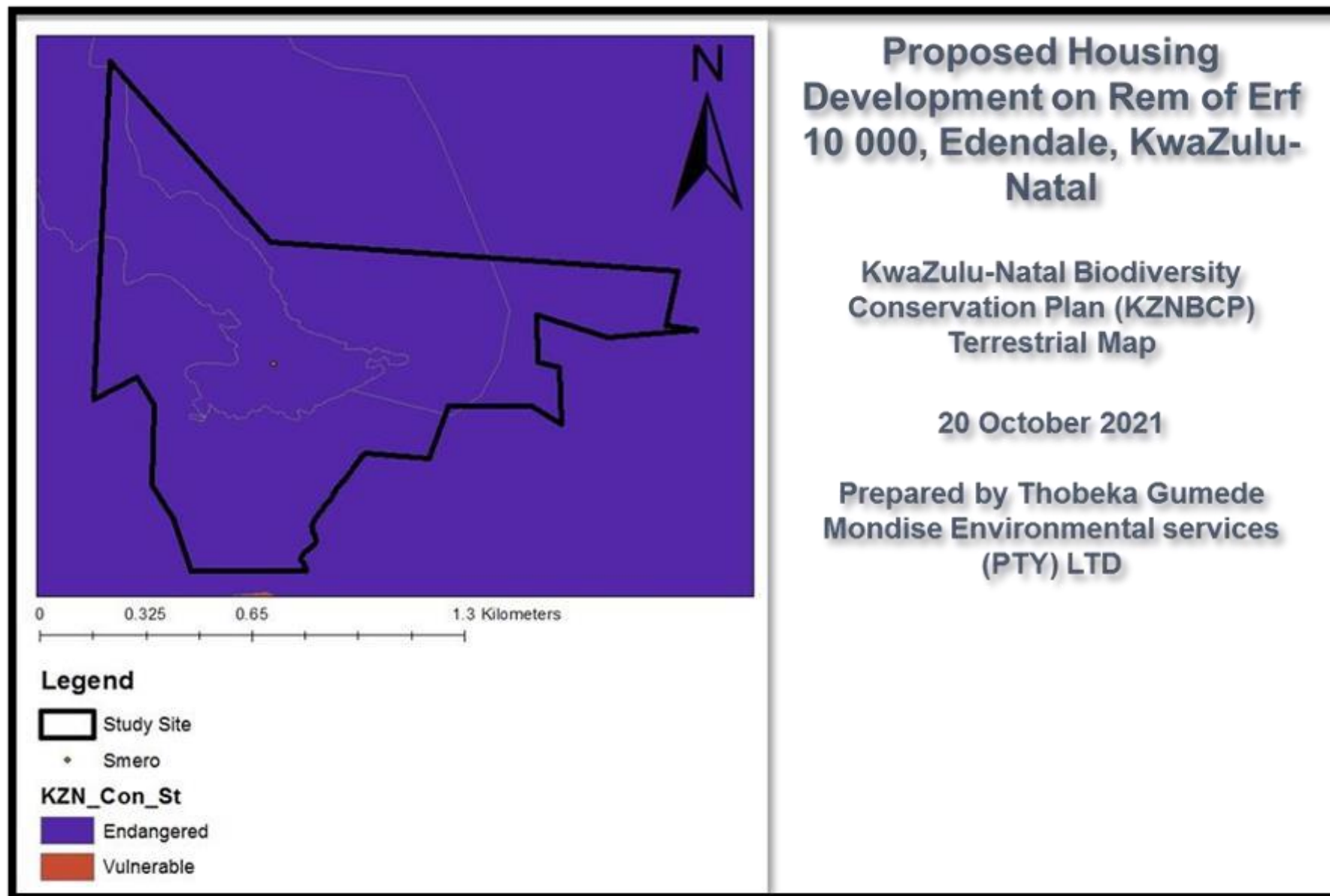


Figure 2: Regional conservation status map shows the study area at Rem of Erf 10 000, Edendale at Pietermaritzburg Msunduzi Municipality, completely within the Endangered biodiversity area

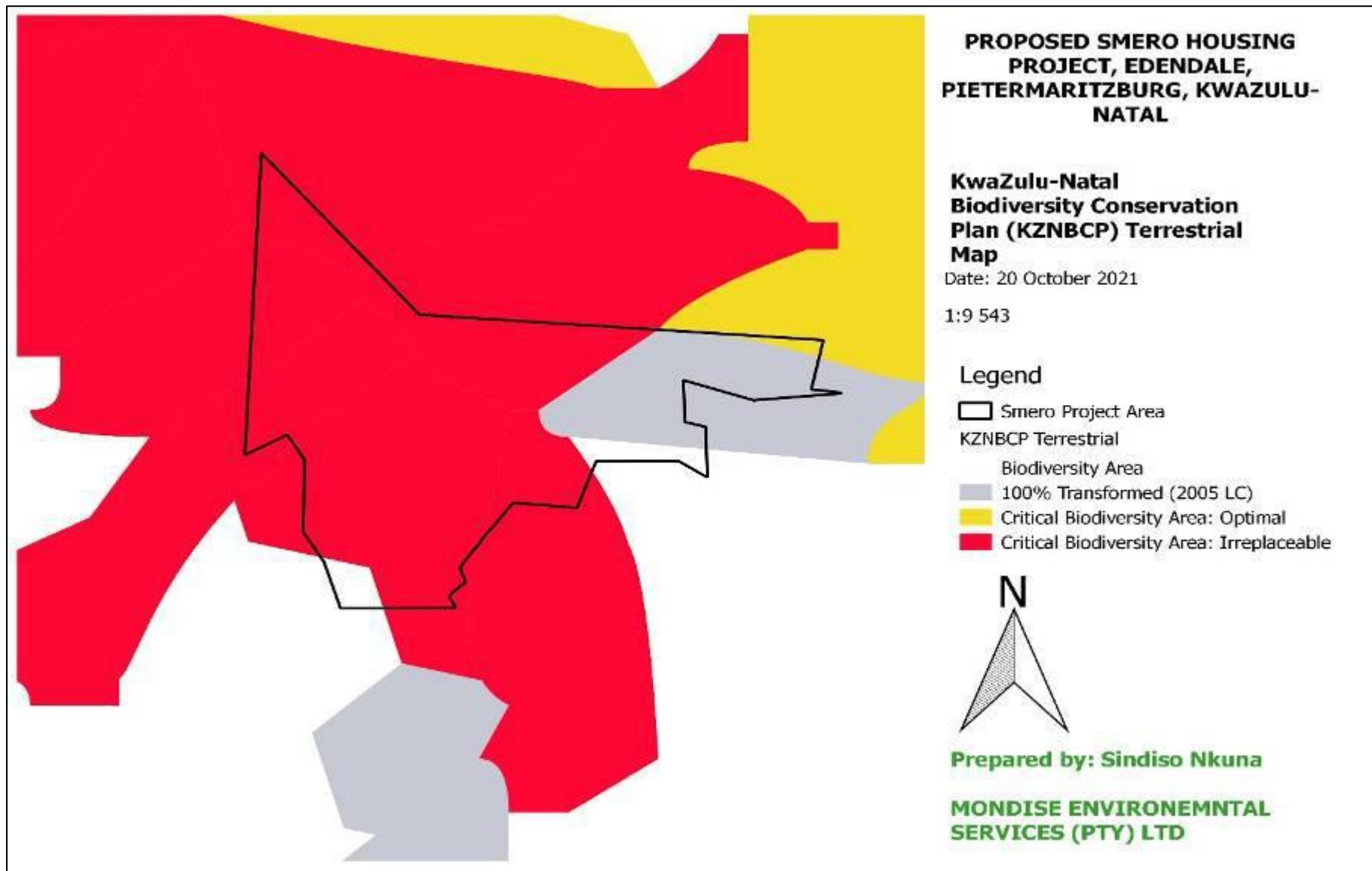


Figure 3: KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) map shows the study area for the Smero housing development project.

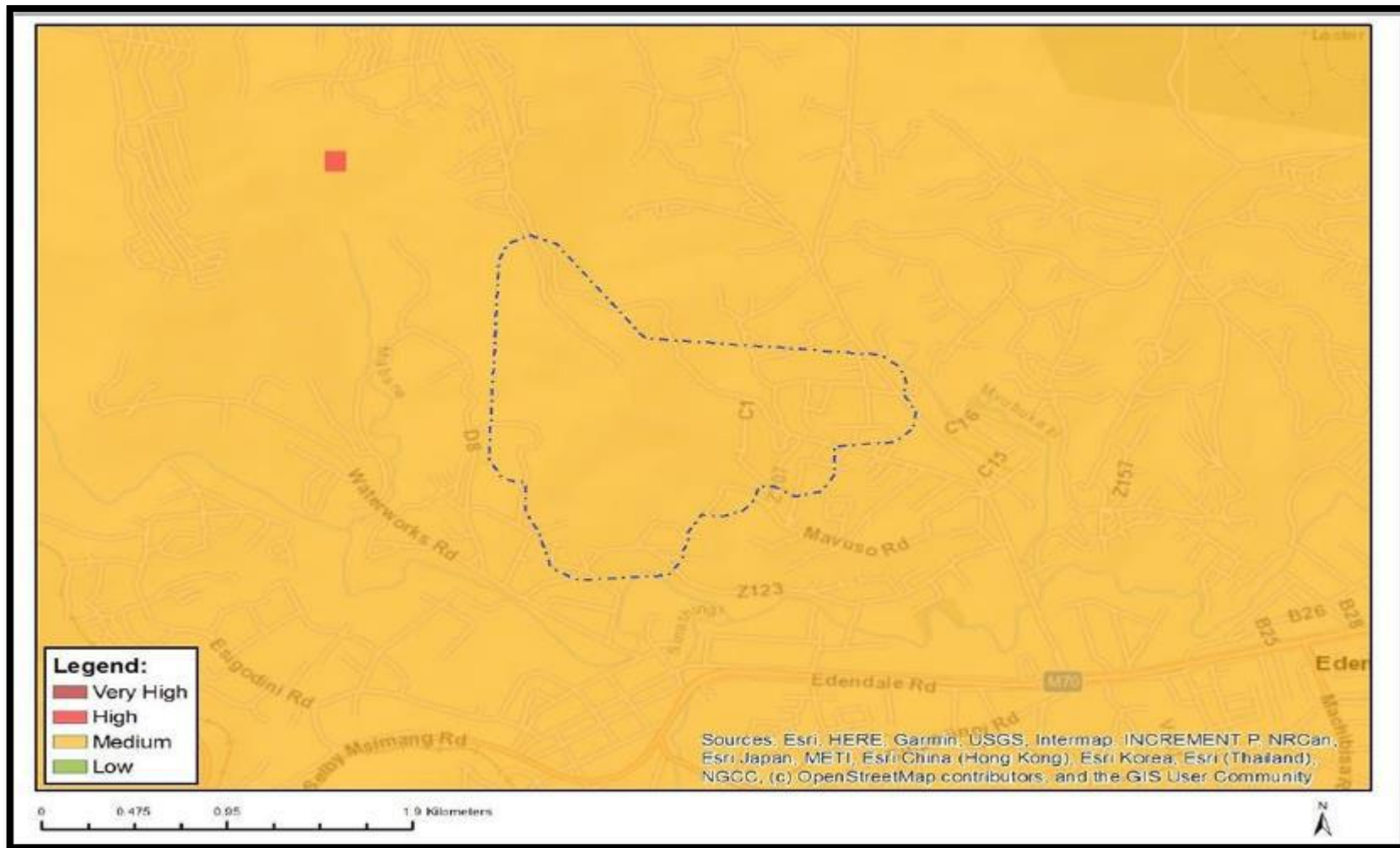


Figure 4: Map of of relative animal species theme sensitivity at the study site for the Smero housing development on rem of erf 10 000, Edendale, Pietermaritzburg, KwaZulu-Natal.

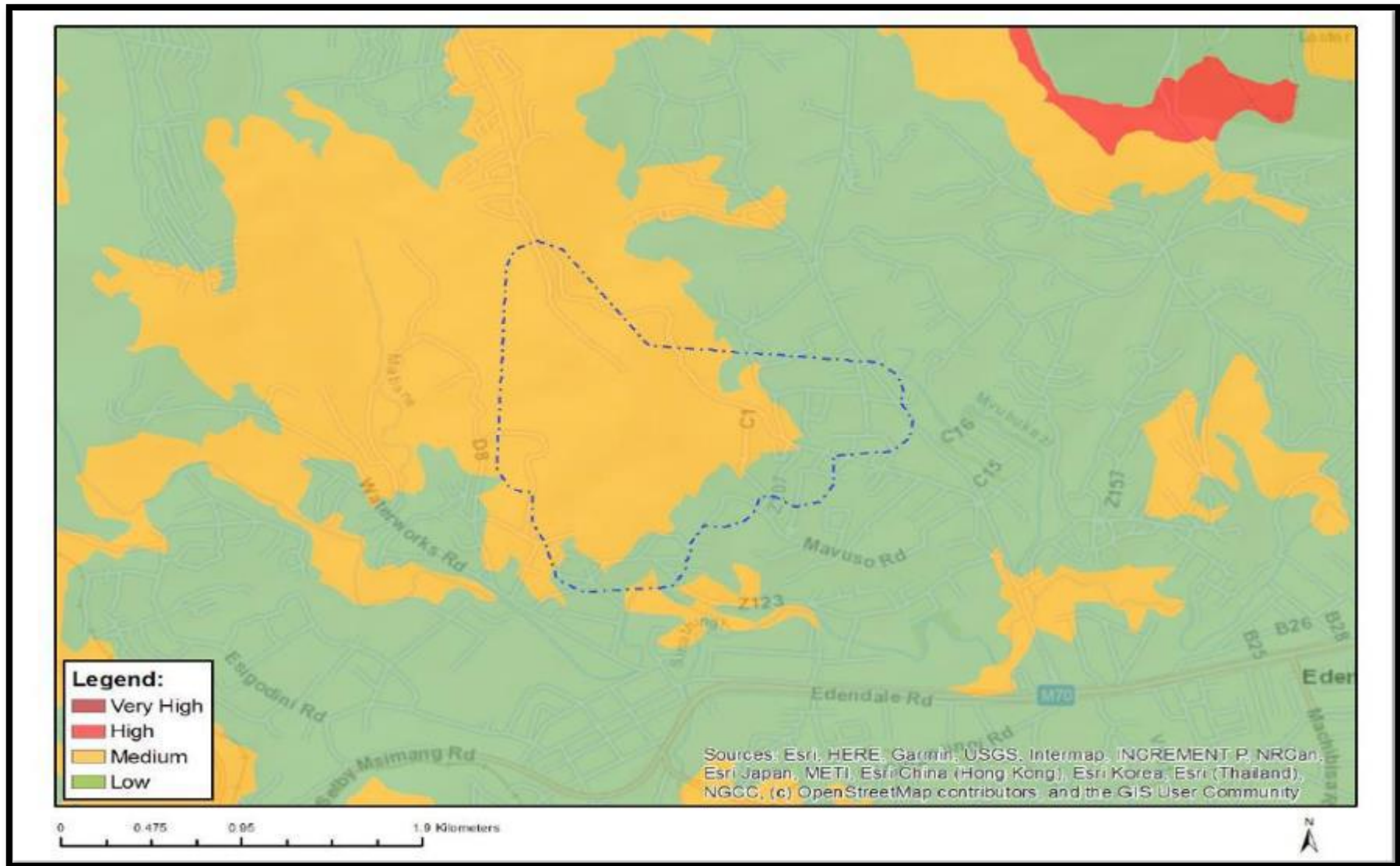


Figure 5: Map of relative plant species theme sensitivity at the study site for Smero housing development on rem of erf 10 000, Edendale, Pietermaritzburg, KwaZulu-Natal.

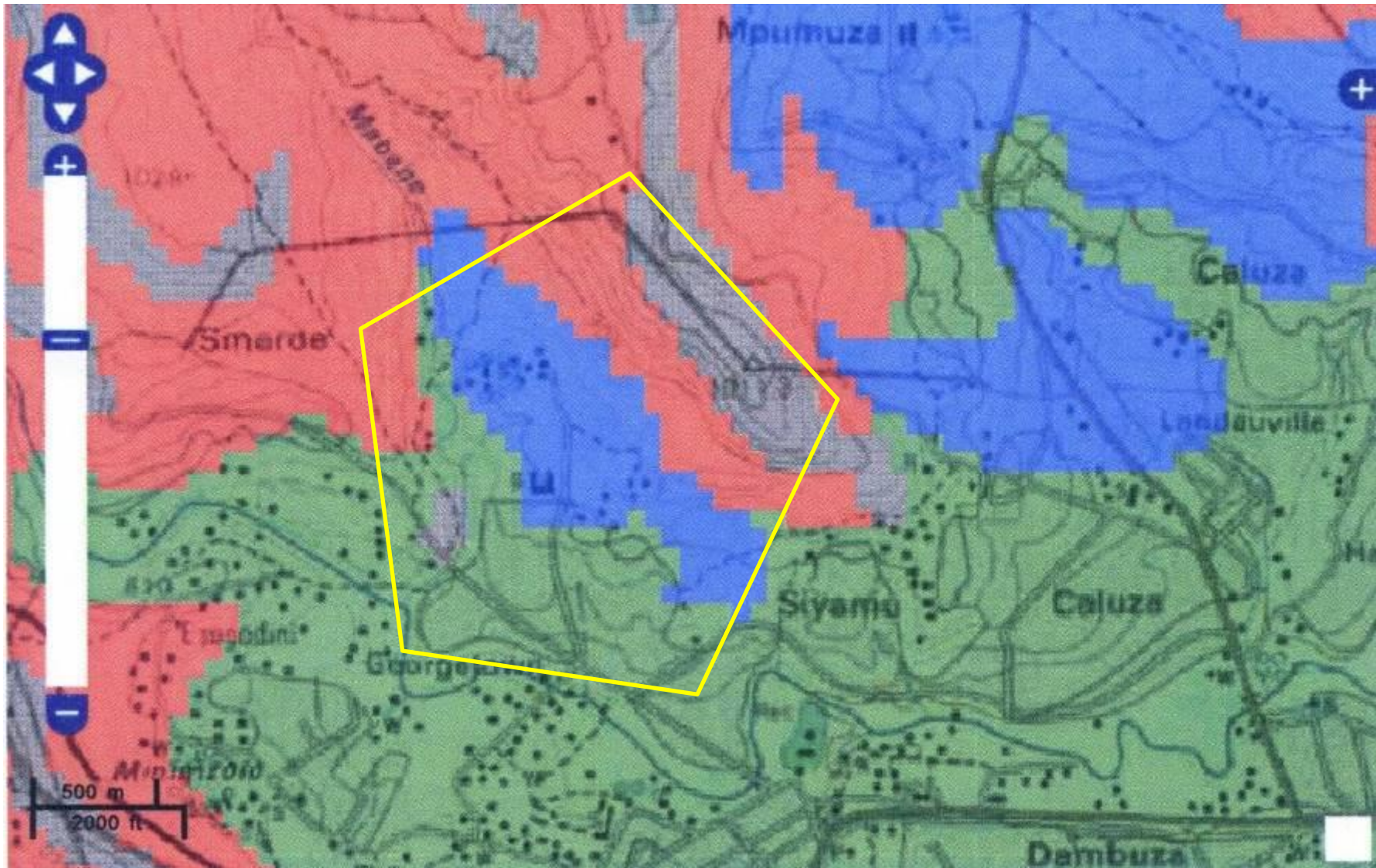


Figure 6: SAHRIS palaeosensitivity map for the site for the proposed Smero Housing project shown within the yellow outline. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

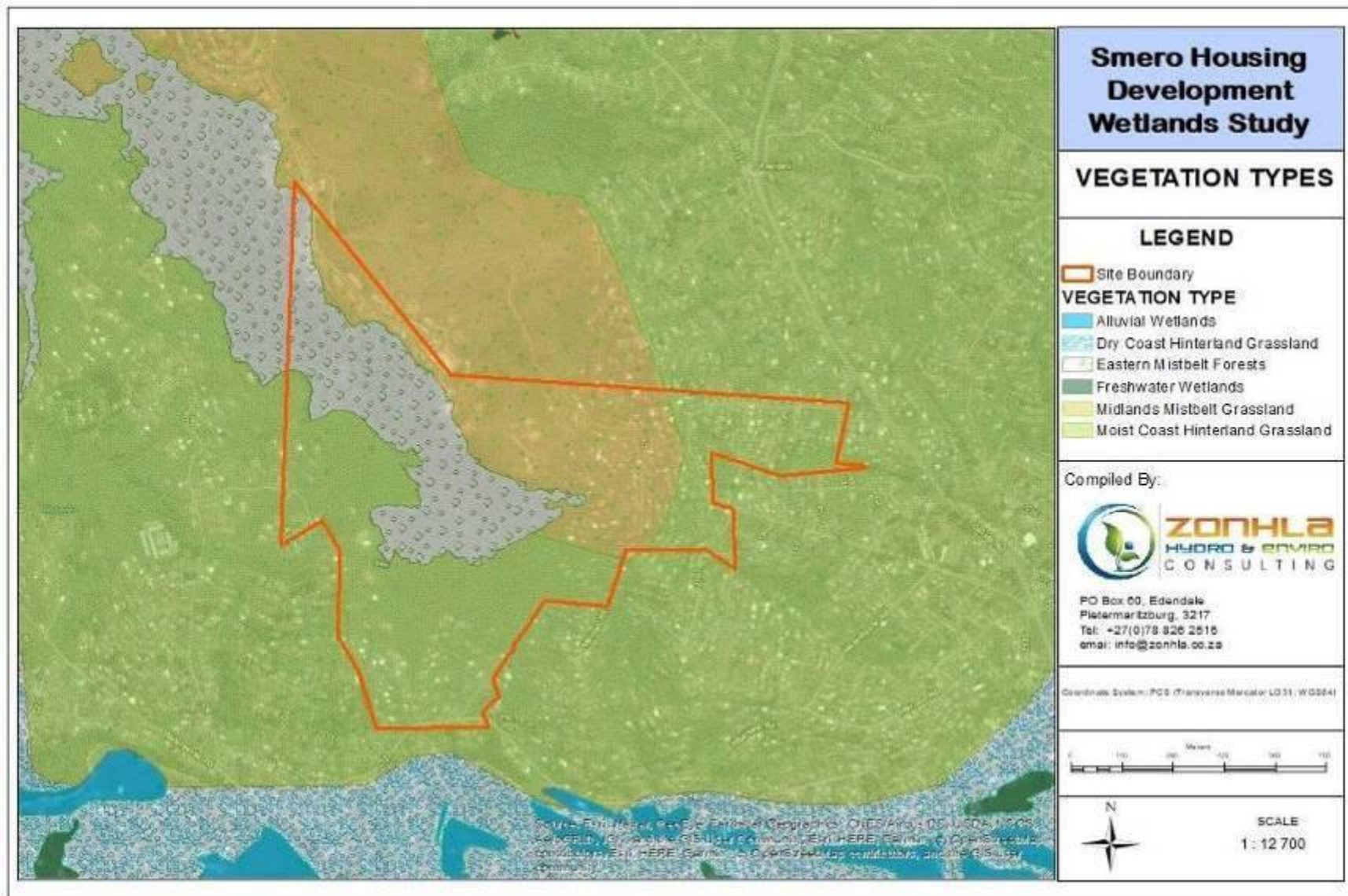


Figure 7: Vegetation Cover of the Project Site

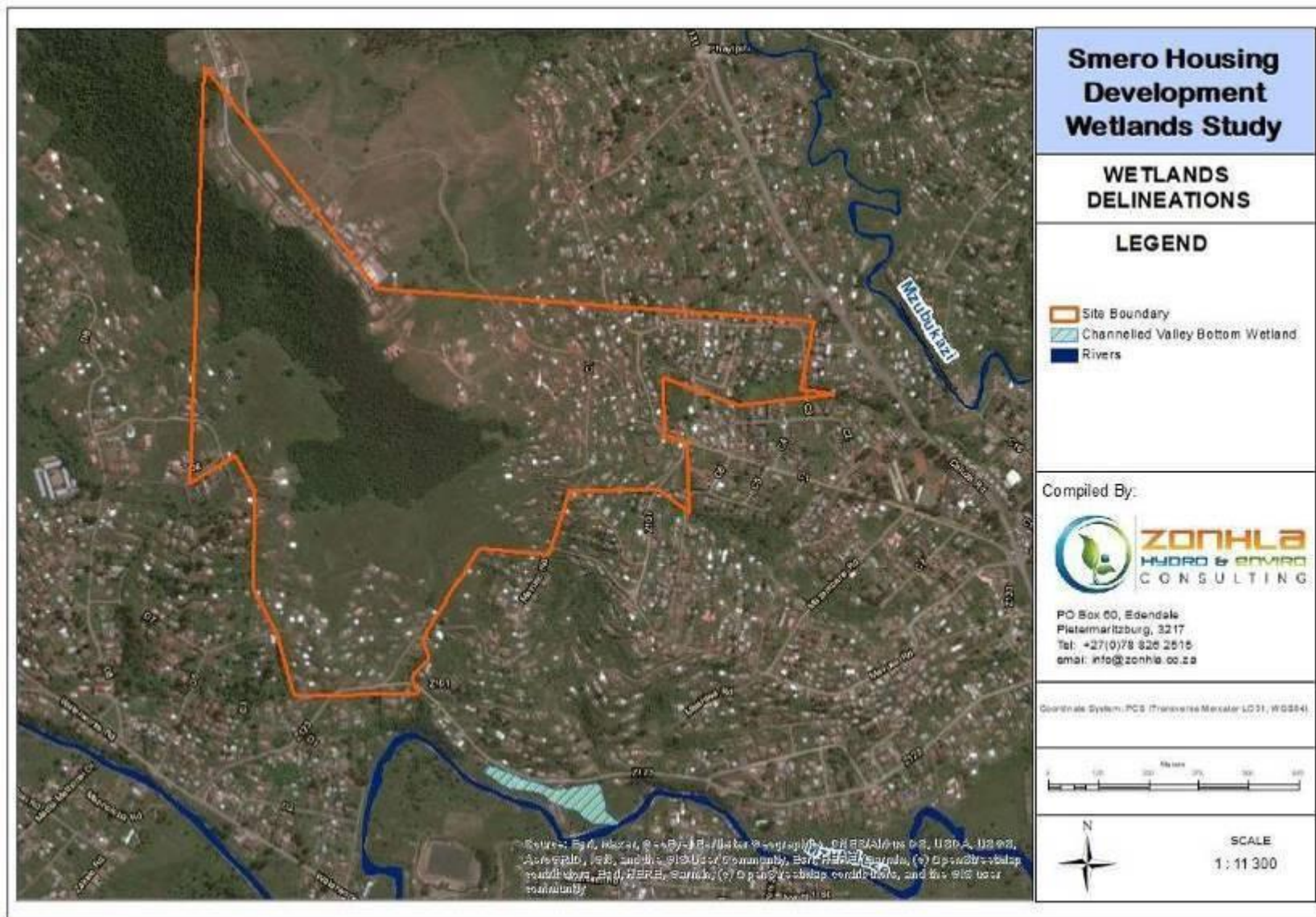


Figure 8: Delineated Wetland and Rivers Within the 500m Radius of the Proposed Housing Development Boundary

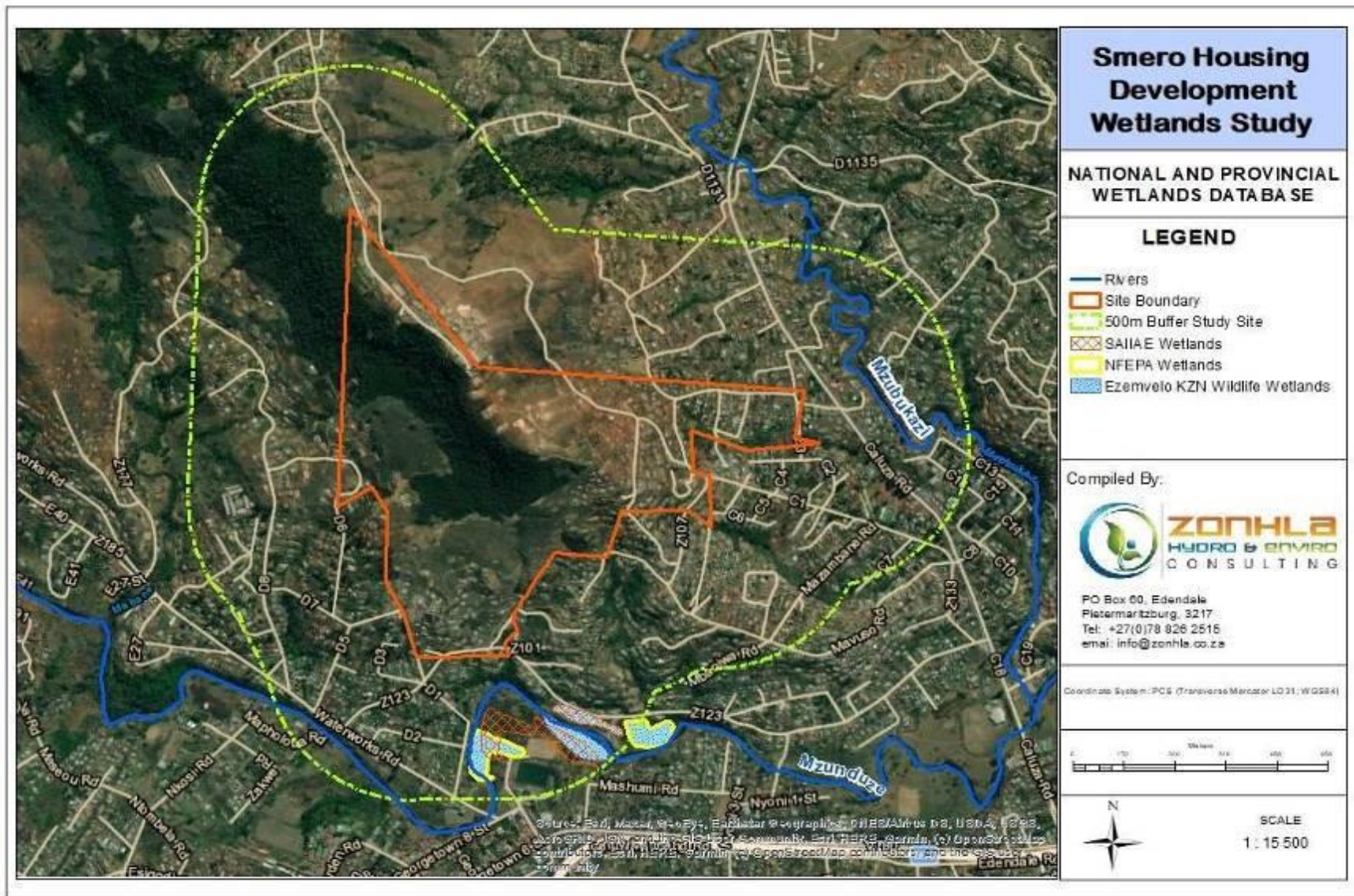


Figure 9: Location of the Wetlands as Indicated by the NFEPA and KZN Ezemvelo Wildlife and SAIIE Wetlands Database.



VAT: 4910274481
Tax no. 9221522197
Reg.no 2015/009313/07
UIF.no. 2504928/9

No. 49 Peter Kertch hoff (Chapel Str.)
No. 49 Peter Kertch hoff (Chapel Str.)
Office no. 105/106/119
Pietermaritzburg
3201
Email: info@amathongagroup.co.za
Tell: 033 940 9635 or 0736292617

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
REPORT (EIAR) FOR THE
PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON
ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN PROVINCE
OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

The logo for SINOHYDRO Consultant (PTY) Ltd features the word "SINO" in black, a green circular icon with a leaf and a water drop, and "HYDRO" in blue. Below the text are wavy lines representing water. Underneath the logo, the text "Consultant (PTY) Ltd" is written in a smaller black font.	<p>Sinohydro Consultants (PTY) Ltd. No. 49 Peter Kertch hoff (Chapel Str.) Office no. 105/106/119 Pietermaritzburg, 3201 Email: info@amathongagroup.co.za Tell: 033 940 9635 or 0736292617</p>
--	--

APPENDIX B4: SNERO/CALUZA BULK SERVICES

S -

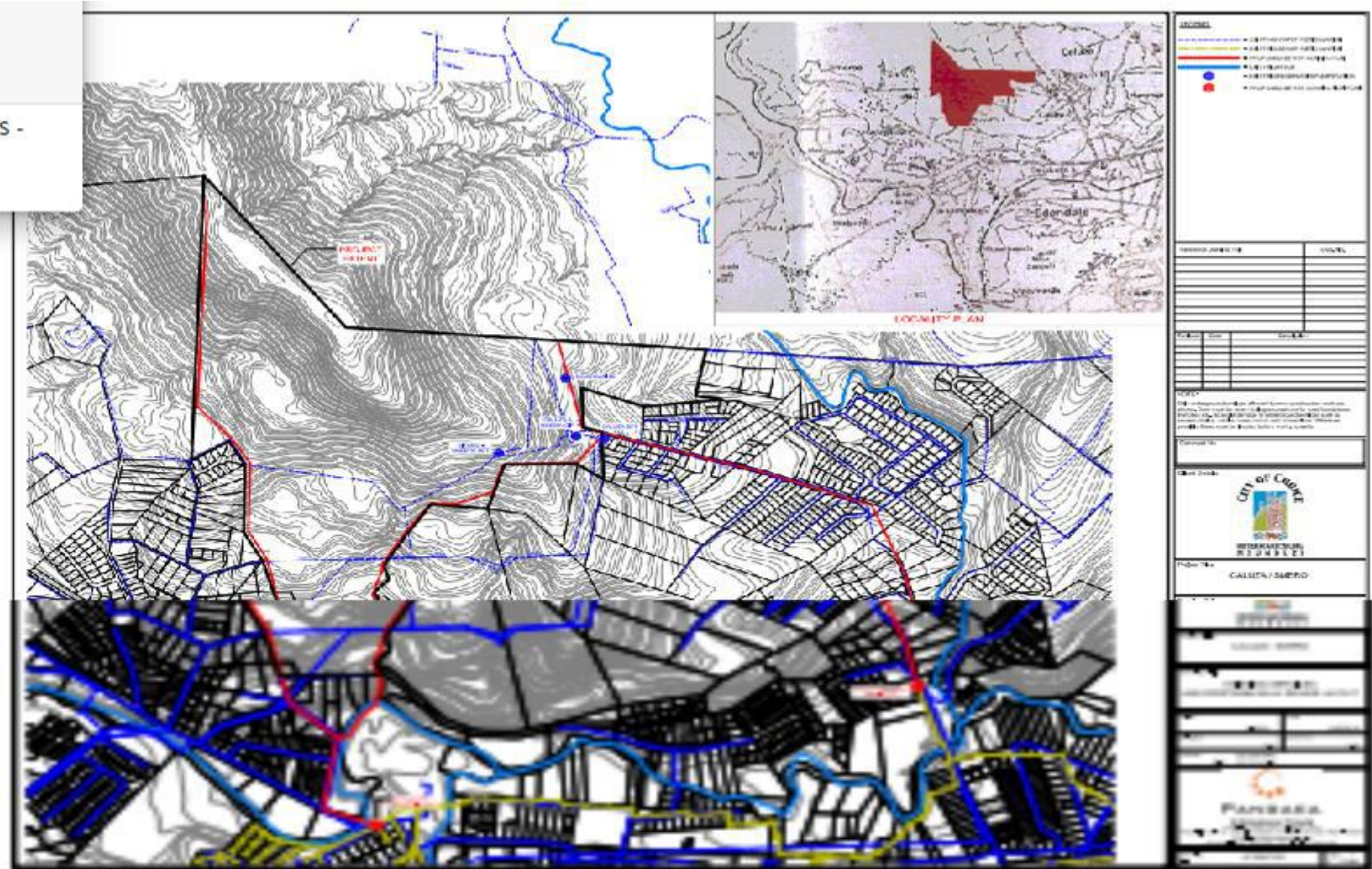


Fig 2 : Snero/Caluza bulk services connection routes



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UIF.no. 2504928/9

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Pietermaritzburg
3201
Email: info@amathongagroup.co.za
Tell: 033 940 9635 or 0736292617

**FINAL ENVIRONMENTAL IMPACT ASSESSMENT
REPORT (EIAR) FOR THE
PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON
ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20
EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY,
UNDER UMGUNGUNDLOVU DISTRICT MUNICIPALITY IN KZN PROVINCE
OF SOUTH AFRICA.**

EDTEA REF NO. DC22/0017/2022

EAP

The logo for SINOHYDRO Consultant (PTY) Ltd features the word "SINO" in black, a circular icon with a green leaf and a blue water drop, and the word "HYDRO" in blue. Below the icon are three wavy lines representing water. The text "Consultant (PTY) Ltd" is written in black below the main logo.	<p>Sinohydro Consultants (PTY) Ltd. No. 49 Peter Kerchhoff (Chapel Str.) Office no. 105/106/119 Pietermaritzburg, 3201 Email: info@amathongagroup.co.za Tell: 033 940 9635 or 0736292617</p>
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APPENDIX C1: PUBLIC PARTICIPATION MEETINGS REPORT

APPENDIX CI:

PUBLIC PARTICIPATION PROCEDURES DONE BY SPHE CONSULTING

Please note the information contained in this section (C1) was extracted from SPHE Consulting and the references done are found in the documents submitted to EDTEA by SPHE Consulting

5 PUBLIC PARTICIPATION PROCESS

The EIA Regulations specify that a public participation process must be conducted as an integral part of the EIA. The public participation followed the process stipulated in Section 39 of the 2017 EIA Regulations. This chapter outlines the public participation process followed.

5.1 Notification of Interested and Affected Parties (I&AP's)

Section 39 of the EIA Regulations outlines the requirements for the notification of all potential I&AP's. These requirements typically include the following:

- Giving notification to:
 - The landowners and occupiers of the project site and those within 100m of the project site and alternative sites, or those directly influenced by the activity under consideration;
 - The municipality that has jurisdiction over the area;
 - The municipal councilors of the affected wards; and
 - Any organ of state having jurisdiction in respect of any aspect of the activity.
- Placing an advertisement in a local and a provincial newspaper; and
- Fixing a notice board at a conspicuous place on all alternative sites.

5.1.1 Notification of Landowners, Authorities, and Organs of State

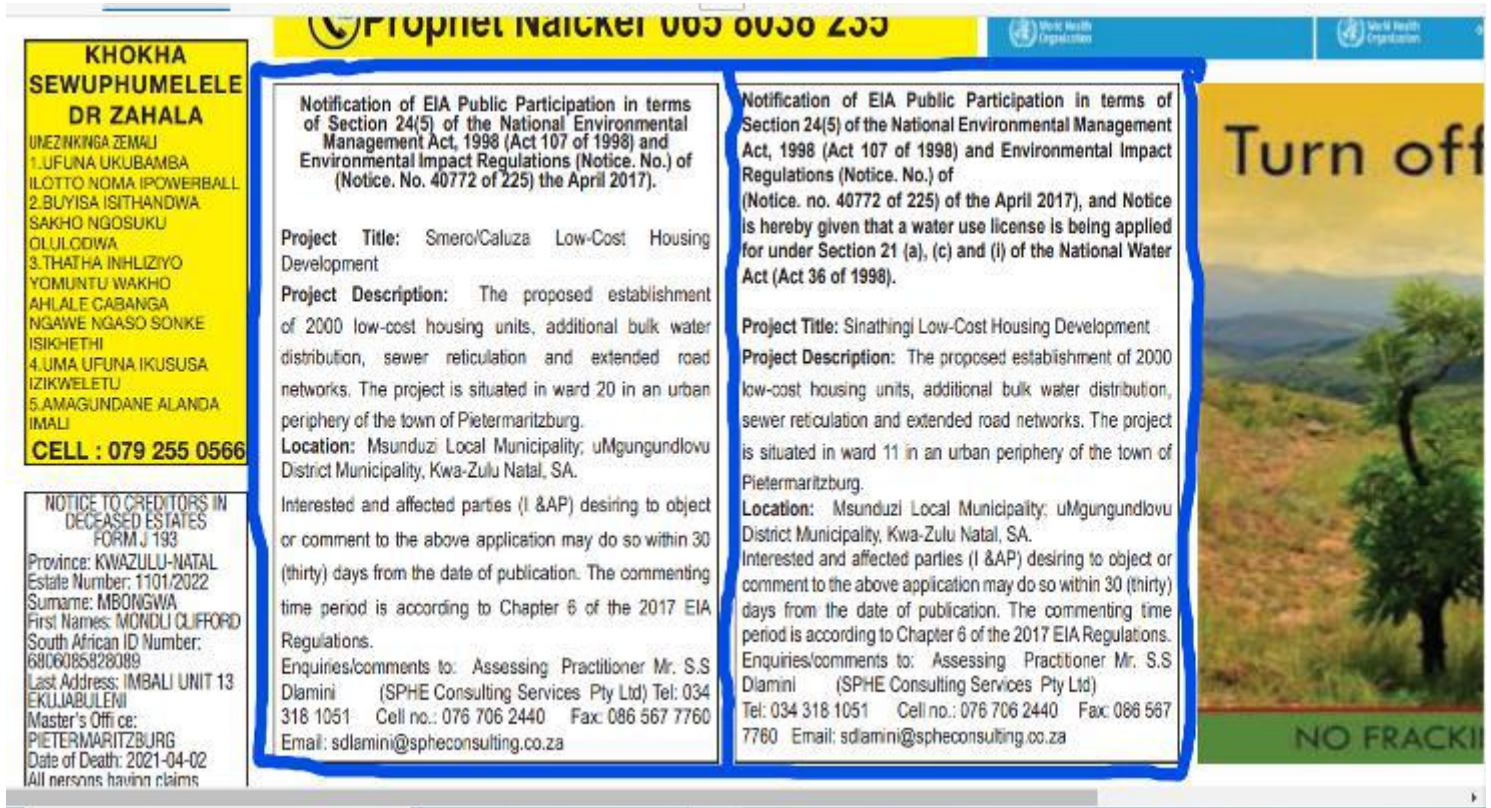
At the commencement of the EIA, SPHE Consulting Services (Pty) Ltd notified and obtained written consent from Msunduzi Local Municipality (MLM), the landowner of the project site, (See **Appendix B** for a copy of the landowner consent form).

Surrounding landowners and occupiers of land within 100 metres of the proposed project site were notified by hand delivered letters of the applicant's intention to submit an application to the competent authority (See **Appendix G** for copies of the letter).

In addition, written notification via registered mail was sent to the Authorities and Organs of State that have jurisdiction over the activity as well as the relevant Ward Councilor (See **Appendix C** for the I&AP Register and **Appendix G** for copies of the letter).

5.1.2 Newspaper Advertisement

A newspaper advertisement detailing information about the project and the EIA process that has since been finalized, as well as calling for the registration of I&AP's, was placed on the 15th of April 2022 in the Msunduzi Eyethu newspaper, the regional newspaper for the Midlands area. The advertisement provided I&APs 28 days to register and to submit their comments in writing to SPHE Consulting. The closing date for registration was therefore on the 26th of May 2022 See **Appendix D** for a copy of the newspaper advertisement.



5.1.3 Notice Board

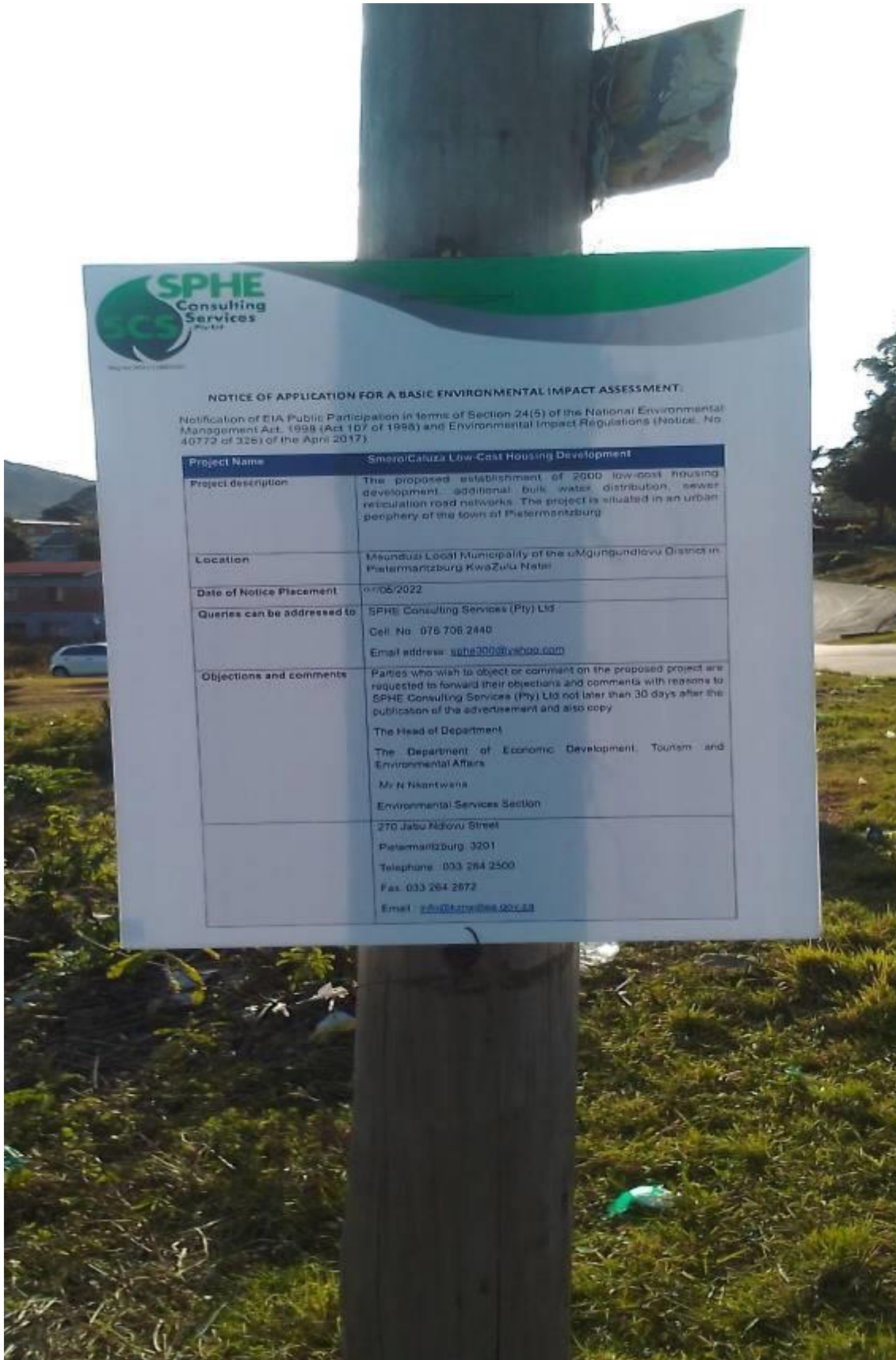
An A2 size notice board detailing information about the project and the EIA process was erected on site at a recognized public area on 05th of June 2022.



NOTICE OF APPLICATION FOR A BASIC ENVIRONMENTAL IMPACT ASSESSMENT

Notification of EIA Public Participation in terms of Section 24(b) of the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Regulations (Notice No. 40772 of 326) of the April 2017.

Project Name	Sango/Galaza Low-Cost Housing Development
Project description	The proposed establishment of 2000 low-cost housing development, additional bulk water distribution sewer reticulation road networks. The project is situated in an urban periphery of the town of Pietermaritzburg.
Location	Masendal Local Municipality of the uMgungundlovu District in Pietermaritzburg, KwaZulu-Natal
Date of Notice Placement	27/06/2023
Queries can be addressed to	SPHE Consulting Services (Pty) Ltd Cell No. 076 700 2440 Email address: sphe300@xh00.co.za
Objections and comments	Persons who wish to object or comment on the proposed project are requested to forward their objections and comments with reasons to SPHE Consulting Services (Pty) Ltd not later than 30 days after the publication of the advertisement and also copy The Head of Department The Department of Economic Development, Tourism and Environmental Affairs Mr N Nkomo Environmental Services Section 270 Javu Ndlovu Street Pietermaritzburg, 3201 Telephone: 033 264 2500 Fax: 033 264 2672 Email: info@sphe.co.za



NOTICE OF APPLICATION FOR A BASIC ENVIRONMENTAL IMPACT ASSESSMENT

Notification of EIA Public Participation in terms of Section 24(5) of the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Regulations (Notice, No. 40772 of 32b) of the April 2017)

Smeroi/Catuzi Low-Cost Housing Development	
Project description	The proposed establishment of 2000 low-cost housing development, additional bulk water distribution, sewer reticulation road networks. The project is situated in an urban periphery of the town of Pietermaritzburg.
Location	Meunzini Local Municipality of the uMgungundlovu District in Pietermaritzburg, KwaZulu Natal.
Date of Notice Placement	09/05/2022
Queries can be addressed to	SPHE Consulting Services (Pty) Ltd Cell No: 076 706 2440 Email address: sphe300@yahoo.com
Objections and comments	Parties who wish to object or comment on the proposed project are requested to forward their objections and comments with reasons to SPHE Consulting Services (Pty) Ltd not later than 30 days after the publication of the advertisement and also copy The Head of Department The Department of Economic Development, Tourism and Environmental Affairs Mr N Nkantwana Environmental Services Section 270 Jabu Ndlovu Street Pietermaritzburg, 3201 Telephone: 033 264 2500 Fax: 033 264 2672 Email: sphe@sphe.co.za

Figure 2: Notice board erected on site

5.1.4 Background Information Document

At commencement of the project a Background Information Document (BID) was prepared and sent to I&APs that provided a summary of the details of the proposed project as well as the EIA process that was to follow (See **Appendix E**).

5.2 Public Meeting

The project public meeting was conducted on the 05th of June 2022. See **Appendix I**

5.3 Register of Interested and Affected Parties (I&AP's)

As per the requirements of Regulation 42 of Government Notice No. R 326, a register of I&AP's has been maintained and updated throughout this project. Kindly refer to **Appendix C** for a copy of the register.

5.4 Comments Register

Kindly refer to **Appendix F** for a copy of the Comments Register. The key issues have been documented in **Section 8** of this document.

5.5 Public review of the draft Scoping Report

The draft Scoping Report was made available to I&AP's for a 30-day comment period. Kindly refer to **Appendix F** for a copy of the Comments Register.

5.6 Public Review of the Environmental Impact Report

This Environmental Impact Report (EIR) was made available to registered I&AP's for a 30-day comment period, beginning on 23rd of June 2022 and ending on the 03rd of August 2022. All comments received from I&AP's during this public review period have been included in the Final EIR that has been submitted to EDTEA.

APPENDIX C2:

STAKEHOLDER CONSULTATION BEING DONE BY SINOHYDRO

Please note that Sinohydro has done the public participation process / stakeholder consultation for the revised final EIAR. Different state organs were emailed with the Draft Environmental Impact Assessment Report and the 1st response received was from Amafa who requested that we go through the AMAFA application process so that they can make comments; which is in progress. The second comment we received was from the KZN Department of Human Settlements, which was the acknowledgment of the report. No responses were received from the other state organs that were emailed with the Draft EIAR.

The newspaper adverts were circulated and no responses were received from members who would be registered as Interested and Affected Parties on the 2nd of May 2023. Therefore, we closed the subject matter on the 2nd of May 2023. Below are the newspaper adverts for the process as well as the responses from the State Organs.

202 MISCELLANEOUS SALES	202 MISCELLANEOUS SALES	601 EDUCATION & TRAINING	601 EDUCATION & TRAINING	710 LIQUOR ACT	710 LIQUOR ACT	714 PUBLIC NOTICES	714 PUBLIC NOTICES
<p>BEST WAY TO GO OFF-GRID</p> <p>ELECTRICITY R3 /KW 2023 R2 /KW 2020 • R1 /KW 2010</p> <p>STOVE Change to GAS</p> <p>GEYSER Retrofit to : • SOLAR R17 999 • HEAT PUMP R17 999</p> <p>SOLAR PHOTOVOLTAIC • Supply Essential Loads • POWER For Load - Shedding</p> <p>Call 066 033 7233</p>		<p>Jobs!, Training, Security</p> <p>Register for a Security or Firearm course Today! To help You, get employed, in the industry.</p> <p>Register & qualify for R400 off any course CALL NOW! Special ends 31 March 2023 Whatsapp info to: 061 508 5637 or call (031) 902 2533 / (031) 836 0879</p> <p>84 Phila Ndwandwe Road</p> <p>We Improve employment opportunities, Faster! T&C's apply</p> <p>BRENT SECURITY SERVICES</p>		<p>ANNEXURE D NOTICE TO DISPLAY INTENTION TO APPLY FOR LIQUOR LICENCE IN TERMS OF SECTION 42) (1) (B) (III) OF ACT KWAZULU-NATAL LIQUOR LICENSING ACT, 2010 (ACT NO. 6 OF 2010) KZNLA 3</p> <p>Name and surname of the applicant: MACSYLVIO (PTY) LTD</p> <p>Category of licence applied for: (on/off-consumption/micro-manufacturer/special event): ON- CONSUMPTION</p> <p>Type of premises for which licence is applied for: (type of licence) RESTAURANT LICENCE</p> <p>Trading name of the premises: WIMPY PAVILION HYPERAMA</p> <p>Address of the premises: SHOPS 3-4, ERF 2369, JACK MARTINS DRIVE, DAWNCLIFF WESTVILLE PAVILION, CHECKERS HYPER, WESTVILLE 3630</p> <p>Date of display: 27 MARCH 2023</p> <p>Expiry date of display: 01 MAY 2023</p> <p>NB: Objections to this application to be lodged with the EThekweni Local Committee at the address hereunder and a copy thereof to be served on the applicant within 21 working days from the date of display of this Notice. Address: KwaZulu-Natal Liquor Authority, 22 Dorothy Nyembe Street, Durban, 4000.</p> <p>The objectors must comply with section 42 & 43 of the KZN Liquor Act, Act 6 of 2010 relating to procedure of objecting. E-mail:sibusiso.zwane@kznliqa.co.za Tel: 031-302 0600</p>		<p>NOTICE OF ENVIRONMENTAL ASSESSMENT PROCESS FOR SMERO/ CALUZA LOW-COST HOUSING DEVELOPMENT UNDER THE MSUNDUZI LOCAL MUNICIPALITY WITHIN UMGUNGUNDLOVU DISTRICT, IN KWAZULU-NATAL PROVINCE</p> <p>INVITATION TO REGISTER AS AN INTERESTED OR AFFECTED PARTY</p> <p>Isaziso sinikeziwe ngokoMthethonqubo 41(2) weMithethonqubo Yokuhloha Umthelala Wezemvelo (EIA) (GNR.962) ka-2014 (njengoba ichtshiyelwe), emenyazelwe ngaphansi kweSahluko sesi-5 soMthetho Wokuphathwa Kwemvelo Kazwelonke we-107 ka-1998 (njengoba uchitshiyelwe) ukuthi uMasipala Wendawo Msunduzi ufaka isicelo ngomthetho activities, GN 327, 'Listing Notice 1 isigaba 12(ii)(a) and 19, and GN 325, 'Listing Notice 2 isigaba 15 no-GN 324, 'Listing Notice 3 isigaba 12, UMasipala waseMgungundlovu esfundazweni saKwaZulu Natali uzimisele ukwaka imizi yemxaso (izindlu ezibiza kancane) eziwu-2000 eSmero/ Caluza, Ward 20 kuphinde kunezezelwe namanzi womphakathi, kufakwe indle ezosusa amanzi angcolile, kwakhiwe nemigwaqo ehlangene nemixaso. Uma ufisa ukubhaliswa njengeQembu Elithakaselayo noma Elithintekile kule phrojekthi, noma uthole iminingwane eyengezele, sicela ulethe igama lakho, iminingwane yokuxhumana (inombolo yocingo/ifeksi, ikheli le-imeyili, noma ikheli leposi) ku: SINOHYDRO CONSULTANTS, Office No. 105/106/119, No. 49 Peter Kerchhoff (Old Chapel Str.), Pietermaritzburg, 3201; noma Ucingo: (033) 940 9635, noma i-imeyili: info@amathongagroup.co.za. Uma ufisa ukusinikeza imibono yakho, sicela uthumele okufanayo kungakadluli umhla-ka-02 kuNhlaba 2023. Iminigwane mayelana neminingwane yeBackground Information Document neDraft Scoping and EIA Report iyatholakala uma ufaka isicelo. Suku lesaziso: 27 KuNdasa 2023. Iihovisi eliphethe isicelo EDTA Office: Umgungundlovu District Isicelo esisemithethweni: Scoping and Environmental Impact Assessment Report.</p>	
<p>PAWN YOUR CAR</p> <p>LOW Interest</p> <p>RB's PAWN Brokers</p> <p>We Lend cash against Bikes, Boats, Trailers, Light Industrial Machinery</p> <p>GOLD WE PAY UP TO 9ct- R340 18ct- R680 22ct-R831</p> <p>GOLD Silver and Diamond or anything</p>		<p>DMT Training and Jobs Agency. (SETA registered)</p> <p>New Year's special on all courses. Petrol attendant/cashier /firefight/ first aid receptionist /waiter/ cleaning: R1200 -10 days training Superlink truck: R6000 - 2 weeks Welding R3000 - 2 weeks. CO2-R4000. Boilermaker: R4500 - 6 weeks. TLB: R2200 -10 days. Grader dozer, F.E.L excavator, dump truck: R3200 (gett hyster training free if you do machine course) LHD mining drillers / 777- R4700 -10 days. Jobs in mining operation. Motor /diesel mechanic /Panel-beating: R7500 - 2 months. Practical/electrical Free accomm. Assistance with jobs in Ngumalanga coal, gold mines and powerstations Free forklift/ hyster training with any course</p> <p>Call 072 954 7705</p>		<p>DYNAMIC Security Training Academy dynamicsecuritytraining.co.za Pera Reg No : 638908</p> <p>COMBO SPECIAL for employment Grade EDC now R950!!</p> <p>Grade B, A, Reaction, CIT, NKP, instructor course, Banking, Retail, Hotel & Events Security, CCTV Operators Course Self study options available Firearm Training Psira company registrations Psira profile & job assistance</p> <p>508 Anton Lembede Str, Durban ☎0313069880 📞0671613614</p>		<p>717 TENDERS</p> <p>717 TENDERS</p> <p>717 TENDERS</p> <p>717 TENDERS</p>	

Figure C2.1: isiZulu Newspaper Advert – Smero/Caluza

INDEPENDENT MEDIA

C

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INDEX

DOMESTICS	001-024	LEGISLATION	160	PROPERTY	425-418
PETS	076-395	ENTERTAINMENT	165-193	ACCOMMODATION	560-575
MOTOR	300-319	MISCELLANEOUS	200-240	STAFF RECRUITMENT	601-604
PERSONAL	102-107	MOTOR SERVICES	331-338	LEGALS	700-729
HEALTH	140-146	ADULT ENTERTAINMENT	195-192	AUCTIONS	785-782
HOLIDAY ACCOMMODATION	150	BUSINESS	400-412	SERVICE GUIDE	801-848

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Glock 19 Gen 5 - R12 500
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DM4 AR15 - R17 000
SHOTGUN FROM - R5 000

PROFICIENCY COURSE FROM R1500

FULL PACKAGES FROM R3250

Shop 1 Joyland Shopping Center • Shop 7 Crossroads Shopping Center
CONTACT: 087 814 0911

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Contact: Zahraa Amen
Tel: 031 368 7781
Cell: 084 852 1575
zahraa@urbanlaw.co.za

Sule 31, 3rd Floor Lornegrey Medical Centre,
280 Dr Yusuf Dadoo (Grey) Street, Durban
We are situated at the corner
of Lorne Street and Grey Street
- Near City Hospital.

DEATHS

PLATT SUE
24/02/1927 - 21/03/2023

Widow of Richard Dick, beloved mother of Belinda, Guy, Justin, Martin and Sarah, much loved mother-in-law of Pete, Lynda, Gill, Jenny and Pierre, Granny of 11 and Great Granny of 9, passed away peacefully, aged 96 on the 21 March, in her home at Amberfield, Howick. Forever in our hearts and memories. RIP our dearest Mum and Gran Sue.

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WE WILL BEAT ANY WRITTEN QUOTATION • WE DELIVER! EDGE

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7x12	Frame Tent R26 999
9x15	Frame Tent R49 500
9x30	Frame Tent R115 000
12x32	Frame Tent R139 000
15x32	Frame Tent R205 000

Deal 1 - 5 x 10 Frame Tent
30 Chairs, 1 Table, ratchet & straps, Windows **R24 500**

Deal 2 - 7 x 12 Frame Tent
50 Chairs, 2 Tables, ratchet & straps, Windows **R35 499**

Deal 3 - 9 x 15 Frame Tent
100 Chairs, 4 Tables, ratchet & straps, Windows **R59 999**

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Osman's CLOTHING

CLOTHING FROM

MISCELLANEOUS SALES

FARM EGGS FOR SALE

2.5 dozen Large Loose on Trays @ R50.00 per tray

MISCELLANEOUS SALES

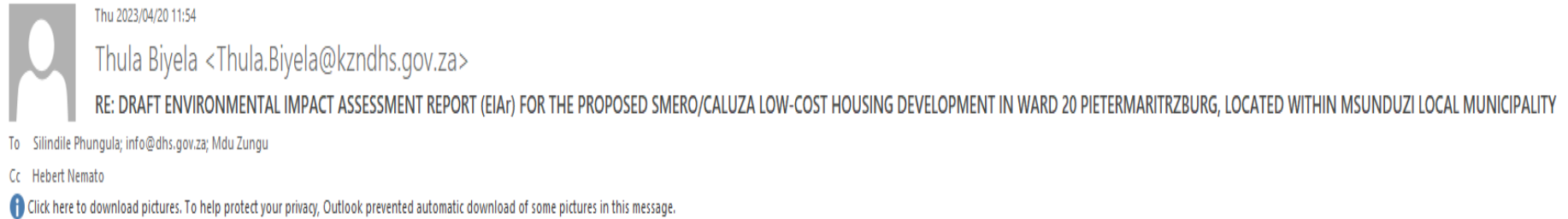
VEHICLES WANTED

WE BUY

1000 CARS AND BAKKIES WANTED!!!

Figure C2.2: English Newspaper Advert – Smero/Caluza

Figure C2.4: Responses from AMAFA – Smero/Caluza



Received thank you.

Thula Biyela (*Menziwa*)
KZN Human Settlements
Integrated Planning
0712995524

Figure C2.5: Responses from Department of Human Settlements – Smero/Caluza

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 - 3. THATHA INHLIZIYO YOMUNTU WAKHO AHLALE CABANGA NGAWWE NGASO SONKE ISIKHETHI
 - 4. UMA UFUNA IKUSUSA IZIKWELETU
 - 5. AMAGUNDANE ALANDA IMALI
- CELL : 079 255 0566**

NOTICE TO CREDITORS IN DECEASED ESTATES FORM J 193

Province: KWAZULU-NATAL
Estate Number: 1101/2022
Surname: MBONGWA
First Names: MONDLI CLIFFORD
South African ID Number: 6806085828089
Last Address: IMBALI UNIT 13 EKWJABULENI
Master's Offi ce: PIETERMARITZBURG
Date of Death: 2021-04-02
All persons having claims against the under-mentioned estate must lodge it with the Executor concerned within 30 days (or as indicated) from date of publication hereof.
Advertiser and Address: Gosai & Company Inc - Attorneys And Conveyancers, 105 SIXTH AVENUE, MORNINGSIDE
Advertiser email: vinay@gosaiattorneys.co.za
Advertiser telephone number: 031 303 5549. For Publication in the Government Gazette on: 2022-04-14

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If your hands are not visibly dirty, frequently clean them by using alcohol-based hand rub or soap and water

Protect yourself and others from getting sick

Wash your hands

- after coughing or sneezing
- when caring for the sick
- before, during and after you prepare food
- before eating
- after toilet use
- when hands are visibly dirty
- after handling animals or animal waste

Protect others from getting sick

When coughing and sneezing cover mouth and nose with flexed elbow or tissue

Throw tissue into closed bin immediately after use

Clean hands with alcohol-based hand rub or soap and water after coughing or sneezing and when caring for the sick

Notification of EIA Public Participation in terms of Section 24(5) of the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Regulations (Notice. No.) of (Notice. No. 40772 of 225) the April 2017).

Project Title: Smero/Caluza Low-Cost Housing Development

Project Description: The proposed establishment of 2000 low-cost housing units, additional bulk water distribution, sewer reticulation and extended road networks. The project is situated in ward 20 in an urban periphery of the town of Pietermaritzburg.

Location: Msunduzi Local Municipality; uMgungundlovu District Municipality, Kwa-Zulu Natal, SA.

Interested and affected parties (I &AP) desiring to object or comment to the above application may do so within 30 (thirty) days from the date of publication. The commenting time period is according to Chapter 6 of the 2017 EIA Regulations.

Enquiries/comments to: Assessing Practitioner Mr. S.S Dlamini (SPHE Consulting Services Pty Ltd) Tel: 034 318 1051 Cell no.: 076 706 2440 Fax: 086 567 7760 Email: sdlamini@spheconsulting.co.za

Notification of EIA Public Participation in terms of Section 24(5) of the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Regulations (Notice. No.) of (Notice. no. 40772 of 225) of the April 2017), and Notice is hereby given that a water use license is being applied for under Section 21 (a), (c) and (i) of the National Water Act (Act 36 of 1998).

Project Title: Sinathingi Low-Cost Housing Development

Project Description: The proposed establishment of 2000 low-cost housing units, additional bulk water distribution, sewer reticulation and extended road networks. The project is situated in ward 11 in an urban periphery of the town of Pietermaritzburg.

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DEATHS

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NOTICE OF ENVIRONMENTAL ASSESSMENT PROCESS FOR SMEROCALUZA LOW-COST HOUSING DEVELOPMENT UNDER THE MSUNDUZU LOCAL MUNICIPALITY WITHIN UMGUNGUNDLOVU DISTRICT, IN KWAZULU-NATAL PROVINCE

INVITATION TO REGISTER AS AN INTERESTED OR AFFECTED PARTY

Notice is hereby given in terms of Regulation 41(2) of the Environmental Impact Assessment (EIA) Regulations (GNR 982) of 2014 (as amended), promulgated under Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), (as amended), that the Msunduzi Local Municipality intends to carry out the following listed activities, GN 327, Listing Notice 1 activities 12(i)(a) and 19, and GN 325, Listing Notice 2 activities 15 and GN 324, Listing Notice 3 activities 12. Development of 2000 low-cost housing units, additional bulk water distribution, sewer reticulation and extended road networks. PROJECT LOCATION: Smeroc Caluza, Ward 20 in an urban periphery of the town of Pietermaritzburg in Msunduzi Local Municipality, uMgungundlovu District Municipality. You are hereby invited to register as an Interested and Affected Party (I&AP), please submit your name contact information and matter of interest (in writing), to the contact Offices below, not later than 02 May 2023. Background Information Documents (BIDs) and Draft Scoping and EIA Report are made available to any I&AP on request. CONTACT OFFICE: SINOHYDRO CONSULTANTS, Office No. Office No. 105/106/119, No. 49 Peter Kerchhoff (Old Chapel Str.), Pietermaritzburg, 3201; or Tel: (033) 940 9535 or E-mail: info@amathongroup.co.za. Date of Notice: 27 March 2023. EDT/EA Office dealing with application: uMgungundlovu Region Form of application: Scoping and Environmental Impact Assessment Report

MEMORIAM/YAHRZEIT

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LINDE JANET MARY

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TENDER NO.: MN 41/2023

In terms of Chapter 11 of the Municipal Finance Management Act No. 56 of 2003, tenders are hereby invited for the above.

The physical address for collection of tender documents is: PMU Building, KwaDukuza upon presentation of a receipt proving prior payment of a non-refundable fee of R416.00 (inclusive of VAT), having been made at the Municipal Finance Directorate, General Justice Mpanza Building, 104 Mahatma Gandhi Street, KwaDukuza, (Cash only). Tender documents will be available from 10h00 on 30 March 2023. The cut-off time for selling of tender documents is 15h00 on 19 April 2023. Documents to be collected from Nqobile Kawula, Office Number 04 PMU Building, 2 Crescent KwaDukuza, Human Settlement Department, Corner of Chief Albert Lutuli and 2 Industrial Crescent (032) 437 5052. Technical Queries contact: Mr Sandile Cele, on tel. (032) 437 5079, e-mail: cele@kwaDukuza.gov.za or Ms. N. Kawula, e-mail: nqobile@kwaDukuza.gov.za tel. (032) 437 5053/071 687 5476.

A compulsory clarification meeting, with representatives of the Employer, will take place at the KwaDukuza Municipality: Open Space - PMU Building (Back Entrance) c/o Lavoipierre Building, No. 2 Industria Crescent, KwaDukuza, 4450, on 19 April 2023, starting at 10h00. Failure to attend the compulsory clarification meeting will disqualify a tender. Doors to the venue will be closed at 10h00 and the briefing will commence immediately. Late attendance will not be accepted and tenderer's WILL NOT be admitted into the meeting venue. Only those tenderers who are in possession of a tender document shall be permitted to participate in discussion at the compulsory clarification meeting and site inspection. All Bidders need to adhere to COVID-19 regulations.

Tenders shall be placed in sealed envelopes with **TENDER NO. MN41/2023** APPOINTMENT OF A PANEL OF SOCIAL HOUSING INSTITUTIONS CONSULTANTS FOR A PERIOD OF FIVE (5) YEARS placed in the tender box at the SCM Municipal Offices, No. 2 Industria Crescent, KwaDukuza, Lavoipierre Building, SCM Offices not later than 12h00 on 10 May 2023, at which time the tenders will be opened in public. Tenderers are to be submitted on the tender documentation provided by the Municipality. Late, electronic, or faxed tenders WILL NOT be accepted.

Any bid that fails to achieve a minimum of 60 points on the functionality evaluation shall not be evaluated further and will be deemed to be non-responsive.

Tenders will be evaluated and adjudicated according to the following Criteria: • 80/20 Preference Points System will apply in terms of the Preferential Procurement Regulations, 2022 (Points claimed will be scored for specific goals and proof of such claim must be provided with your bid). Failure in providing relevant proof will result in no points being awarded for specific goals/Preference Points • KwaDukuza Municipality will be applying specific goals in terms of Section 2 (1)(d) and (e) of the Act • Council's Supply Chain Management Policy, MFMA, Council's Preferential Procurement Policy and other Applicable Legislation • Service Providers Shall be registered on the National Treasury's Central Supplier Database (CSD) • Prices tendered must be firm and inclusive of VAT • The validity of your Bid Clearance Certificate issued by the South African Revenue Services certifying that the taxes of the bidder are in order will be verified against the information recorded on the Central Supplier Database (CSD) • Service providers to complete in full all Applicable MBD's • A copy of the most recent Municipal account/utility bill in which the business is registered or any of its Directors, District Municipality (water) and Local Municipality (rates, electricity and other) or if the bidder is a tenant then a letter or certificate from the landlord indicating that the Municipal Services are not in arrears OR a letter from the Ward Council or an Affidavit stating that the ward in which the business operates is Exempt from paying Municipal rates and taxes or Municipal Services. (The validity of the contents of the letter or affidavit in respect of rates will be tested with the Municipal Finance Rates office). Failure to submit this will lead to your bid being deemed as non-responsive • RDP Criteria applied for this Tender. Service providers who reside within the Republic of South Africa. Proof of your bid as being non-responsive • Social Housing Institutions (SHIs) shall be accredited by the Social Housing Regulatory Authority (SHRA) • Certificate of attendance at the clarification meeting • Social Housing Institution that score a minimum of 60 Points or above will be included in the final panel of consultants for the period of five years. The bid will be evaluated on Functionality.

All prospective tenderers will be screened in accordance with the National Treasury's Disruptive Tenders Database.

Council does not bind itself to accept the lowest tender or any tender and reserves the right to accept any part or the whole of any tender. The Municipality also reserves the right to call on preferred bidders to form a joint venture with a BEE company. Conveying in any form in the gift of Council is strictly prohibited and will lead to the disqualification of the tender. No bids will be considered from the persons in the service of any organ state.

N. M. MDAKANE, MUNICIPAL MANAGER

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ANNEXURE D
NOTICE TO DISPLAY INTENTION TO APPLY FOR LIQUOR LICENCE IN TERMS OF SECTION (42) (1) (B) (III) OF ACT KWAZULU-NATAL LIQUOR LICENSING ACT, 2010 (ACT NO. 6 OF 2010) KZNLA

Name and surname of the applicant: MACSYLVIO (PTY) LTD

Category of licence applied for: (on-/off-consumption/micro-manufacturer/special event): ON- CONSUMPTION

Type of premises for which licence is applied for: (type of licence) RESTAURANT LICENCE

Trading name of the premises: WIMPY PAVILION HYPERAMA

Address of the premises: SHOPS 3-4, ERF 2369, JACK MARTINS DRIVE, DAWNCLIFF WESTVILLE PAVILION, CHECKERS HYPER, WESTVILLE 3630

Date of display: 27 MARCH 2023

Expiry date of display: 01 MAY 2023

NB: Objections to this application to be lodged with the EThekweni Local Committee at the address hereunder and a copy thereof to be served on the applicant within 21 working days from the date of display of this Notice. Address: KwaZulu-Natal Liquor Authority, 22 Dorothy Nyembe Street, Durban, 4000.

The objectors must comply with section 42 & 43 of the KZN Liquor Act, Act 6 of 2010 relating to procedure on objecting. E-mail: sibusiso.zwane@kznliqa.co.za Tel: 031-302 0600

NOTICE OF ENVIRONMENTAL ASSESSMENT PROCESS FOR SMERO/ CALUZA LOW-COST HOUSING DEVELOPMENT UNDER THE MSUNDUZI LOCAL MUNICIPALITY WITHIN UMGUNGUNDLOVU DISTRICT, IN KWAZULU-NATAL PROVINCE

INVITATION TO REGISTER AS AN INTERESTED OR AFFECTED PARTY

Isaziso sinikeziwe ngokoMthethonqubo 41(2) weMithethonqubo Yokuhlola Umthelela Wezemvelo (EIA) (GNR.982) ka-2014 (njengoba ichtshiyelwe), emenyazelwe ngaphansi kweSahluko sesi-5 soMthetho Wokuphathwa Kwemvelo Kazwelonke we-107 ka-1998 (njengoba uchitshiyelwe) ukuthi uMasipala Wendawo Msunduzi ufaka isicelo ngomthetho activities, GN 327, 'Listing Notice 1 isigaba 12(ii)(a) and 19, and GN 325, 'Listing Notice 2 isigaba 15 no-GN 324, 'Listing Notice 3 isigaba 12. UMasipala waseMgungundlovu esfundazweni saKwaZulu Natali uzimisele ukwaka imizi yemxaso (izindlu ezibiza kancane) eziwu-2000 eSmero/ Caluza, Ward 20 kuphinde kunezelwe namanzi womphakathi, kufakwe indle ezosusa amanzi angcolile, kwakhiwe nemigwaqo ehlangene nemixaso. Uma ufisa ukubhaliswa njengeQembu Elithakaselayo noma Elithintekile kule phrojekthi, noma uthole iminingwane eyengeziwe, sicela ulethe igama lakho, iminingwane yokuxhumana (inombolelo yocingo/fekisi, ikheli le-imeyili, noma ikheli leposi) ku: SINOHYDRO CONSULTANTS, Office No. 105/106/119, No. 49 Peter Kerchhoff (Old Chapel Str.), Pietermaritzburg, 3201; noma Ucingo: (033) 940 9635; noma i-imeyili: info@amathongagroup.co.za. Uma ufisa ukusinikeza imibono yakho, sicela uthumele okufanayo kungakadluli umhla-ka-02 kuNhlaba 2023. Iminingwane mayelana neningwane yeBackground Information Document neDraft Scoping and EIA Report iyatholakala uma ufaka isicelo. Siculo lesaziso: 27 KuNdaga 2023. Ikhovisi elipethe isicelo EDTA Office: Umgungundlovu District Isicelo esisemthethweni: Scoping and Environmental Impact Assessment Report.

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Identity number: 740523 5442 08 8
Date of death: 7 December 2022
Address: 574 Michale Nsimbi Road Gamalake, Port-Shepstone
Surviving spouse: Zandile Maria Stella Nstshulani
Identity number: 671230 0429 08 5
ESTATE NO. 1517/2023

CREDITORS and DEBTORS in the above Estate are hereby required to file their claims with and pay debts to the undersigned within 30 days from the date of publication hereof. Dated at Durban on this 22nd Day of March 2023.
Attorneys / Agents: B.W ZONDI ATTORNEYS 379 ANTON LEMBEDE STREET DOONE HOUSE 2ND FLOOR SUITE 201F DURBAN 4001

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Nontokozi Mary De Faith Mzoneli

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Identity number: 581225 0362 08 7
Date of death: 31 December 2020
Address: 64 Genazzo Road, Seatide, Tongaat ESTATE NO. 1551/2023 DBN

CREDITORS and DEBTORS in the above Estate are hereby required to file their claims with and pay debts to the undersigned within 30 days from the date of publication hereof. Dated at Durban this 22nd Day of March 2023.
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Bids are hereby invited from qualified and experienced bidders for the provision of the following services for the Harry Gwala District Municipality.

PROJECT NAME	TENDER NUMBER	CLOSING DATE
PANEL OF TWO SERVICE PROVIDERS: SUPPLY AND DELIVERY OF PLUMBING MATERIALS FOR A PERIOD OF 36 MONTHS.	Contract No. HGDM 775/HGDM/2022	28 April 2023 at 12h00.

Invalid or non-submission of the following documents will lead to immediate disqualification: • Central Supplier Database registration • Utility bill: Municipal statement • JV Agreement (if applicable) • A signed MBD4 form must be submitted with all bids (available on our website or at Reception).

The following will apply in all the above bids: • Valid Tax Certificate or SARS PIN • Price(s) quoted must be firm and must be inclusive of VAT • A firm delivery period must be indicated • All tenders must be valid for 90 days after the tender closing date • 80/20 Preference Point System will be used in Evaluation. Functionality will be calculated first.

Specific Goals

1. Ownership	Verification Method	Weighting
• Black Ownership ≥ 51%	ID copies of directors, Company registration, CSD and shareholder certificates.	20
• Black ownership 40% - 50%	ID copies of directors, Company registration, CSD and shareholder certificates.	15
• Black ownership 30% - 39%	ID copies of directors, Company registration, CSD and shareholder certificates.	12
• Black ownership 20% - 29%	ID copies of directors, Company registration, CSD and shareholder certificates.	10
• Black ownership 10% - 19%	ID copies of directors, Company registration, CSD and shareholder certificates.	8
• Black ownership 1% - 9%	ID copies of directors, Company registration, CSD and shareholder certificates.	4

Bid documents may be collected from the **05 April 2023 between 09h00 to 16h00 at Harry Gwala District Municipality Offices, Finance Services Department, situated at 40 Main Street, Ixopo 3276.** Tender documents will be issued upon payment of a non-refundable cash fee of **R300.00 each.** Bid documents can also be downloaded on municipal website: www.harrygwalaadm.gov.za

The closing date for the bids is as per the table above. Bids must be enclosed in sealed envelope and clearly labelled with the **CONTRACT NUMBER AND PROJECT NAME** on the outside of the envelope addressed to: **The Municipal Manager.**

Bids must be deposited in the bid box at the Reception area of **Harry Gwala District Municipal, 40 Main Street, Ixopo**, before the closing date and time. Telegraphic, telexed or faxed bids **WILL NOT** be considered, and late bids **WILL NOT** be accepted.

All bid enquiries and other matters shall be directed to: The Executive Director: Water Service: Mr D.S. Gqiba during working hours on tel. (039) 834 5573.

Harry Gwala District Municipality does not bind itself to accept the lowest or any Bid and reserves the right to accept the whole or any part of the bid.

G.M. SINEKE: MUNICIPAL MANAGER

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Report to Verern Builders cc on a Desktop Geotechnical Appraisal of the Proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal

Reference: 161-18.R01

Dated: 11 June 2018

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Report Title		Report to Verern Builders cc on a Desktop Geotechnical Appraisal of the Proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal			
Report Reference		161-18.R01	Responsible Persons	Mr S. Sathnarayan	
Client Name		Verern Builders cc	Client Contact Details	sanjay@pangaeahe.co.za	
Revision	Date	Revision Details/Status		Author	Reviewer
0	11/06/2018	Geotechnical desktop appraisal with planning considerations		Mrs H. Pillay	Mr F. Smith
Current Revision					
	1				
Approval					
Author Signature		Reviewer Signature			
Name	H. Pillay	Name	F. Smith Pr. Sci. Nat.		
Title	Engineering Geologist	Title	Associate		

***Report to Verern Builders cc on a Desktop Geotechnical
Appraisal of the Proposed Smero/Caluza Low Income
Housing Project within Ward 20, Edendale, KwaZulu-
Natal***

Reference : 161-18.R01

Dated : 11 June 2018

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Report to Verern Builders cc on a Desktop Geotechnical Appraisal of the Proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal

Reference: 161-18.R01

Date: 11 June 2018

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Appendix A: Logs of Exposure Profiles

Figure 1: Site Plan

Report to Verern Builders cc on a Desktop Geotechnical Appraisal of the Proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal

Reference: 161-18.R01

Date: 11 June 2018

1. TERMS OF REFERENCE

Geosure Pty (Ltd), hereafter referred to as Geosure, was requested by Mr S. Sathnarayan from Pangaea Consulting on behalf of Verern Builders cc to provide a proposal and cost estimate to carry out a geotechnical desktop appraisal of the proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal.

Geosure provided Mr S. Sathnarayan with a proposal and cost estimate in a letter referenced p331-18 (Desktop – Smero-Caluzza Housing Project)/mb and dated 29th May 2018.

In correspondence dated 01 June 2018 in response to the fee proposal, Mr S, Sathnarayan on behalf of Verern Builders cc appointed Geosure to proceed with the desktop geotechnical appraisal as proposed.

2. SCOPE OF WORK

This report sets out the results of a Desktop Geotechnical Appraisal carried out for the proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal.

The appraisal has been carried out in accordance with the guidelines set down in the National Department of Housing (DoH) document titled “Geotechnical Site Investigations for Housing Development”, referenced GFSH-2 and dated September 2002.

3. CODES OF PRACTICE

The investigation was carried out generally according to standard practice codes and guidelines, including:

- Minimum guidelines for the Department of Housing GSFH-2: Phase 1 Geotechnical Site Investigation; and
- National Home Builders Registration Council (NHBRC) Home Builders Manual (HBM).

The nature of geotechnical engineering is such that variations in soil conditions may occur even where sites seem to be consistent. Variations in what is reported here may become evident during construction and it is thus imperative that a Competent Person inspects all excavations to ensure that conditions at variance with those predicted do not occur and to undertake an interpretation of the facts supplied in this report.

It is also possible that certain indications of ground stability, contamination or groundwater levels were latent or otherwise not visible. Our opinions can only be based on what was visible at the time the appraisal was conducted.

This report was prepared for use by Verern Builders cc and their professional team for the purpose stated and should not be relied upon for any other purpose.

4. INFORMATION SUPPLIED

The following sources of information were consulted:

- Observations during a drive-over of the site, which included profiling exposures, numbered EXP1 – EXP5;
- Geological Map Sheet “2930 Durban” dated 1988 to scale 1:250 000 produced by the Council for Geoscience;
- Shape files of the site indicating the site boundary provided by the client; and
- Low-resolution satellite imagery of the site available from Google Earth.

5. SITE LOCATION AND DESCRIPTION

The site is located approximately 5 kilometres (km) to the north of Edendale, central KwaZulu-Natal.

The regional and local contexts of the site are shown below and overleaf in Plates 1 and 2, respectively.

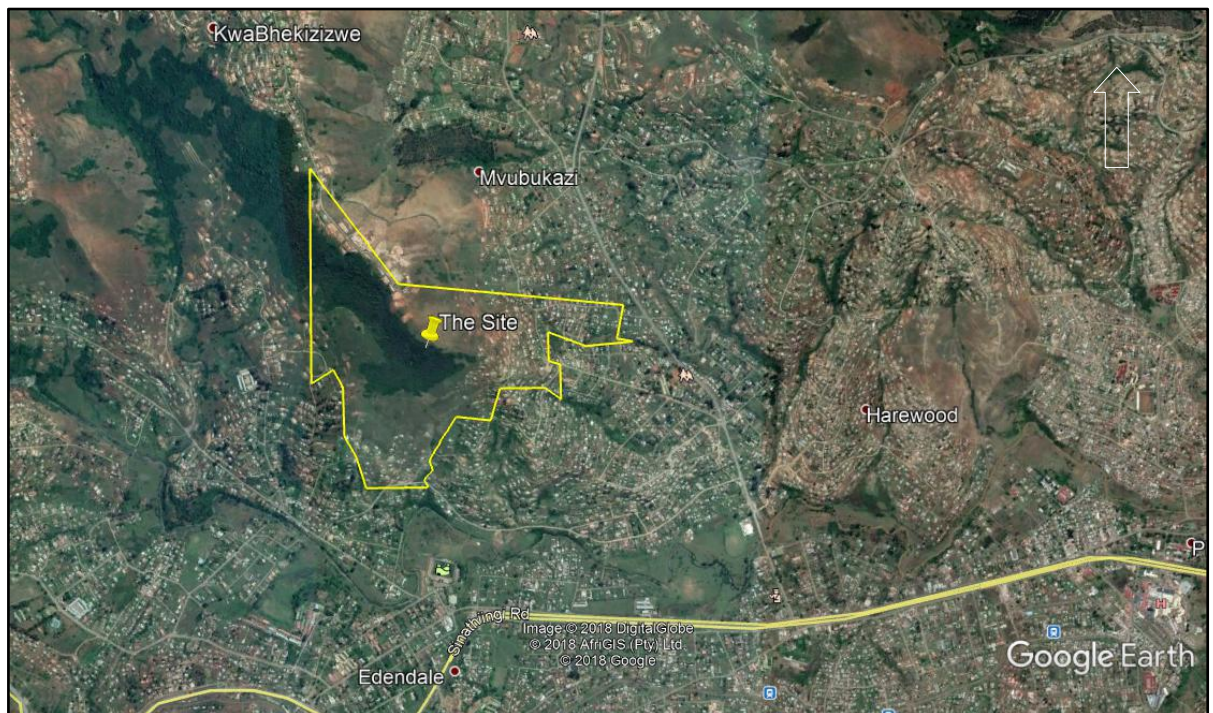


Plate 1: Regional context of the site area shown in yellow (Source: Google Earth imagery)



Plate 2: Local context of the site indicated as the area demarcated in yellow

The site appears to be characterised by highly undulating and steep terrain over the portions of the northern site making up the greater majority of the site area. This contrasts with gently sloping terrain over the eastern, southern and south western portions of the site generally. An elevated plateau defines the north-western limit of the site.



Plates 3 and 4: Densely vegetated and steeply sloping terrain located in the central and north western portions of the site

Additionally drainage lines including a stream and secondary tributaries traverse the eastern to southern portions of the site.

Village settlements are dispersed mostly along the mild to gently sloping eastern and southern terrain.

Densely forested and low-lying terrain occurs over an estimated 30 percent of the site in the central and north-western portions of the site.



Plate 5: Informal housing structures present along the eastern slopes

Various gravel and blacktop roads traverse the site.

6. INFERRED REGIONAL GEOLOGY AND SUBSOIL CONDITIONS

According to the Council For Geoscience's regional geological sheet "2930 Durban", the general area of the site appears to be underlain by four geological mapping units. The inferred geology is shown below in an excerpt from the above records in Plate 6 and listed below in order of increasing stratigraphic age with the geological symbols adjacent to the mapping Formations:

- Alluvium;
- Jurassic Age dolerite (Jd);
- Vryheid Formation shale and sandstone (Pv);
- Pietermaritzburg Formation shale (Pp).

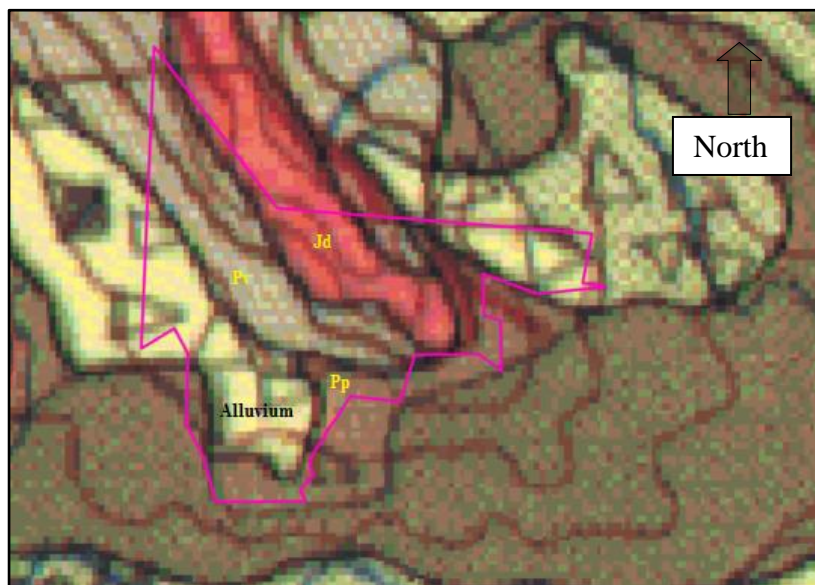


Plate 6: Inferred regional geology of site (Source: Geoscience sheet 2930 Durban)

Based on profiling of exposures EXP1 – EXP5 and sites elsewhere underlain by similar geologies, descriptions of subsurface horizons derived from weathering of the above mapping units are inferred below:

- **Alluvial Deposits** – Anticipated mostly in the vicinity of the north-western and eastern portions of the site and potentially near any major drainage courses elsewhere on the site. Inferred to vary broadly and comprise adverse subsoil-founding materials of high compressibility.
- **Dolerite** – Usually comprises fully decomposed bedrock showing as a silty CLAY to sandy silty CLAY with variable amounts of corestone boulders and gravels. A potential activity phenomenon refers to cyclical movements usually manifesting as expansion and shrinkage movements within the residual clay soil cover and completely to highly weathered bedrocks in response to fluctuations in soil moisture content.
- **Shale** – Usually comprises fully decomposed bedrock, showing as a CLAY. A potential activity phenomenon refers to cyclical movements usually manifesting as expansion and shrinkage movements within the residual clay soil cover and completely to highly weathered bedrocks in response to fluctuations in soil moisture content.
- **Sandstone** - Soils derived from weathering of sandstone bedrock are generally sandy, weakly cohesive in nature and highly erodible in response to uncontrolled runoff, with residual clays in areas of deeper weathering. Weakly cohesive and loosely consolidated sandy soil profiles tend to be compressible and may exhibit a collapsible grain structure when wet up under applied load. A potentially active condition may be associated with the residual clay soils.



Plate 7: Fissured residual dolerite soils observed on site

Geological and topographical controls may influence the variability in the thicknesses of the derived soil covers across the site. In this regard, thicker soil profiles tend to be generally anticipated at the foot of slopes near and within valley terrain. Conversely, relatively thin

developed soil covers tend to be present along well elevated steeply sloping and/or eroded and/or rugged landscapes.

7. GROUNDWATER

Desktop records point to the presence of a variable topography including an escarpment overlooking steep hillsides mostly along the northern and central portions of the site, contrasting with lower-lying plains including valley terrain carrying drainage courses.

Satisfactory slope drainage patterns usually apply to upper to mid hillsides.

Weak to poor drainage is usually common along valley (head and bottom) terrain, where there is the potential in the latter for the development of wetland habitat.

A flood risk may apply to low-lying valley bottom areas.

Separate to the topographical variations outlined above, a perched groundwater table may develop intermittently at shallow depths both during and after periods of heavy and prolonged rainfall and/or during the high rainfall season generally across the site.

8. SOIL PERCOLATION APPRAISAL

At desktop level, the presence of fine grained clayey soils, areas of shallow bedrock and areas subject to a shallow groundwater condition are inferred at the site.

Accordingly, soil percolation rates of the prevailing fine grained soils are provisionally to be generally variable.

Soil percolation testing shall form part of a subsurface investigation outside of the current desktop scope of appraisal.

9. DISCUSSION

9.1 Proposed Development

Information received by to Geosure indicates that 2000 low income RDP type housing units are proposed for the project site.

9.2 Suitability of the Site in Terms of Terrain Classification Units

The suitability of the site has been evaluated by classifying the site into major geotechnical zones in accordance with the “*Terrain Classification System for Geotechnical Constraints on Development*¹”. The results of this classification are tabled overleaf.

¹ Geotechnical Terrain Classification Table (Adapted from Partridge T. C., Wood C. K. and Brink A. B. A.)

Table 1
Smero/Caluza Housing Project: Geotechnical Terrain Classification Table
 (Adapted from Partridge T. C., Wood C. K. and Brink A. B. A.)

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 more than 750mm in thickness e.g. alluvial deposits	A “least” situation for this situation does not occur.
B	Seepage	Permanent or perched water table more than 1.5m below ground surface.	Permanent or perched water table less than 1.5m below ground surface.	Swamps and marshes
C	Active Soil	Low soil-heave potential anticipated	Moderate soil-heave potential anticipated e.g. dolerite & shale areas	High soil-heave potential anticipated e.g. Alluvium
D	Highly compressible soil	Low soil compressibility anticipated.	Moderate soil compressibility anticipated. e. g. Alluvium	High soil compressibility anticipated
E	Erodability 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 the total volume.
I	Steep slopes	Between 2 and 6 degrees	Slopes between 6 and 18 degrees and less than 2 degrees	More than 18 degrees
J	Areas of unstable natural slope	Low risk	Intermediate risk e.g. shale areas	High risk
L	Areas subject to flooding	A “most favourable” situation for this constraint does not occur.	Area adjacent to a known drainage channel or floodplain with slope less than 1%.	Areas with a known drainage channel or floodplain

In terms of Table 1 above, the site classifies mostly as Most Favourable to Intermediate.

A rating of Least Favourable applies only to Category B - “Seepage” comprising Swamps and Marshes, Category C: High soil – heave potential anticipated”, Category E – “Erodibility of Soil (High)”, Category I – “Steep Slopes” and Category L - “Areas subject to flooding” – comprising areas with a known drainage channel or floodplain,.

9.3 Slope Stability

On the basis of the desktop pre-feasibility appraisal, there do not appear to be any “fatal flaws” from a geotechnical perspective across the majority of the site, excluding oversteep and/or rugged terrain and areas of alluvium associated with the stream/and other major drainage courses.

Accordingly, the greater majority of the site is considered at this stage from a slope stability perspective to be generally suitable for the macro planning of RDP-type housing development as proposed.

Suitable detailed geotechnical site investigations and a groundwater protocol evaluation are however required to inform final planning and civil engineering design in line with the

requirements of the national and provincial government agencies i.e. Department of Human Settlements and Department of Water and Sanitation.

The site does, however, exhibit unfavourable topographical and subsoil features discussed below as follows:

- Development of any areas steeper than 1 vertical in 3 horizontal ($>18^\circ$) will present practical engineering and costing challenges for low income RDP housing. **A low income development along slopes steeper than 18° is thus generally not considered economically feasible and should either not be planned or alternatively limited in extent.**
- Valley terrain exhibits an adverse geotechnical character including slope instability permanent shallow groundwater activity including ground saturation, potential areas of flooding and / or wetland environs. For these reasons, **development of valley bottoms for the purposes of the proposed development is to be avoided.**
- Similarly, heads of valleys generally exhibit unfavourable geotechnical features including weakly drained concave slopes with a risk of shallow groundwater activity and thicker soil profiles. As such, valley head slopes are classified as **potentially unstable** i.e. slopes presently stable yet at a real risk of instability. Accordingly, **development of valley head slopes for rural low cost housing is only considered feasible provided suitable and potentially costly development controls are put in place.**
- On even, relatively compact stands, earthworks along slopes steeper than 1 vertical (v) in 5 horizontal (h) (12°) have the potential to generate high cuts and fills. From economical and practical consideration, housing development should be planned along non-wetland slopes grades preferably less than approximately 1v:5h.
- There is a **higher risk of slope instability associated with earthworks** in areas underlain by bedded sedimentary bedrocks such as shale and sandstone. It is thus recommended that Geosure be intimately involved in the earthworks stage of development to ensure that no unfavourably orientated bedding planes will affect the long-term integrity of the development.
- **Good site drainage**, including the provision of stormwater control facilities such as retention structures, interceptors, subsoil drainage and similar such measures, is strongly advised to reduce concentrated overland flows, particularly along slopes underlain by erodible subsoils. In this regard, although not observed at desktop level, localised landslides may form along steep slopes, usually mobilisation of the soil cover if it becomes saturated. The need for subsoil drainage to manage this feature will depend on the proposed development and should be assessed on site during the construction phase.
- The natural soils occurring on the site are considered susceptible to sloughing by stormwater and it is important that adequate erosion controls to engineer's detail are put in place.

The yield of the site based on areas suitable for development in terms of stable slopes requires to be established by conducting a *Phase 1 Geotechnical Site Investigation and specialist environmental studies*.

10. PLANNING AND ENGINEERING DESIGN CONSIDERATIONS GOVERNING LOW SUBSIDY NATIONAL HOUSING DEVELOPMENT

Geotechnical and geohydrological guidelines are set down below to guide the macro planning and conceptual civil engineering design of a low income housing project at the site.

10.1 Sanitation

If a waterborne connection facility is unavailable, on-site sanitation systems that are usually considered for low income projects of this nature comprise the following options to engineer's detail:

- Ventilated Improved Pit (V.I.P.) toilet;
- Low flush "aqua-privy" toilet discharging into a septic/digestor tank and soakaway.

Variations in the major geotechnical and geohydrological conditions will be one of the major determinants for the planning, design and use of a particular on-site sanitation system.

It is considered at a desktop level that the inferred geotechnical site conditions away from wetland habitat should generally suit the use, in principle, of a V.I.P. toilet system to engineer's detail.

The feasibility and engineer's design of an on-site sanitation system should, however, be based on a Groundwater Protocol Evaluation in accordance with requirements set down by the Department of Water Affairs (DWA).

10.2 Inferred Founding Conditions

At desktop level, the range of inferred founding materials and properties inferred at the site are outlined below in Table 2 as "Site Class Designations", reproduced from the NHBRC Home Building Manual (Part 1, Section 2, Table 1 refers).

Table 2
Inferred NHBRC Site Class Designations

TYPICAL FOUNDING MATERIAL	CHARACTER OF FOUNDING MATERIAL	EXPECTED RANGE OF TOTAL SOIL MOVEMENTS (mm)	ASSUMED DIFFERENTIAL MOVEMENT (% OF TOTAL)	SITE CLASS
Rock (excluding mud rocks which may exhibit swelling to some depth)	STABLE	NEGLIGIBLE	-	R
Fine grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)	EXPANSIVE SOILS	<7,5 7,5-15 15 - 30	50% 50% 50%	H H1 H2
Fine grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils (Alluvium)	COMPRESSIBLE SOILS	<10 10-20	50% 50%	S S1

Taking the above inferred founding conditions into due consideration, it is considered that all foundations and surface bed floor slabs are constructed and certified in accordance with

structural engineers' details, taking the results of detailed geotechnical design recommendations arising from an appropriate subsurface investigation into due consideration.

10.3 Geotechnical and Geohydrological Site Investigations

As part of the urban planning exercise for a low income housing development, it is national policy that provision be made for conducting the following stages of geotechnical and geohydrological investigations as described in documents by the National Department of Housing² and DWA.

➤ Phase 1 Geotechnical Site Investigation

This is both a feasibility and detailed geotechnical design report to guide detailed planning and engineering design of civil infrastructure and foundation.

It is important that engineering design is based on geotechnical recommendations arising from *Phase 1 Geotechnical Site Investigation*.

➤ Groundwater Protocol

For the purpose of this report, disposal of human waste effluent by means of a VIP toilet system has been assumed.

The geotechnical and geohydrological planning requirements to define and manage the potential of groundwater contamination for a rural VIP toilet programme should be determined by means of conducting a “*Groundwater Protocol Evaluation*”³ in accordance with DWS requirements.

➤ Phase 2 Geotechnical Site Investigation

A Phase 2 geotechnical investigation follows on from a Phase 1 Site Investigation to enable verification of soil classes as assessed from platform earthworks and, referencing guidelines set down by the NHBRC.

The verification exercise is usually carried out once a building contractor commences with site earthworks and installing infrastructure.

10.4 Oversteep and Rugged Slopes

As a rule, economic development of land steeper than 1 vertical: 3 horizontal (>18°) for low income housing purposes is general not cost-effective.

Signs of steep terrain are apparent from aerial imagery over the north western portions of the site. The extent of oversteep terrain across the entire site should, however, be determined on the basis of a slope analysis by the urban planner.

A rugged landscape may also preclude low income housing from practical and engineering constraints.

² Geotechnical Site Investigations for Housing Developments-Project Linked Greenfield Subsidy Project Developments-Generic Specification GFSH-2, September 2002

³ A Protocol to Manage the Potential of Groundwater Contamination From Onsite Sanitation dated March 2005 (Edition 2)

10.5 Environmentally Sensitive Areas

Planning for development should take account of the presence of any of the following environmentally sensitive features:

- Wetland habitat;
- Floodline;
- Protected vegetation.

11. SUMMARY OF FINDINGS AND CONCLUSIONS

This report sets out the results of a Geotechnical Desktop Appraisal carried out for the proposed Smero/Caluza Low Income Housing Project within Ward 20, Edendale, KwaZulu-Natal.

The nature and general scope of the investigation is in accordance with guidelines set down in the National Department of Housing (DOH) document titled “Geotechnical Site Investigations for Housing Development” referenced GFSH-2 dated September 2002.

According to the Council For Geoscience’s regional geological sheet “2930 Durban”, the site appears to be underlain by alluvium, Jurassic age dolerite, Vryheid Formation shale and sandstone and Pietermaritzburg Formation shale.

On the basis of the desktop pre-feasibility appraisal, there do not appear to be any “fatal flaws” from a geotechnical slope stability perspective across the majority of the site, excluding areas of alluvium including river tributaries.

The site does however exhibit unfavourable topographical and subsoil features which are, discussed in Section 9.3 of this report:

In accordance with a planning document from the National Department of Housing, allowance should be made for conducting a *Phase 1 Geotechnical Site Investigation and Phase 2 Geotechnical Site Investigation*. These studies will inform the engineering design of the civil infrastructure and house foundations.

Planning and engineering design of an appropriate toilet system should be based upon the positive findings of a *Groundwater Protocol Evaluation*.

GEOSURE (PTY) LTD

*Geotechnical, Environmental & Groundwater Engineering Consultants
Civil Engineering Soils Laboratory*

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South Africa

Tell: 011 314 3148

Fax: 011 314 4278

E-mail: gauteng@geosure.co.za



APPENDIX A



EXPOSURE PROFILES





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Tel: (031) 266-0458
email: geosure@iafrica.com

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Groundwater Engineering
Pile Integrity Testing & Civil
Engineering Laboratory

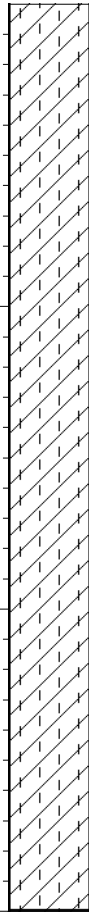
Fax: 086 689-5506
www.geosure.co.za

Verern Builder's cc
Proposed Smero/Caluza Low Income
Housing Project within Ward 20,
Edendale

HOLE No: EXP1
Sheet 1 of 1

JOB NUMBER: 161-18

Scale
1:25



0.00

Slightly moist, light orange brown, firm to stiff, fissured, silty CLAY with dolerite corestones up to 30cm. Residual Dolerite.

3.00

NOTES

- 1) No groundwater seepage observed.
- 2) Final depth at 3,00m.

CONTRACTOR : -

MACHINE :
DRILLED BY :
PROFILED BY : H.Pillay

TYPE SET BY : K.Naidoo
SETUP FILE : STANDARD.SET

INCLINATION :

DIAM :
DATE : 06 June 2018
DATE : 06 June 2018

DATE : 08/06/18 08:23
TEXT : ..C:\LOGS\PITS.TXT

ELEVATION : -

X-COORD : 30 17'49,8"E
Y-COORD : 29 38'05,5"S

HOLE No: EXP1



P O Box 1461, Westville, 3630, South Africa
 Tel: (031) 266-0458
 email: geosure@iafrica.com

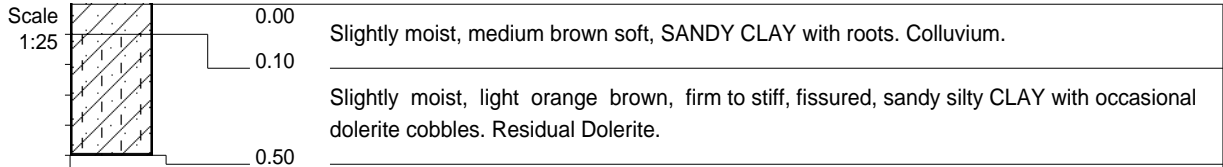
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 Pile Integrity Testing & Civil
 Engineering Laboratory

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 www.geosure.co.za

Verern Builder's cc
 Proposed Smero/Caluza Low Income
 Housing Project within Ward 20,
 Edendale

HOLE No: EXP2
Sheet 1 of 1

JOB NUMBER: 161-18



NOTES

- 1) No groundwater seepage observed.
- 2) Final depth at 0,50m.

CONTRACTOR : -
 MACHINE :
 DRILLED BY :
 PROFILED BY : H.Pillay
 TYPE SET BY : K.Naidoo
 SETUP FILE : STANDARD.SET

INCLINATION :
 DIAM :
 DATE : 06 June 2018
 DATE : 06 June 2018
 DATE : 08/06/18 08:23
 TEXT : ..C:\LOGS\PITS.TXT

ELEVATION : -
 X-COORD :
 Y-COORD :

HOLE No: EXP2



P O Box 1461, Westville, 3630, South Africa
Tel: (031) 266-0458
email: geosure@iafrica.com

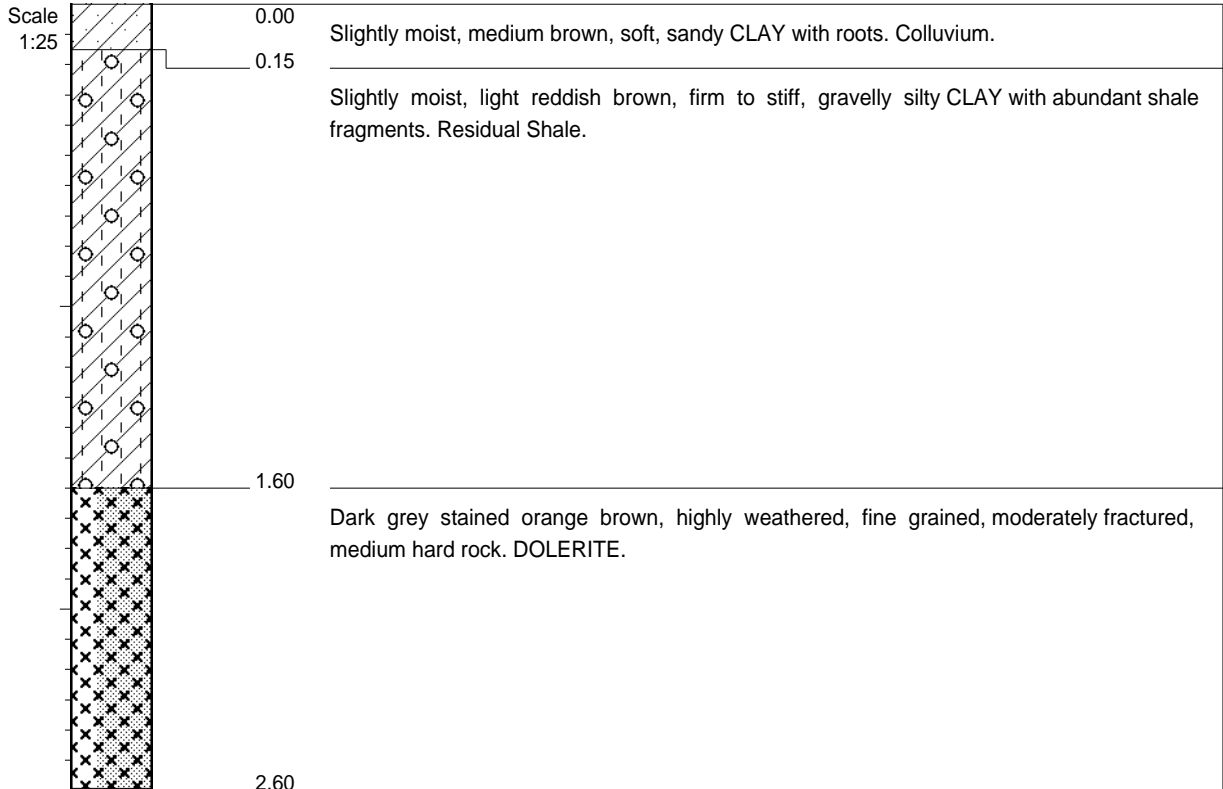
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Verern Builder's cc
Proposed Smero/Caluza Low Income
Housing Project within Ward 20,
Edendale

HOLE No: EXP3
Sheet 1 of 1

JOB NUMBER: 161-18



NOTES

- 1) No groundwater seepage observed.
- 2) Final depth at 2,60m.

CONTRACTOR : -

MACHINE :
DRILLED BY :
PROFILED BY : H.Pillay

TYPE SET BY : K.Naidoo
SETUP FILE : STANDARD.SET

INCLINATION :

DIAM :
DATE : 06 June 2018
DATE : 06 June 2018

DATE : 08/06/18 08:23
TEXT : ..C:\LOGS\PITS.TXT

ELEVATION : -

X-COORD : 30 17'15,0"E
Y-COORD : 29 38'09,2"S

HOLE No: EXP3



P O Box 1461, Westville, 3630, South Africa
Tel: (031) 266-0458
email: geosure@iafrica.com

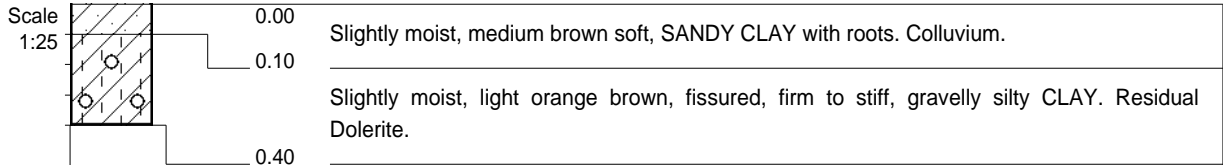
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Verern Builder's cc
Proposed Smero/Caluza Low Income
Housing Project within Ward 20,
Edendale

HOLE No: EXP4
Sheet 1 of 1

JOB NUMBER: 161-18



NOTES

- 1) No groundwater seepage observed.
- 2) Final depth at 0,40m.

CONTRACTOR : -

MACHINE :
DRILLED BY :
PROFILED BY : H.Pillay

TYPE SET BY : K.Naidoo
SETUP FILE : STANDARD.SET

INCLINATION :

DIAM :
DATE : 06 June 2018
DATE : 06 June 2018

DATE : 08/06/18 08:23
TEXT : ..C:\LOGS\PITS.TXT

ELEVATION : -

X-COORD :
Y-COORD :

HOLE No: EXP4



P O Box 1461, Westville, 3630, South Africa
 Tel: (031) 266-0458
 email: geosure@iafrica.com

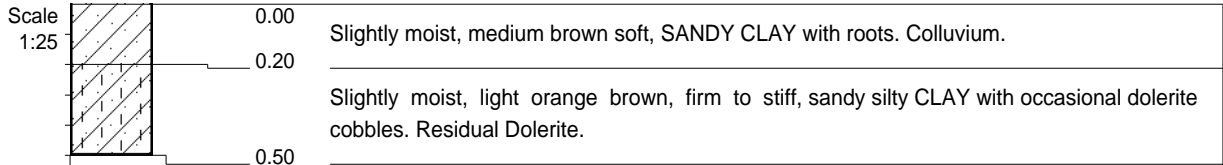
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 Proposed Smero/Caluza Low Income
 Housing Project within Ward 20,
 Edendale

HOLE No: EXP5
Sheet 1 of 1

JOB NUMBER: 161-18



NOTES

- 1) No groundwater seepage observed.
- 2) Final depth at 0,50m.

CONTRACTOR : -

MACHINE :
 DRILLED BY :
 PROFILED BY : H.Pillay

TYPE SET BY : K.Naidoo
 SETUP FILE : STANDARD.SET

INCLINATION :

DIAM :
 DATE : 06 June 2018
 DATE : 06 June 2018

DATE : 08/06/18 08:23
 TEXT : ..C:\LOGS\PITS.TXT

ELEVATION : -

X-COORD :
 Y-COORD :

HOLE No: EXP5

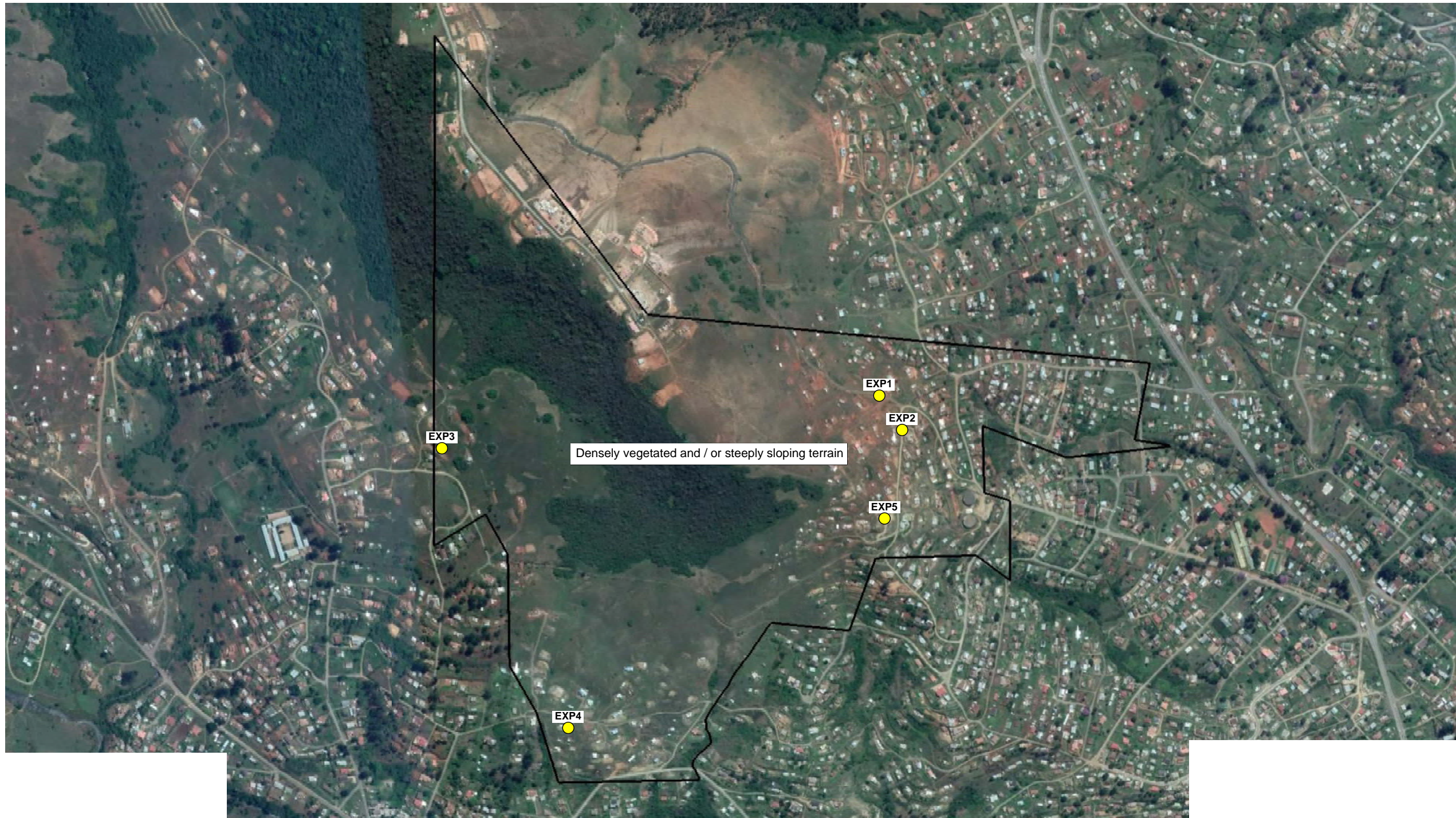
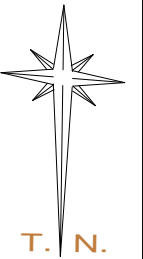


FIGURE 1





SITE PLAN




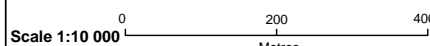


KEY:

-  Approximate extent of outer limit.
-  EXP1 Approximate position of Exposure Profile.

Note: Feasibility of development and development yield to be based on environmental ecological study and detailed surface geological investigation.

Co ordinates: S 29°38'5.50" E 30°17'49.80"E
 Aerial image sourced from Google Earth

Site Plan showing approximate positions of : (i) Exposure Profiles.	Verern Builders cc Smero Caluza Housing Project Desktop Geotechnical Study		DATE 08-06-2018
	 <small>Consulting Engineering Geologists, Geotechnical Engineers, Geotechnicians and Geotechnical Quality Assurance Specialists</small>		DRAWN V. G
		CHECK H.P / F.S	161-18
<small>P.O. Box 1461, Westville, 3630, 122 Interste Avenue, Umgeni Business Park, Durban, 4001 Tel: +27 (0)31 266 0456, Fax: +27 (0)31 689 5508, Call: 082 784 0544, E-Mail: geosure@iafrica.com, Website: www.geosure.co.za</small>		Figure 1	

DECLARATION OF INTEREST BY SPECIALIST



KWAZULU-NATAL PROVINCE
ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

	(For official use only)
Provincial Reference Number:	
NEAS Reference Number:	KZN / EIA /
Waste Management Licence Number (if applicable):	
Date Received by Department:	

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **May 2021**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

BIODIVERSITY STUDY FOR THE SMERO HOUSING DEVELOPMENT ON REM OF ERF 10 000, EDENDALE, PIETERMARITZBURG, KWAZULU-NATAL.

DISTRICT MUNICIPALITY

Umgungundlovu District Municipality

1. SPECIALIST INFORMATION

Specialist name:	Dr Sindiso C. Nkuna		
Contact person:	Dr Sindiso C. Nkuna		
Postal address:	11 Avocado Place, Eastwood, PMB		
Postal code:	3201	Cell:	0825251733
Telephone:		Fax:	n/a
E-mail:	Sindiso.chamane@gmail.com		
Professional affiliation(s) (if any)	SACNASP Grassland Society of Southern Africa		

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
--	---	----------------

DECLARATION OF INTEREST BY SPECIALIST

Project Consultant / EAP:	Sinohydro Consultants (Pty) Ltd		
Contact person:	Nemato Hebert		
Postal address:	49 Peter Kerchhoff Street , Pietermaritzburg		
Postal code:	3200	Cell:	073 629 2617
Telephone:	033 940 9635	Fax:	086 731 6815
E-mail:	info@amathongagroup.co.za		

2. DECLARATION BY THE SPECIALIST

Sindiso C. Nkuna are that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist:

Name of company:

Mondise Environmental Services

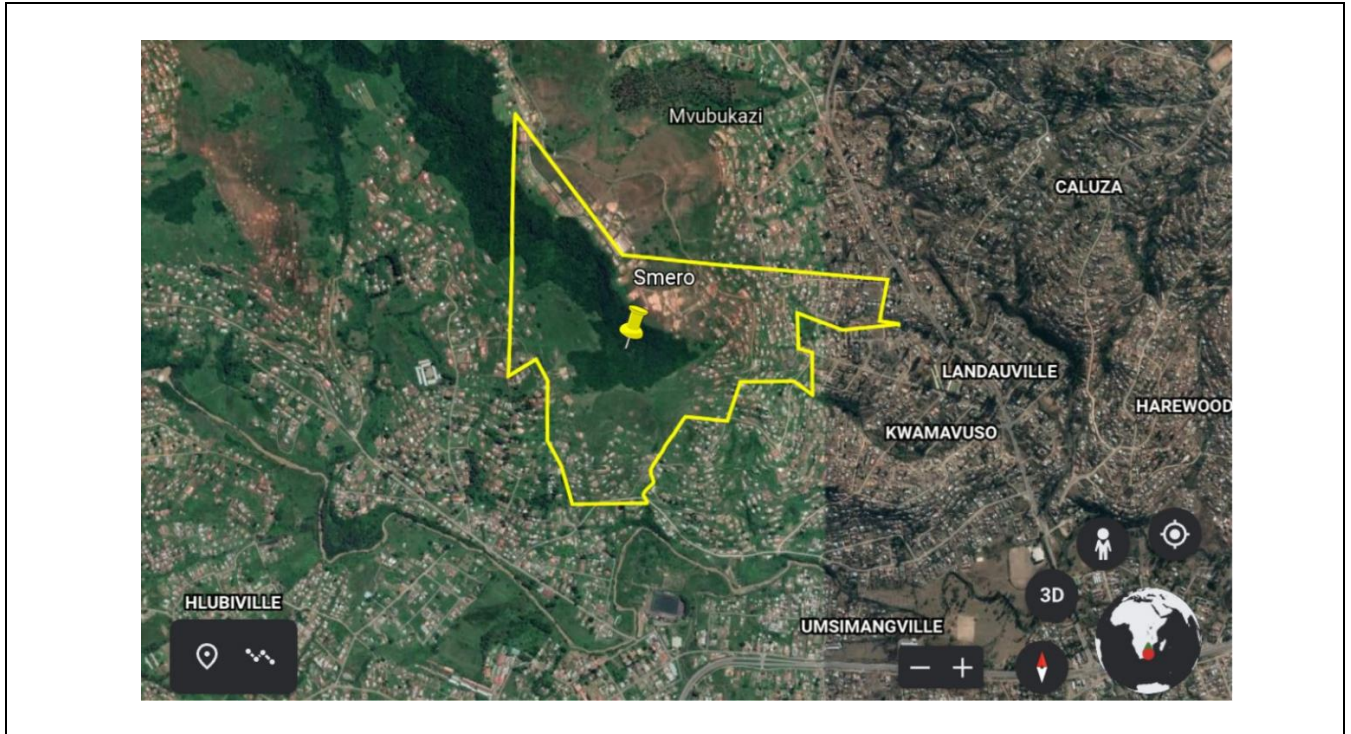
Date:

26 November 2021

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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**BIODIVERSITY STUDY FOR THE SMERO HOUSING DEVELOPMENT ON REM
OF ERF 10 000, EDENDALE, PIETERMARITZBURG, KWAZULU-NATAL.**

26 November 2021



Prepared by:

MONDISE ENVIRONMENTAL SERVICES (PTY) LTD

Reg: 2018/222862/07, Mobile: 082 525 1733, Email: sindiso.chamane@gmail.com,

Postal and Physical Address: 11 Avocado Place, Eastwood, Pietermaritzburg, 3201

Contact Person: **Dr Sindiso Nkuna Pr. Sci. Nat.**

Prepared for:

Stedone Developments

DECLARATION

I declare that I have no business, personal or financial interest in the project, other than fair remuneration for work completed, and that there are no circumstances that would compromise my objectivity.

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 326 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017).

MONDISE ENVIRONMENTAL SERVICES (PTY) LTD

Report Title: BIODIVERSITY STUDY FOR THE SMERO HOUSING DEVELOPMENT ON REM OF ERF 10 000, EDENDALE, PIETERMARITZBURG, KWAZULU-NATAL.

Roles and responsibilities

Name	Responsibility	Date
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PROJECT TEAM

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Dr Sindiso Nkuna Pr.Nat.Sci. Sindiso is an ecologist with more than 10 years' experience and her interests include ecological and biodiversity specialist studies, veld condition assessments, and conducting research in ecology, mainly around understanding how to sustainably manage rangelands using key drivers, fire and grazing, in the changing climate. She is registered with the South African Council for Natural Scientific Professional (SACNASP) and is a member of Grassland Society of Southern Africa (GSSA), International Association for Impact Assessment (IAIA) and Golden Key International Society. She holds a BSc and BSc Hons in Biological Sciences (UKZN), an MSc in Grassland Science (UKZN in collaboration with Yale University) and PhD in Grassland Science (UKZN). She was a Capacity Development and Linkages for Environmental Assessment in Africa (CLEAA) Professional Development Fellow (2017-2018). She has published a number of scientific papers and has attended and presented at numerous conferences both nationally and internationally (details available on request). As a CLEAA PD Fellow (2017/2018), she was an intern at EOH-Coastal and Environmental Services in East London, where she conducted environmental audits, ecological specialist studies, biodiversity plans and alien vegetation control plan. Sindiso is well versed in the Biodiversity legislation such as the CARA Regulations, the NEM Biodiversity Act and the NEM Protected Areas Act.

EXECUTIVE SUMMARY

Background

A housing project is proposed for Smero in Pietermaritzburg, KwaZulu-Natal. The proposed study site is located within the Msunduzi Municipality in Pietermaritzburg, KwaZulu-Natal. The project proposed site has the following geographical coordinates: South 29° 38' 09" East 30° 17' 33".

Desktop classification

The vegetation of the study area is described by three vegetation types; Moist Coast Hinterland Grassland vegetation type (Gs20), Midlands Mistbelt Grassland (Gs9) and Eastern Mistbelt Forest and their regional conservation status is Endangered (Munica and Rutherford 2006). Based on the provincial KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) for terrestrial areas, the current study site mainly falls under the Critical Biodiversity Area: Irreplaceable (CBA 1) which represents areas of high biodiversity value. Another portion falls under the Critical Biodiversity Area: Optimal (CBA 3) which has been identified as a Biodiversity Priority area with a lower irreplaceability score compared to CBA 1 and CBA 2. It is important to note that although these areas are critical biodiversity areas but they have already been transformed as residential built-up areas (referring to the areas that were previously a grassland). Another portion is 100% transformed into a residential area. Small portions of the study area fall under the biodiversity area. These are areas that were not selected as critical biodiversity areas.

The National Freshwater Ecosystem Priority Areas (NFEPA) database showed that there were no NFEPA River, within 100m of the study area. There were also no NFEPA wetlands within 500 m of the proposed Smero Housing Development Project area. Under the provincial KwaZulu-Natal Freshwater Systematic Conservation Plan (FSCP), the conservation status of the catchment at the study site is Earmarked, which is a Biodiversity important sub-catchment selected in the prioritizing process for conservation.

Site investigation

The vegetation at the site was an open grassland dominated by *Sporobolus Africana* (common name: Cat's tail dropseed) and *Aristida junciformis* (common name: Ngongoni). There was also an extensive natural forest patch that was not easily accessible, on its edge it had some alien invasive species. There were no species of conservation concern (SCC) located onsite during the site visit. The vegetation condition of the natural grassland at the study site based on the current observation was relatively poor, dominated by *Sporobolus Africana* and *Aristida*

junciformis and there were alien invasive species in some areas such as *solanum mauritianum* (common name: Bugweed).

Sensitivity of the receiving environment

The highly sensitive area was the natural forest patch and it is recommended as a no-go area with a 50 m buffer around its boundary (where there is still natural vegetation) because it is likely to have species of conservation concern i.e. forest invertebrates.

Conclusion

Based on the overall findings and the nature of the proposed development (which is the development of housing), limited constraints to the proposed activity exist provided that the recommendations made on this report are adhered to. This does not suggest that the activity would be free from ecological impacts; hence a net loss of biodiversity would inevitably result. It is important to note that the study area is in endangered vegetation cover in terms of conservation status regionally. The highly sensitive natural forest is recommended as a no-go area with a 50 m buffer around it to be maintained. Additionally, extra care needs to be taken on the developmental activities that will take place on the sloping areas of the study site to ensure that the disturbances are kept at a minimum. Moreover, sites that would be disturbed during the development and operational phases of the project would need to be rehabilitated so as not to cause accelerated soil erosion. It is recommended that construction activities should be restricted to areas demarcated by the project plans (except where there is a natural forest patch which is recommended as a no-go area) to minimise impacts on the sensitive biodiversity areas. The impacts of the proposed expansion of Smero Housing Development on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. Therefore, although the commencement of the proposed construction activities is recommended, the mitigation measures and recommendations outlined in this report need to be adhered to in order to minimize the overall impact of the project. If the outlined measures and recommendations are adhered to, then it is not expected that there will be any unacceptable impacts on the vegetation of the receiving environment.

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ABBREVIATIONS USED IN THE REPORT

CITES - Convention on International Trade in Endangered Species

KZNBCP – KwaZulu-Natal Biodiversity Conservation Plan

DWA – Department of Water Affairs

DAFF - Department of Agriculture, Forestry and Fisheries

IUCN - International Union for Conservation of Nature

NEMBA - National Environmental Management: Biodiversity Act

NFEPA - National Freshwater Ecosystem Priority Areas

NPAES - National Protected Areas Expansion Strategy

PNCO - Provincial Nature Conservation Ordinance

SANBI - South African National Biodiversity Institute

SCC – Species of conservation concern

1 INTRODUCTION

Mondise Environmental Services (Pty) Ltd was appointed to conduct a Biodiversity Assessment Study of the site for the Smero housing development on Rem of Erf 10 000, Edendale, Pietermaritzburg within the province of KwaZulu-Natal. This assessment will inform the Basic Assessment Report for the environmental authorisation application. The project site is located in Pietermaritzburg local Municipality area with following geographical coordinates: South 29° 38' 09" East 30° 17' 33". (Figure 1.1).

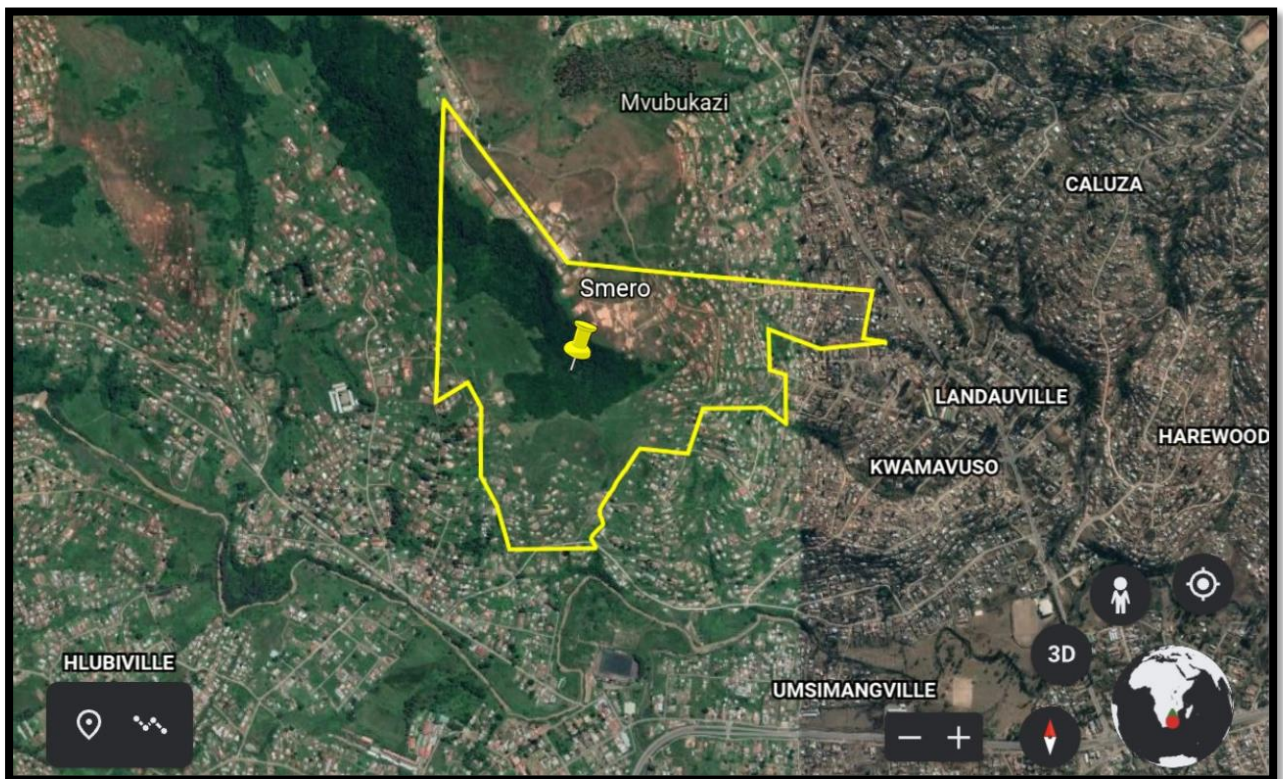


Figure 1.1: Google earth image showing the location of the proposed housing project in Rem of Erf 10 000, Edendale, KwaZulu-Natal.

1.1 Scope of work and objectives

The proposed development aims to construct 2000 housing units. The prime objective of the study was to identify potential impacts on biodiversity associated with the proposed activity. To a large extent, the condition and sensitivity of the vegetation will also determine the presence of animal species of conservation concern (SCC) and areas with high faunal biodiversity. It is for this reason that the assessment focuses on the vegetation aspects of the site. In order to achieve this and to accurately assess the ecological integrity of the area, emphasis has been placed on the following aspects:

- Identification of the Environmental Sensitivity of the site using desktop and online resources.
- Identification of the existing vegetation units and the floristic composition of this vegetation within the study area.
- Determine the extent to which the vegetation types represent the 'natural state' vegetation as described in the national classification of vegetation by Mucina and Rutherford (2006).
- Determine the threat status of the vegetation assessed according to the South African National Biodiversity Institute (SANBI) and KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP).
- Detection and identification of red list and/or protected plant species which may occur within the proposed footprint area so that provision may be made to safeguard these. Also of importance is the potential presence of protected habitat/s at the site.
- Describe the level of degradation of the vegetation on site
- Assess the impact of the proposed development on the vegetation of the site.
- Provide recommendations to mitigate the negative environmental impacts of the proposed development.

Lastly, the objectives above will be used to determine sites that should not be subjected to development activities.

1.2 Project description

The development proposal entails the construction of 2000 housing units in the Smero area, Pietermaritzburg, KwaZulu-Natal.

1.3 Terms of Reference

The Scope of this Terrestrial Biodiversity, Plant and Animal Species Assessment is designed to meet the requirements of Appendix 6 of the NEMA: EIA Regulations (2014), the Protocol for the assessment and reporting of impacts on the Terrestrial Biodiversity and Terrestrial Plant Species and Animal Species Themes, and the Species Environmental Assessment Guideline.

- Consult all relevant Biodiversity Assessments, including Bioregional Plans and other Conservation Assessments and Plans for the municipality, including the KZNBCP, NEMBA List of Threatened Ecosystems, NEMPAA Protected Areas and Priority Areas for Expansion of Terrestrial Areas, Strategic Water Source Areas, Freshwater Ecosystem Priority Areas, and areas of Indigenous Forest as identified by the DFFE.

- Identify the biodiversity features of the site, including CBAs, EPAs.
- Identify the vegetation types and faunal habitat types using available online information, including VEGMAP.
- Identify the threat status and sensitivities of the vegetation type.
- Compile a list of Species of Conservation Concern (SCCs) by consulting various local experts and online databases, including SANBI
- Conduct a site visit to determine the status of the vegetation and habitat types on the surrounding area of the site, including the presence of Species of Conservation Concern, Threatened or Protected Species (ToPS) and the presence of Alien Invasive Plants (AIPs). The site visit will include:
 - Vegetation survey: Due to the large scale of the project selected representation of the vegetation types on site will be surveyed. All Protected and Threatened Species visible and identifiable in the field will be mapped. Photos and plant material will be collected for species that cannot be identified in the field.
 - Faunal survey: Faunal habitat types on site will be identified, and fauna will be opportunistically sampled.
- Determine the Site Ecological Importance (SEI) of the sensitive receptors (vegetation types, plant SCCs animal SCCs) on site.
- Determine the environmental impact of the project on the biodiversity features, vegetation and plant and animal SCCs of the site.
- Make recommendations to mitigate the negative environmental impacts of the project on the vegetation of the site.

Prepare a report indicating the current environmental sensitivities and Land Uses on the site.

1.4 Assumptions and limitations

This report is based on currently available information and, as a result, the following limitations and assumptions are implicit:

- The information regarding the proposed development received from the client and EAP is deemed accurate.
- The historical vegetation on site will be based on the surrounding remaining indigenous vegetation, which are assumed to be the same.
- Due to the large scale of the project area, not all areas were sampled, hence a representation of the area were selected and surveys focused on the areas that will most likely be impacted by the project activities (areas that were around and within existing properties).

- Descriptions of natural and social environments in this report was based on limited fieldwork and available literature.
- The site visit was conducted in September, which does not constitute a summer survey as per Ezemvelo KZN Wildlife recommendations (November to April), some of the plant species that occur in that site including geophytes may have been missed.
- Seasonal trends were not assessed hence species described in this report do not comprise an exhaustive list but rather a representative list. Some plant species, with particular seasonal/short-lived flowering, may have gone undetected. Therefore it is likely that additional species of conservation concern may be found during construction and operation of the development.

2 RELEVANT/ KEY ENVIRONMENTAL LEGISLATIONS

The following legislations are relevant when considering biodiversity impacts identified during the housing project in Smero, Edendale in Pietermaritzburg, KwaZulu-Natal.

2.1 South African Key National Environmental legislation

Table 2.1. Environmental legislations considered in the preparation of the Biodiversity Report for the proposed housing development in Smero, Edendale, Pietermaritzburg, KwaZulu-Natal.

Title of Environmental legislation, policy or Guideline	Implications for Rehabilitation
Constitution Act (No. 108 of 1996)	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.
National Environmental Management Act (NEMA) (No. 107 of 1998)	The developer must apply the NEMA principles, the fair decision- making and conflict management procedures that are provided for in NEMA. The developer must apply the principles of Integrated Environmental Management and consider, investigate and assess the potential impact of existing and planned activities

	on the environment, socio-economic conditions and the cultural heritage.
National Environment Management: Biodiversity Act (No. 10 of 2004)	The proposed development must conserve endangered ecosystems and protect and promote biodiversity; The impacts of the proposed development on endangered ecosystems must be assessed; No protected species may be removed or damaged without a permit; The proposed site must be cleared of alien vegetation using appropriate means.
National Water Act (No. 36 of 1998)	This Act provides details of measures intended to ensure the comprehensive protection of all water resources, including the water reserve and water quality. This proposed development will likely trigger the need for a water-use license according to Sections 21 (c) and (i) of the Act.
National Heritage Resource Act (25 of 1999)	Protection of natural and cultural heritage sites into the layout and operation of the project, where applicable. Ensuring compliance with SAHRA
National Forest Act (84 of 1998)	Requires that a permit be obtained should any forests be removed during the survey and the construction phase of the project.
National Environmental Management: Waste Act 59 of 2008	Provision of specific waste management measures

2.2 The following policies are relevant to the project:

Provincial Policy

KwaZulu-Natal Biodiversity Conservation Plan (2010)

Provincial Nature Conservation Ordinance

National Policy

International Policy

International Union for Conservation of Nature

Convention on International Trade in Endangered Species of Wild Fauna and Flora

2.3 International treaties

2.3.1 Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals, also known as the Convention on Migratory Species (CMS) or the Bonn Convention, is an international agreement that aims to conserve terrestrial, marine and avian migratory species within their migratory ranges. The treaty was signed in 1979 in Bonn, Germany, and entered into force in 1983. It is an intergovernmental treaty, concluded under the auspices of the United Nations Environment Programme (UNEP), which is concerned with the conservation of wildlife and habitats on a global scale. As of September 2020, there are 131 Member States to the Convention and South Africa is one of them. Source: https://en.wikipedia.org/wiki/Convention_on_the_Conservation_of_Migratory_Species_of_Wild_Animal Accessed on 19 October 2021).

2.3.2 Convention on Biological Diversity (CBD)

Convention on Biological Diversity (CBD), also known as the Biodiversity Convention, was established and signed by 150 government leaders at the 1992 Rio Earth Summit, held in Rio de Janeiro, Brazil. It represented the first global, comprehensive, legally-binding agreement to address all aspects of biological diversity ranging from genetic resources to species and ecosystems. It is regarded as the key document regarding sustainable development. The CBD has three main goals: conservation, and sustainable use of biodiversity, and equitable sharing of benefits arising from genetic resources. South Africa signed this treaty in 1998 showing further commitment to the conservation of biodiversity including biomes, ecosystems, species and sub-specific diversity. Source: <https://www.cbd.int/convention/> Accessed on 19 October 2021.

3 METHODOLOGY

The aim of this assessment was to identify areas of ecological importance and to evaluate these in terms of their conservation importance. The study site was described using a two-

phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans.

Further to the above, a site visit was conducted on the 10th of September 2021 in order to assess the actual ecological state, current land-use, identify potential sensitive ecosystems and species of conservation concern (SCC). Due to the large scale of the project area, the limited sampling time and inaccessibility of some areas, we could not sample all areas. Hence, a representative sample of sites, covering the study area, was sampled. It was attempted to cover all natural variation that occurred on site as well as to cover as much of the site as possible. Naming of the plant species follows South African National Biodiversity Institute Database (SANBI, 2015).

A special effort was made to locate species of conservation concern and the vegetation was assessed to determine the extent to which it represented the vegetation type as described by Mucina and Rutherford (2006). The focus on national and provincial priorities and critical biodiversity issues is in line with National legislation protecting environmental and biodiversity resources.

Databases that were examined for establishing the conservation significance of the vegetation and identifying species of conservation concern included NEMA Threatened Ecosystems List (Dec. 2011), KZNBCP (2010) and the SANBI Red List of South African plants, version 2017.1.

Aspects that would increase impact significant include:

- Presence of plant SCC
- Presence of animal SCC
- Vegetation types of conservation concern
- Areas of high biodiversity
- The presence of process areas:
 - Ecological corridors
 - Wetlands (and rivers)
 - Complex topographical features (especially steep and rocky slopes that provide niche habitats for both plants and animals).

3.1 Project Area of Influence (PAOI)

The Project Area of Influence is defined by the important ecosystem processes and functions that may be affected by the proposed development and its activities. The Species Environmental Assessment Guideline (2020) requires that the EAP and Specialists define the

taxon-specific Project Area of Influence (PAOI) based on the spatial location of the project (footprint) and the potential extent of the impacts of the anticipated activities of the project.

3.2 Desktop assessment

A desktop assessment of the potential plant species, vegetation types and sensitivities of the site based on data extracted from:

- Mucina and Rutherford's (2009) vegetation map and 2018 updated vegetation map and vegetation descriptions.
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004): National List of Threatened Ecosystems (2011).
- KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) (2010).
- uMgungundlovu District Municipality Biodiversity Sector Plan (2014)
- DWA (wetlands, rivers and streams)
- NFEPA and NPAES
- Review of the SANBI Red Data List,
- Convention on International Trade in Endangered Species (CITES),
- International Union for Conservation of Nature (IUCN),
- Provincial Nature Conservation Ordinance (PNCO),
- NEMBA List of Threatened or Protected Species (ToPs),
- DFFE List of Protected Trees

3.3 Site Assessment

Due to the large scale of the project area and some areas being not easily accessible, a site assessment on foot was done using walking transects on the selected areas at the study site that were a representative of the site to achieve the following:

- Describing habitats and species present. All plants were identified down to their lowest possible taxonomic level using Plants of Southern Africa (POSA), accessed during November 2021, and the Red List of South African plants (SANBI 2017), accessed during November 2021.
- Document and describe the present land use, as well as evidence of past land use activities.
- A species list was created and annotated to indicate Species of Conservation Concern (SCCs) according to the SANBI Red List (2020.1); Threatened or Protected Species (ToPS) (2015) according to the National Environmental Management: Biodiversity Act (Act 10 of 2004); Protected tree species according to National Forests Act 84 of 1998

(NFA), the Nature and Environmental Conservation Ordinance of 1974, and declared Alien Invasive Plant (AIPs) species according the National Environmental Management: Biodiversity Act: Alien and Invasive Species List (2020).

- A sensitivity assessment was produced to classify and illustrate the sensitivity of the various identified vegetation types.
- Recommended possible measures to reverse, avoid, manage or mitigate possible environmental impacts,

3.4 Plant and animal species of conservation concerns

Data on the known distribution and conservation status for each potential plant SCC needs to be obtained in order to develop a list of SCC present on site. These plant species are those that may be impacted significantly by the proposed activity. In general, these will be species that are already known to be threatened or at risk. Efforts to provide the conservation status ('red list' status) of individual species may provide additional valuable information on SCC (see <http://www.iucnredlist.org/>). Species that are afforded special protection, which are protected by CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) are also regarded as SCC (see <http://www.cites.org/>).

Animal species of conservation concern in terms of the project area were defined as threatened species if the species were listed in the Endangered or Vulnerable categories in the revised South African Red Data Books and/or species included in other international lists (e.g. 2017 International Union for Conservation of Nature (IUCN) Red List of Threatened Animals).

3.4.1 Definitions

The following definitions of the conservation status of plant SCC are provided (Source: SANBI Red Data List):

- **Critically Endangered (CR)** - A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V of the Red Data List), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
- **Endangered (EN)** - A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V of the Red Data List), and it is therefore considered to be facing a very high risk of extinction in the wild.
- **Vulnerable (VU)** - A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

- **Near Threatened (NT)** - A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
- **Sensitive species** - Species not falling in the categories above but listed in:
 - Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).
- **Endemic species** - Species endemic to South Africa, and more specifically Eastern Cape.
- **Least concern (LC)** – A taxon is of Least Concern when it does not qualify for any of the other categories. Widespread and abundant taxa are typically listed in this category.

3.5 Site Ecological Importance (SEI)

Site Ecological Importance (SEI) is a standardised methodology to spatially identify the importance of a development site for species (SANBI 2020). SEI is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site) and its resilience to impacts (receptor resilience [RR]) as follows:

$$SEI = BI + RR$$

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

$$BI = CI + FI$$

Conservation importance (CI) is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN [2016]). Conservation importance is defined here as: ‘The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.’

Functional integrity (FI) of the receptor (e.g. the vegetation/ fauna community or habitat type) is defined here as the receptors’ current ability to maintain the structure and functions that

define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is: 'A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.'

Receptor resilience (RR) is defined here as: 'The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.'

The details of the methodology can be further studied in the Species Environmental Assessment Guidelines (SANBI 2020).

3.6 Sensitivity assessment

The ecological sensitivity of the site was determined by available ecological and biodiversity information from the KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP), National Freshwater Ecosystem Priority Areas (NFEPA), National Protected Areas Expansion Strategy (NPAES) and SANBI Vegetation Map. The following scale was used to rate the ecological sensitivity of the different units identified:

- Low – low sensitivity is given to areas that are highly impacted by current land use and thus highly degraded and provide no value to the ecosystem and are highly unlikely to harbour any SCC. Most types of development can proceed within these areas with little ecological impact.
- Medium – Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas provide a valuable contribution to biodiversity and ecosystem functioning and have a relatively high species richness. These areas may also contain species of conservation concern. Moderate sensitivity is further given to steeply sloped areas. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- High – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Areas of high sensitivity include process areas such as rivers, wetlands and streams that are important for ecosystem functioning including surface and ground water dispersal. Development within these areas is highly undesirable and should only proceed with caution as it may not be possible to mitigate all impacts

appropriately.

3.7 Impact assessment and rating methodology

To ensure a direct comparison between various specialist studies, a standard rating scale has been defined and will be used to assess and quantify the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. Five factors need to be considered when assessing the significance of impacts, namely:

- Relationship of the impact to **temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact
- Relationship of the impact to **spatial scales** - the spatial scale defines the physical extent of the impact.
- The severity of the impact - the **severity/beneficial scale** is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party. The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word “mitigation” means not just “compensation”, but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.
- The **likelihood** of the impact occurring - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion is ranked with scores assigned as presented in Table 3.3.1 to determine the overall significance of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix presented in Table 3.3.2, to determine the overall significance of the impact. The overall significance is either negative or positive.

The significance scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on

the values of the person making the judgment. For this reason, impacts of a social nature need to reflect the values of the affected society.

Cumulative Impacts

Cumulative impacts affect the significance ranking of an impact because the impact is taken in consideration of both onsite and offsite sources. For example, pollution making its way into a river from a development may be within acceptable national standards. Activities in the surrounding area may also create pollution which does not exceed these standards. However, if both onsite and offsite activities take place simultaneously, the total pollution level may exceed the standards. For this reason, it is important to consider impacts in terms of their cumulative nature.

Seasonality

Although seasonality is not considered in the ranking of the significance of impacts, it may influence the evaluation during various times of the year. As seasonality will only influence certain impacts, it will only be considered for these, with management measures being imposed accordingly (i.e. dust suppression measures being implemented during the dry season).

Table 3.3.1. Significance Rating Table.

Temporal Scale (The duration of the impact)	
Short term	Less than 5 years (many construction phase impacts are of a short duration).
Medium term	Between 5 and 20 years.
Long term	Between 20 and 40 years (from a human perspective almost permanent).
Permanent	Over 40 years or resulting in a permanent and lasting change that will always be there.
Spatial Scale (The area in which any impact will have an affect)	
Individual	Impacts affect an individual.
Localised	Impacts affect a small area of a few hectares in extent. Often only a portion of the project area.
Project Level	Impacts affect the entire project area.

Surrounding Areas	Impacts that affect the area surrounding the development
Municipal	Impacts affect either the Local Municipality, or any towns within them.
Regional	Impacts affect the wider district municipality or the province as a whole.
National	Impacts affect the entire country.
International/Global	Impacts affect other countries or have a global influence.
Will definitely occur	Impacts will definitely occur.
Degree of Confidence or Certainty (The confidence with which one has predicted the significance of an impact)	
Definite	More than 90% sure of a particular fact. Should have substantial supportive data.
Probable	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

Table 3.3.2. Impact Severity Rating.

Overall Significance (The combination of all the above criteria as an overall significance)	
VERY HIGH NEGATIVE	VERY BENEFICIAL
<p>These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.</p> <p>Example: The loss of a species would be viewed by informed society as being of VERY HIGH significance.</p> <p>Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance.</p>	
HIGH NEGATIVE	BENEFICIAL

These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.

Example: The loss of a diverse vegetation type, which is fairly common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.

Example: The change to soil conditions will impact the natural system, and the impact on affected parties (such as people growing crops in the soil) would be HIGH.

MODERATE NEGATIVE

SOME BENEFITS

These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.

Example: The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant.

LOW NEGATIVE

FEW BENEFITS

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.

Example: The temporary changes in the water table of a wetland habitat, as these systems are adapted to fluctuating water levels.

Example: The increased earning potential of people employed as a result of a development would only result in benefits of LOW significance to people who live some distance away.

NO SIGNIFICANCE

There are no primary or secondary effects at all that are important to scientists or the public.

Example: A change to the geology of a particular formation may be regarded as severe from a geological perspective, but is of NO significance in the overall context.

DON'T KNOW

In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.

Example: The effect of a particular development on people's psychological perspective of the environment.

4 DESCRIPTION OF STUDY SITE AND DESKTOP CLASSIFICATION

4.1 Climate

The study site is located within the Msunduzi Municipality, KwaZulu-Natal (site coordinates: (South 29° 38' 09" East 30° 17' 33"). The study area is about 20 km from Pietermaritzburg CBD. The mean annual precipitation in Pietermaritzburg is 966 mm per year. The rainfall in Pietermaritzburg is significant, with precipitation even during the driest month. Pietermaritzburg receives the lowest rainfall (23 mm) in June and the highest (140 mm) in January (Figure 4.1). The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Pietermaritzburg range from 11.9 °C in July to 20.6 °C in February (Figure 4.1). The climate data was taken from <https://en.climate-data.org/africa/south-africa/kwazulu-natal/pietermaritzburg-634/> accessed 19 October 2021.

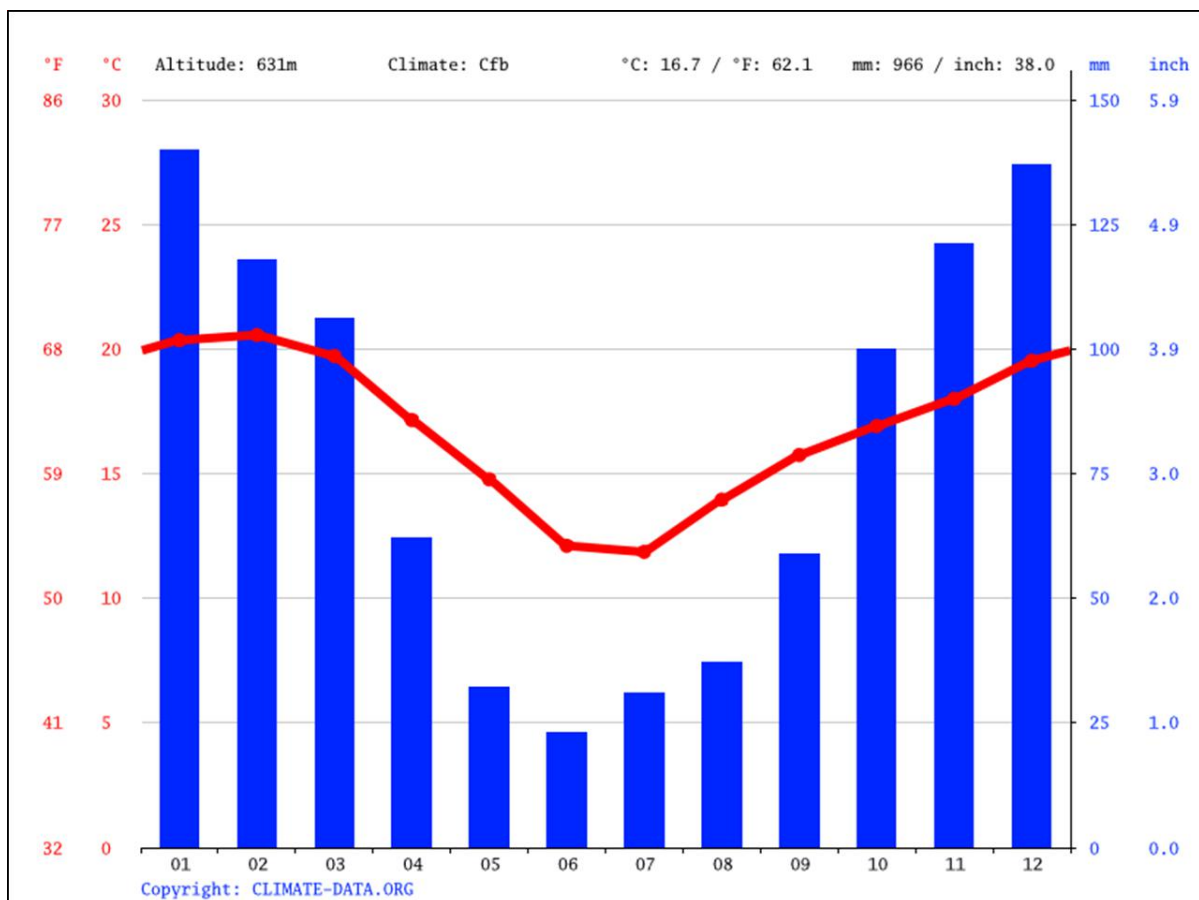


Figure 4.1 Monthly average rainfall (mm) and the monthly average temperatures (°C) of Pietermaritzburg, KwaZulu-Natal accessed 4from <https://en.climate-data.org/africa/south-africa/kwazulu-natal/pietermaritzburg-634/> 19 October 2021.

4.2 Geology and soils

The study area is dominated by shale, best defined as a horizon above which the sand is to shale ratio is greater than 0.5 (Mucina & Rutherford 2012).

4.3 Topography

The proposed activity is house development that will take place in a landscape that is characterized by being uneven and steep landscape (see Figure 4.3.1). The site highest point is 1004 meters above sea-level and the lowest is 738 meters above sea-level.

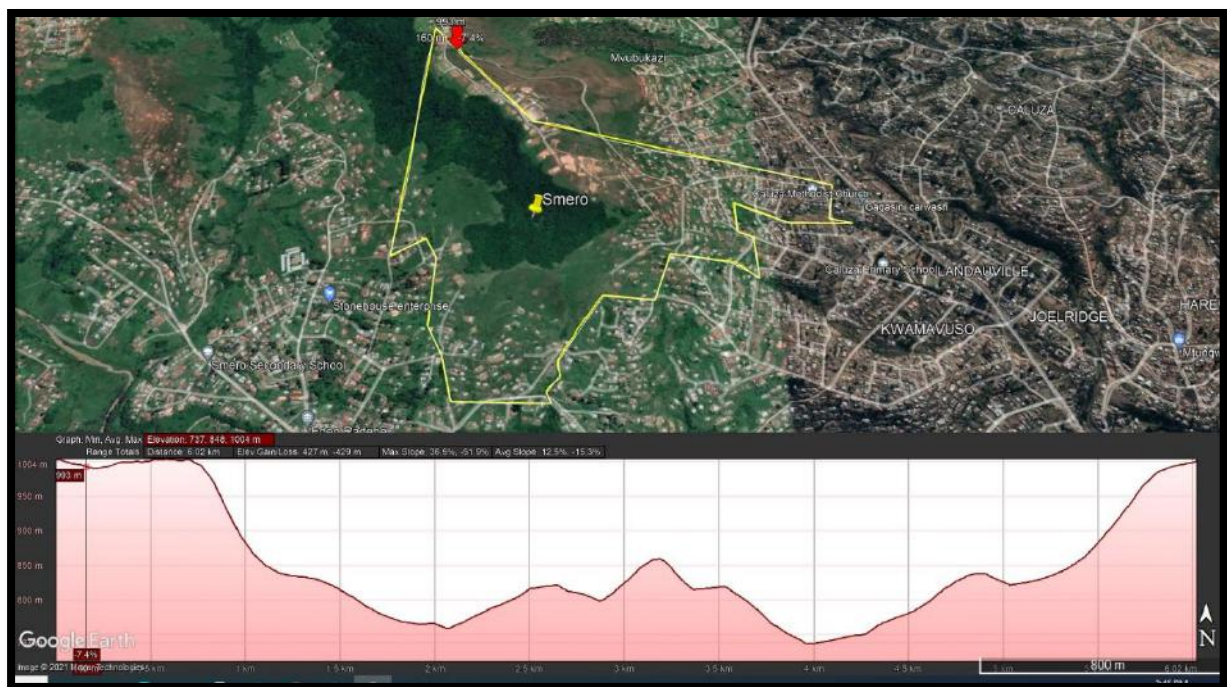


Figure 4.3.1: Google Earth image showing the elevation profile of the study site at Rem of Erf 10 000, Edendale, Msunduzi Municipality, KwaZulu-Natal.

4.4 Regional vegetation patterns

The proposed project is dominated by three vegetation types Moist Coast Hinterland Grassland (Gs20), Midlands Mistbelt Grassland (Gs9) and Eastern Mistbelt Forest (Figure 4.4.1) as classified by Mucina and Rutherford (2006). Moist Coast Hinterland Grassland is distributed in KwaZulu-Natal and Eastern Cape Provinces, generally occurring at 450 -900 m (Mucina & Rutherford 2012). The vegetation occurs on a hilly landscape and comprise of dense tall sour grassland dominated by unpalatable Ngongoni grass (*Aristida junciformis*) associated with low species diversity, when in good condition dominated by *Themeda triandra* and *Tristachya leucothrix* (Mucina & Rutherford 2012).

Midlands Mistbelt Grassland (Gs9) is scattered in a broad belt in the form of several major patches including Melmoth-Babanango area, Kranskop and Greytown, Howick Lions River, Karkloof, Balgowan, Cedara, Edendale, Hilton, Richmond, the Ixopo-Highflats area, Mount Malowe in the Umzimkhulu enclave of the Eastern Cape Province and the Harding-Weza area. The vegetation of Midlands Mistbelt grassland is dominated by forb-rich, tall, sour *Themeda triandra* grasslands transformed by the invasion of native 'Ngongoni grass (*Aristida junciformis* subsp. *junciformis*) on hilly and rolling landscapes. Only a few patches of the original species-rich grasslands remain (Mucina & Rutherford 2012).

Eastern Mistbelt Forest occurs in fire-shadow habitats on south and southeast facing slopes from Somerset East and the Amathole Mountains in the Eastern Cape to the KwaZulu-Natal Midlands and as far east as Ulundi (Mucina and Rutherford 2006). These forests occur at altitudes ranging from 850 to 1,600m but most patches are found between 1,000 and 1,400m. They are dominated by emergent trees of *Podocarpus falcatus* (Outeniqua yellowwood) with *Podocarpus henkelii* (Henkel's yellowwood) being prominent in the canopy layer together with a range of deciduous and semideciduous species such as *Celtis africana* (white stinkwood), *Calodendrum capense* (Cape chestnut), *Vepris lanceolata* (white ironwood) and *Zanthoxylum davyi* (forest knobwood).

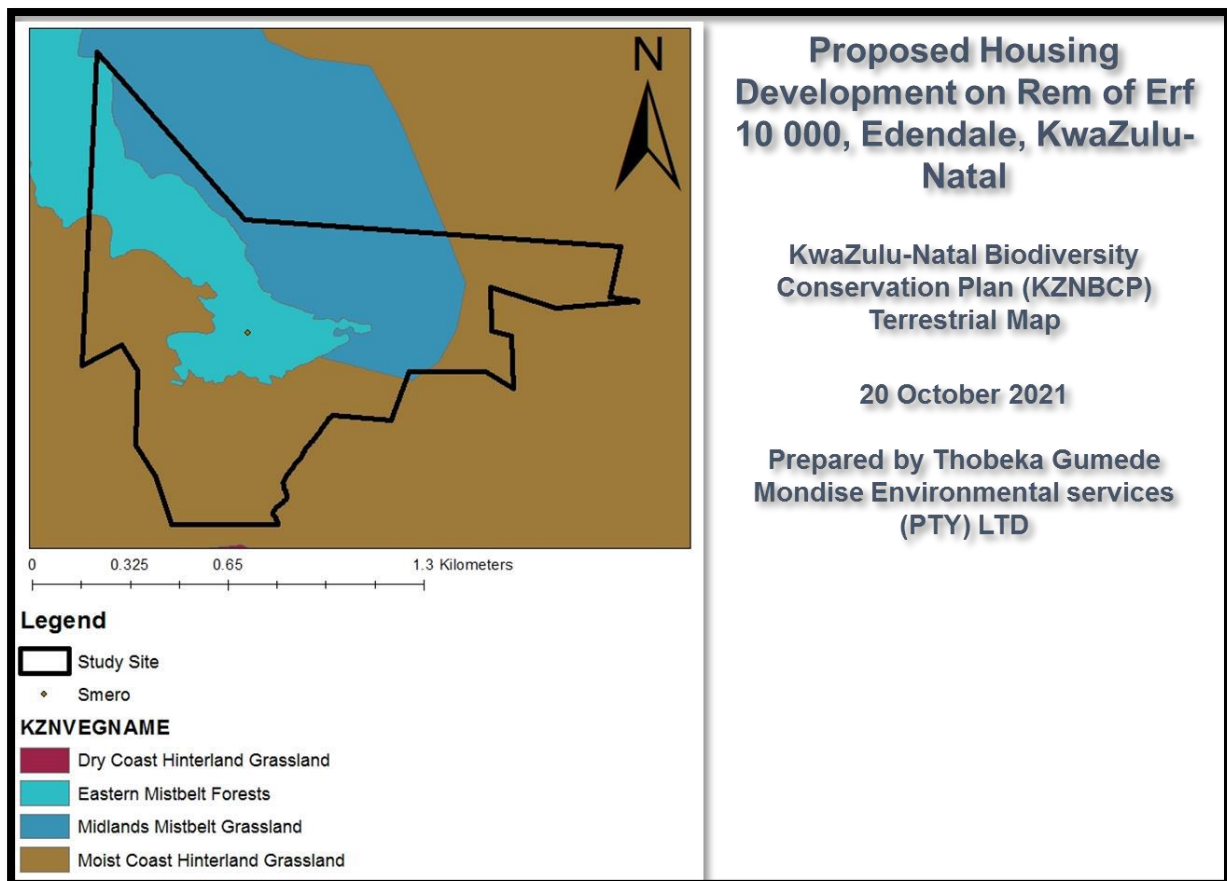


Figure 4.4.1: South African National Biodiversity Institute (SANBI) vegetation map of the region shows the study area at Rem of Erf 10 000, Edendale, KwaZulu-Natal within the Moist Coast Hinterland Grassland, Midlands Mistbelt Grassland and Eastern Mistbelt Forests.

4.5 Vegetation conservation status

4.5.1 National status

Moist Coast Grassland Hinterland vegetation type (Gs20) conservation status is **Endangered**, with a 25% conservation target. Only less than 1% of this vegetation type is formally conserved in the Ophathe and Vernon Crookes Nature and Entumeni Nature Reserves. More than 60% has been transformed for cultivation, plantations and urban development.

Midlands Mistbelt Grassland (Gs9) is also **Endangered**. In Midlands Mistbelt Grassland (Gs9) less than 1% is protected in Ngeli Nature Reserve, Impendle Nature Reserve, Blinkwater Nature Reserve, Qudeni Nature Reserve, Doreen Clark Nature Reserve, Karkloof Nature Reserve and Queen Elizabeth Park.

Eastern Mistbelt Forest conservation status is also **Endangered** and the conservation target is 30% of its original extent. Approximately 8% of it is statutorily conserved in reserves in the

Eastern Cape and it is conserved in Impendle, Igxalingwena, Karkloof and Qudeni Nature Reserves in KwaZulu-Natal.

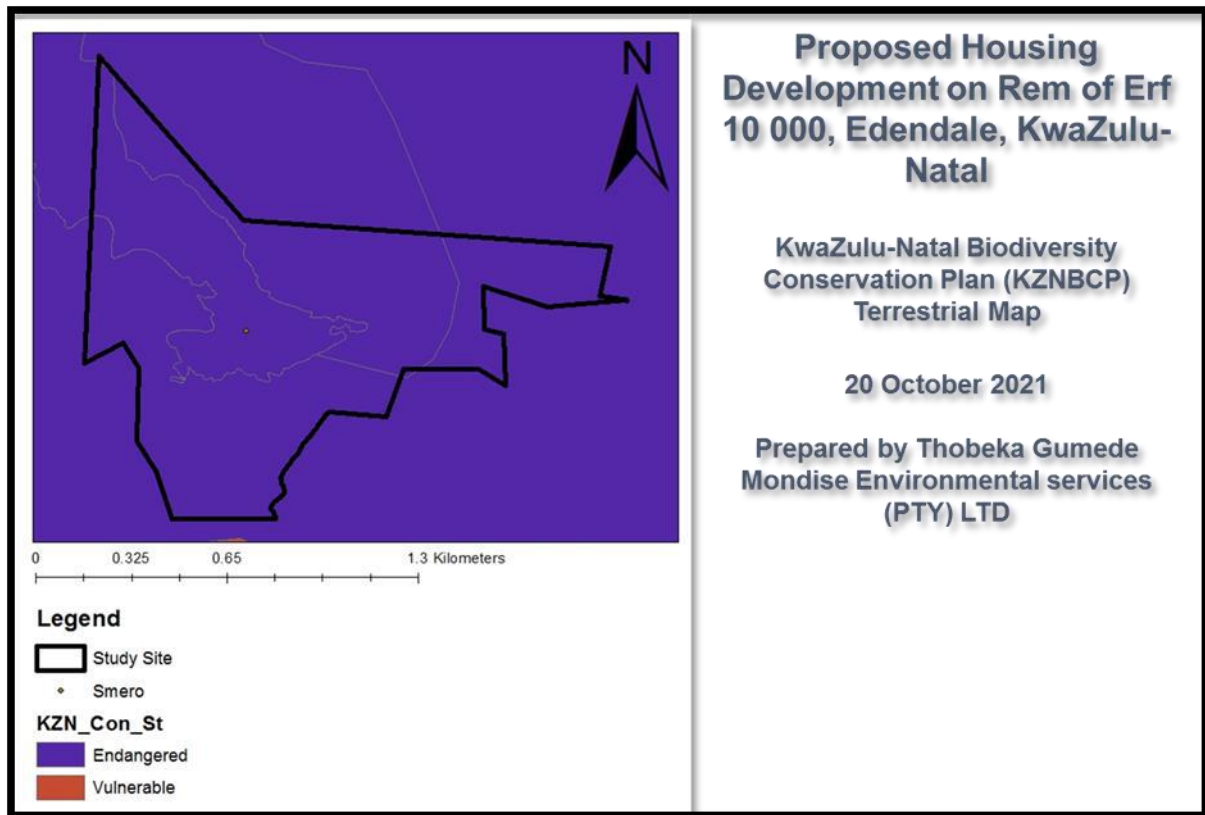


Figure 4.5.1: Regional conservation status map shows the study area at Rem of Erf 10 000, Edendale at Pietermaritzburg Msunduzi Municipality, completely within the Endangered biodiversity area.

4.5.2 Provincial conservation plan status

The KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) is a detailed, low-level conservation mapping tool for land-use planning purposes. The aim of KZNBCP is to map critical biodiversity areas through a systematic conservation planning process for the KwaZulu-Natal Province. The current biodiversity plan includes the mapping of priority aquatic features, land-use pressures, critical biodiversity areas and development of guidelines for land and resource-use planning and decision-making. Below are the Conservation Plan Definitions and their interpretation as taken from the Brief Documentation of the Terrestrial Minset (2010) Version 1.2 Document which is available upon request at data@kznwildlife.com:

- ***Critical Biodiversity Area: Irreplaceable (Previously: Critical Biodiversity Area 1 Mandatory or Biodiversity Priority Area 1 – Value in legend field of the attribute table =R2)***

The **CBA 1 Mandatory** areas are based on the **C-Plan** Irreplaceability analysis. Identified as having an Irreplaceability value of 1, these planning units represent the only localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved (i.e. there are no alternative sites available).

The distribution of the biodiversity features is not always applicable to the entire extent of the planning unit (PU), but is more often than not confined to a specific niche habitat e.g. a forest or wetland reflected as a portion of the PU in question. In such cases, development could be considered within the PU if special mitigation measures are put in place to safeguard this feature(s) and if the nature of the development is commiserating with the conservation objectives. This is site and case dependant. This distribution dynamic outlined above are the same for all three CBA's indicated in the C-Plan MINSET analysis.

- ***Critical Biodiversity Area: High Irreplaceable (Previously: Critical Biodiversity Area 2 Mandatory or Biodiversity Priority Area 2– Value in legend field of the attribute table =R1)***

CBA 2 Mandatory areas represent areas of significantly high biodiversity value. In C-Plan analysis, these areas are identifiable as having an Irreplaceability scores of ≥ 0.8 and < 1.0 whilst the MARXAN equivalent is reflected in PU's displaying a selection frequency value of between 80 – 100%. In practical terms, this means that there are alternate sites within which the targets can be met for the biodiversity features contained within, but there aren't many. This site was chosen because it represents the most optimal area for choice in the systematic planning process, meeting both the conservation target goals for the features concerned as well as a number of other guiding criteria as defined by the [Decision Support Layers](#). Whilst the targets could be met elsewhere, the revised reserve design (derived through either the C-Plan MINSET or MARXAN analysis) would more often than not require more area in order to meet its conservation objectives. The scarcity of the biodiversity features contained within is still the primary driver for this PU's selection in the conservation analysis.

- ***Critical Biodiversity Area: Optimal (Previously: Critical Biodiversity Area 3 Optimal or Biodiversity Priority Area 3– Value in legend field of the attribute table =R0)***

CBA3 Optimal areas are identified, through the systematic conservation planning software, as areas which represent the best localities out of a potentially larger selection of available PU's that are optimally located to meet both the conservation target but also the criteria defined within the [Decision Support Layers](#). Using C-Plan, these areas are identified through the MINSET analysis process and reflect the negotiable sites with an Irreplaceability score of less than 0.8. Within the C-Plan MINSET analysis, this does not mean they are of a lower biodiversity value, only that there are more alternate options available within which the features located within can be met. The determination of the spatial locality of these PU's is driven primarily by the [Decision Support Layers](#).

The MARXAN equivalent is reflected within the "Best" solution output less the **CBA 2 Mandatory** areas. (The "Best" solution output is essentially the most efficient solution and thus the most optimal solution to meet all biodiversity conservation targets while avoiding high cost areas as much as possible).

Even though these areas may display a lower Irreplaceability value or selection frequency score than the previous categories, it must be noted that these areas, together with the above two categories, collectively reflect the minimal reserve design required to meet the Systematic Conservation Plans targets and as such, these are also regarded as CBA areas.

- ***Biodiversity Area (Value in legend field of the attribute table =0CO)***

Areas identified as Biodiversity Areas (Bas) represent the natural and/or near natural environmental areas (i.e. non-transformed areas) not identified within the optimisation software output. It is important to note that whilst these areas are not highlighted in MINSET and MARXAN analysis, this lack of selection should not be misinterpreted as reflecting areas of no biodiversity value. Whilst it is preferred that development be focussed within these areas, this still has to be conducted in an informed and sustainable manner. Important species and ecosystem services can still be associated with these PU's and should be accounted for in the EIA process. They are not highlighted as the analysis highlights the 'choice' areas from a biodiversity point of view only. Should one or more of the CBA 2 and CBA3 sites be utilised for development, it is obvious that the target for whatever feature(s) where located within that PU will no longer be met. Ideally, the analyses would have to be re-run to calculate the next optimal solution and it is from this biodiversity 'reserve' that the next optimal selection will be made.

KZNBCP maps the CBAs based on extensive biological data and input from key stakeholders. Although KZNBCP is mapped at a finer scale than the National Spatial Biodiversity Assessment (Driver, 2005) it is still, for the large part, inaccurate and "coarse". Therefore, it is

imperative that the status of the environment, for any proposed development MUST first be verified before the management recommendations associated with the KZNBCP are considered. It is also important to note that in absence of any other biodiversity plan, the KZNBCP has been adopted by the Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) as a strategic biodiversity plan for the KwaZulu-Natal Province.

The study area mainly falls under the **Critical Biodiversity Area** that is irreplaceable, another portion is 100% transformed, a small portion falls under **Biodiversity Area (OCO)** which is a natural and/or near natural environmental area not identified as a critical biodiversity area and the smallest portion is a Critical Biodiversity Area that is optimal (Figure 4.5.2). It is important to note that whilst the areas that are not highlighted in MINSET and MARXAN analysis, this lack of selection should not be misinterpreted as reflecting areas of no biodiversity value. Whilst it is preferred that development be focussed within these areas, this still has to be conducted in an informed and sustainable manner.

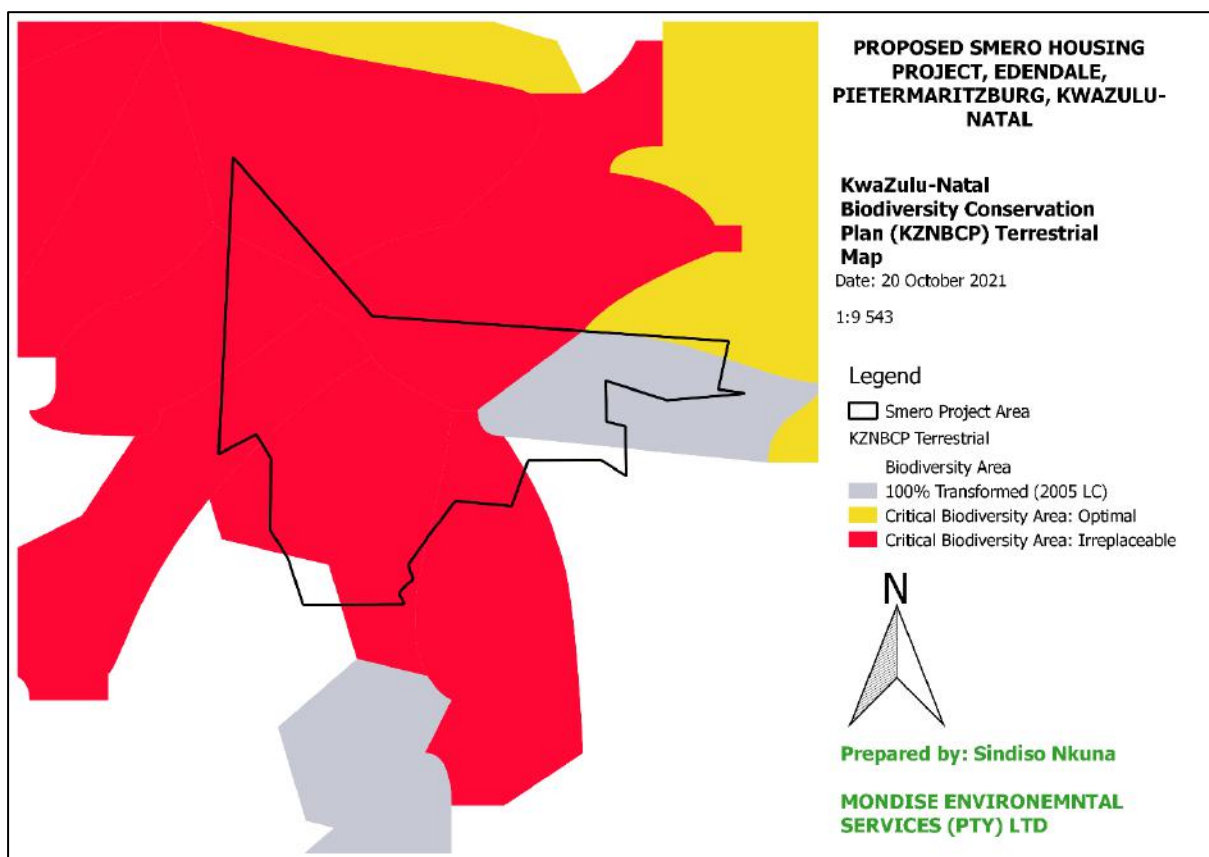


Figure 4.5.2: KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) map shows the study area for the Smero housing development project.

4.5.3 Protected areas

Protected areas are areas of land or sea that are protected by law and managed mainly for biodiversity conservation (DEA 2016). Protected areas are declared under the National Environmental Management: Protected Areas Act (Act 57 of 2003). The Protected Areas Act provides for several categories of protected areas, including special nature reserves, national parks, nature reserves, marine protected areas and protected environments. Development is regulated within protected areas, as well as buffer areas around them.

The National Protected Area Expansion Strategy (NPAES) presents a 20-year strategy for the expansion of protected areas in South Africa, as they currently do not adequately conserve a representative portion of South Africa's biodiversity (DEA 2016). NPAES identifies priority areas where the expansion of protected areas should take place.

The proposed Smero Housing Development Project does not occur within or near to any protected areas identified by NPAES.

4.5.4 Forest patches

Forest is protected under the National Forest Act, Act 84 of 1998. A permit is required to disturb a forest. Patches of forest have been mapped at various scales in South Africa. There was a forest patches within the study site of the proposed project (Figure 4.5.4) and this forest patch is an indigenous forest that is endangered as per the regional and provincial conservation status. It is important to note that permits must be obtained prior to any disturbance of the forest patches.

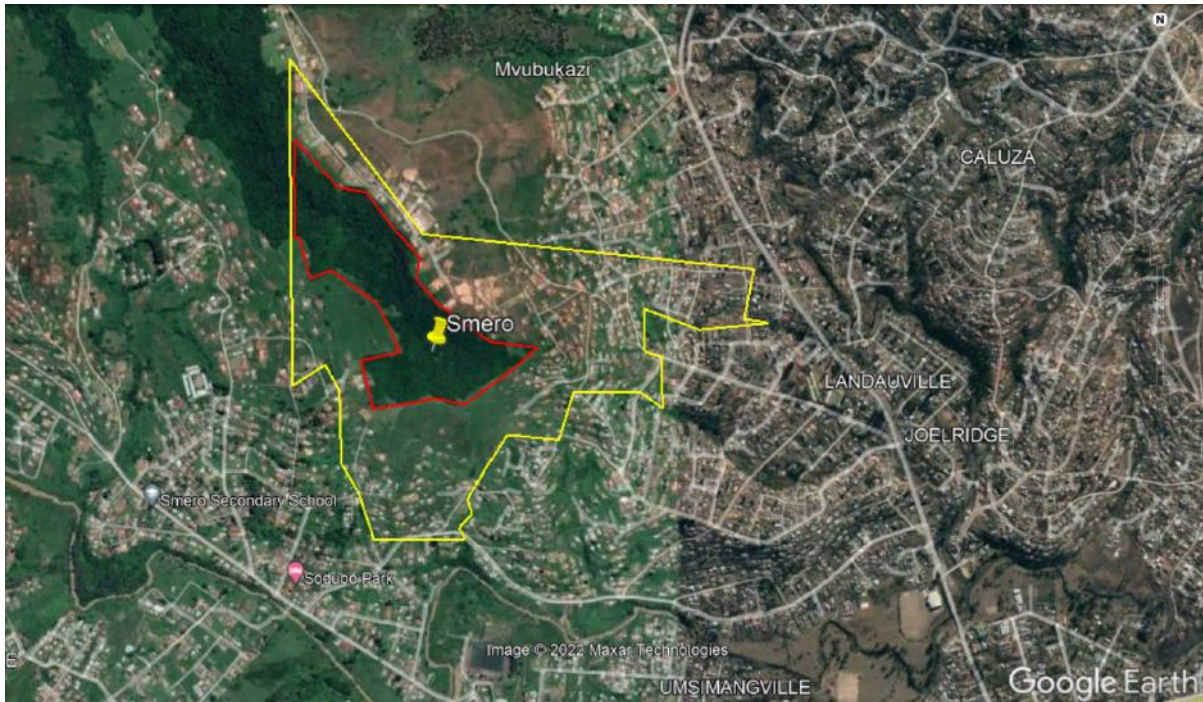


Figure 4.5.4: Google earth map shows the natural forest patch (inside the red polygon) at the study area for the Smero housing development project.

4.5.5 Potential occurrence of species of conservation concern

4.5.5.1 Potential occurrence of animal species of conservation concern

Based on the screening report generated from the National Web-based Environmental Screening Tool, there is an overall medium sensitivity in terms of the animal species that are predicted to occur at the study site (Figure 4.5.5.1). The Sensitivity Report generated from the National Web-based Environmental Screening Tool indicated that there are 10 animal species identified as potentially occurring at the study site (see Table 4.5.5.1).

Table 4.5.3.1 Table of animal species predicted to occur at the study site and their sensitivity taken from the screening report

Sensitivity	Feature(s)	Common name	Red List	Population trend
Medium	Invertebrate-Forest invertebrate			
Medium	Aves-Hirundo atrocaerulea	Blue Swallow	VU	Decreasing
Medium	Insecta-Chrysoritis phosphor borealis	Scarce Scarlet	VU	Decreasing
Medium	Mammalia-Cercopithecus albogularis labiatus	Samango Monkey	VU	Decreasing
Medium	Mammalia-Chrysospalax villosus	Rough-haired golden mole	VU	Decreasing
Medium	Mammalia-Crocidura maquassiensis	Makwassie musk shrew	VU	Decreasing

Medium	Mammalia-Dendrohyrax arboreus	Southern tree hyrax	LC	Decreasing
Medium	Mammalia-Hydricteis maculicollis	Spotted-necked Otter	NT	Decreasing
Medium	Mammalia-Ourebia ourebi ourebi	Oribi	LC	Decreasing
Medium	Sensitive Species 7		LC	Stable

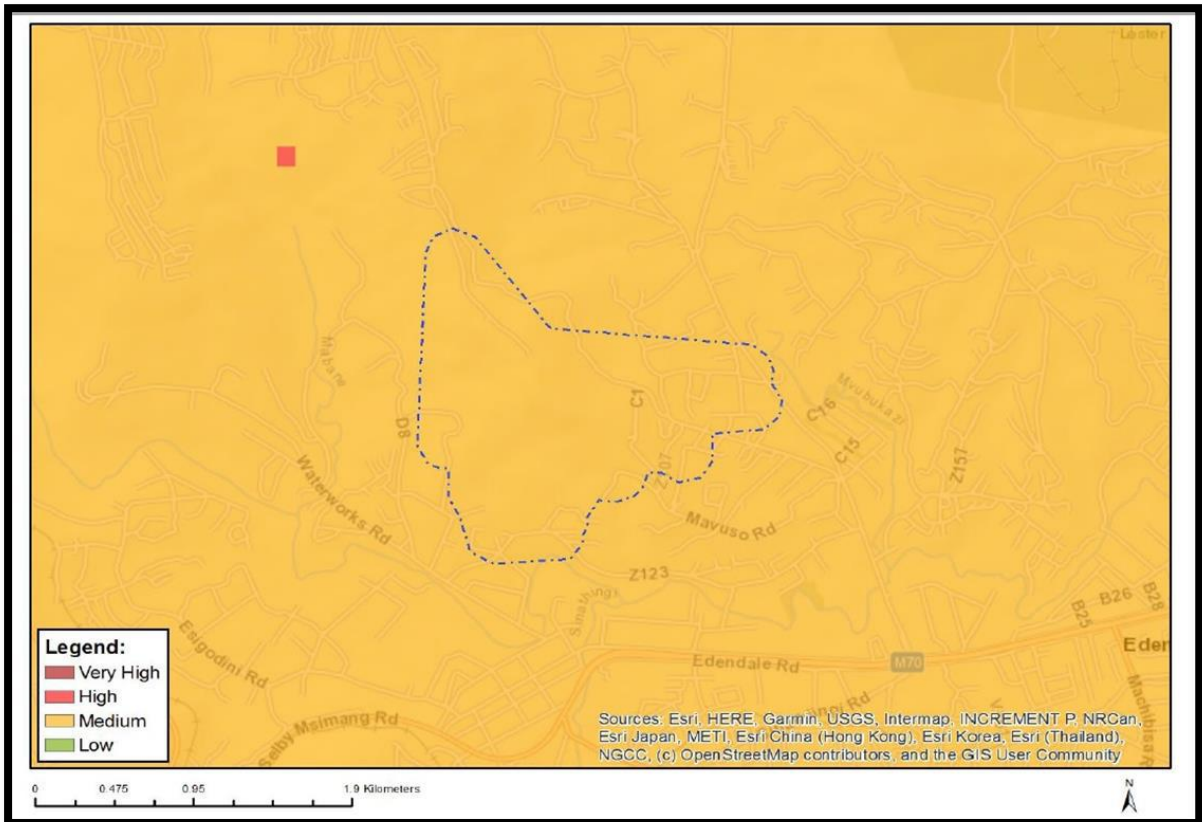


Figure 4.5.3.1: Map of of relative animal species theme sensitivity at the study site for the Smero housing development on rem of erf 10 000, Edendale, Pietermaritzburg, KwaZulu-Natal.

4.5.5.2 Potential occurrence of plant species of conservation concern.

Based on the screening report generated from the National Web-based Environmental Screening Tool, there is an overall medium sensitivity in terms of the plant species that are predicted to occur at the study site (Figure 4.5.5.2). The Sensitivity Report generated from the National Web-based Environmental Screening Tool indicated that there are 36 plant species identified as potentially occurring at the study site (see Table 4.5.5.2).

Table 4.5.5.2 Table of animal species predicted to occur at the study site and their sensitivity taken from the screening report

Sensitivity	Feature(s)	Common name	Red List	Population trend
Medium	Ocotea bullata	Black Stinkwood	EN	Decreasing
Medium	Sensitive species 89		VU	Decreasing
Medium	Dierama pallidum	n/a	VU	Decreasing
Medium	Sensitive species 712		VU	Decreasing
Medium	Hermannia sandersonii	Umakotegoyile	VU	Decreasing
Medium	Hydrostachys polymorpha	n/a	VU	Stable
Medium	Emplectanthus gerrardii	n/a	VU	Stable
Medium	Sensitive species 1260		VU	Decreasing
Medium	Asclepias bicuspis	n/a	CR	Decreasing
Medium	Asclepias woodii	Common milkweed	VU	Decreasing
Medium	Woodia verruculosa	Forest num-num	VU	Decreasing
Medium	Senecio exuberans	Ragworts	EN	Decreasing
Medium	Cineraria glandulosa	Cineraria	VU	Stable
Medium	Helichrysum pannosum		EN	Decreasing
Medium	Sensitive species 1076		VU	Decreasing
Medium	Dierama nixonianum	wandflowers	VU	Decreasing
Medium	Cassipourea gummiflua var. verticillata	Large-leaved Onionwood	VU	Decreasing
Medium	Erica cooperi var. cooperi	Heath	RARE	Stable
Medium	Gymnosporia devenishii	Drakensberg Spike-thorn	RARE	Stable
Medium	Sensitive species 609		VU	Decreasing
Medium	Sensitive species 1083		VU	Decreasing
Medium	Sensitive species 1251		VU	Decreasing
Medium	Sensitive species 814		VU	Decreasing
Medium	Sensitive species 1176		EN	Decreasing
Medium	Sensitive species 535		EN	Decreasing
Medium	Sensitive species 277		EN	Decreasing
Medium	Sensitive species 313		EN	Decreasing
Medium	Sisyranthus fanniniae		VU	Decreasing
Medium	Sensitive species 401		RARE	Stable
Medium	Disperis woodii	Orchid	VU	Decreasing
Medium	Senecio dregeanus		VU	Decreasing
Medium	Gerbera aurantiaca	Daisy	EN	Decreasing
Medium	Polygala praticola	Southern Shores' butterfly bush	VU	Decreasing
Medium	Sensitive species 1248		VU	Decreasing
Medium	Thunbergia venosa		RARE	Stable
Medium	Prunus africana	African Almond	VU	Decreasing

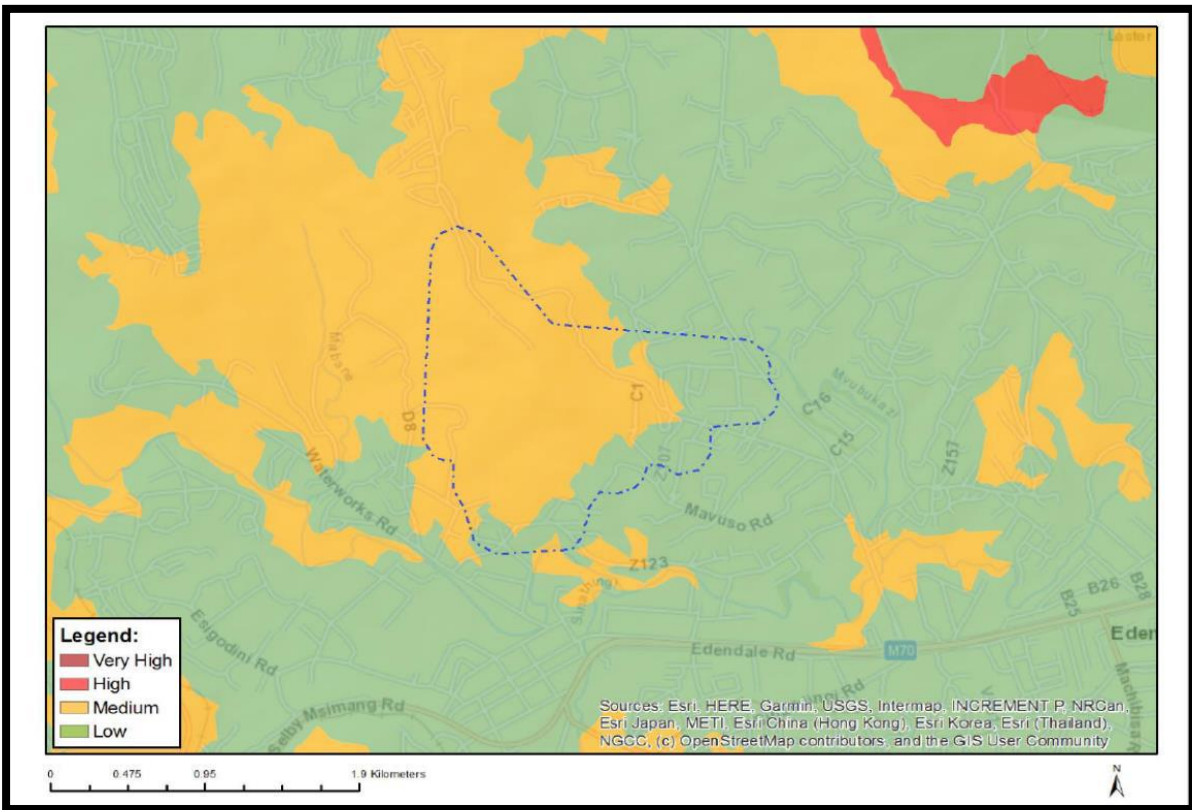


Figure 4.5.5.2: Map of of relative plant species theme sensitivity at the study site for Smero housing development on rem of erf 10 000, Edendale, Pietermaritzburg, KwaZulu-Natal.

4.6 Project Area of Impact

The PAOI (project area of impact) is relatively limited because most of the surrounding areas are already transformed. The project area that is on the boundary of the natural forest, see Figure 4.6, needs to have a buffer of 50 m. The project activity will need to be maintained within the proposed footprint of the development.



Figure 4.5.5.2: Map showing areas (white lines) where a 50 m boundary needs to be maintained at the study site for Smero housing development on rem of erf 10 000, Edendale, Pietermaritzburg, KwaZulu-Natal.

4.7 Land-use

The current land use at the study area include residential, and the open grassland is used for grazing.

4.8 Freshwater ecosystems

4.8.1 National status - NFEPA

The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources. These priority areas are called Freshwater Ecosystem Priority Areas, or 'FEPAs'.

FEPAs were identified based on:

- Representation of ecosystem types and flagship free-flowing rivers
- Maintenance of water supply areas in areas with high water yield
- Identification of connected ecosystems
- Representation of threatened and near-threatened fish species and associated migration corridors
- Preferential identification of FEPAs that overlapped with:

- Any free-flowing river
- Priority estuaries identified in the National Biodiversity Assessment 2011
- Existing protected areas and focus areas for protected area expansion identified in the National Protected Area Expansion Strategy.

At the study site at Smero housing development, there was no NFEPA River within 100 m of the study site (Figure 4.8.1.2). There was no NFEPA wetlands identified within 500 m of the Smero housing development at Pietermaritzburg Msunduzi Municipality (Figure 4.8.1.2).

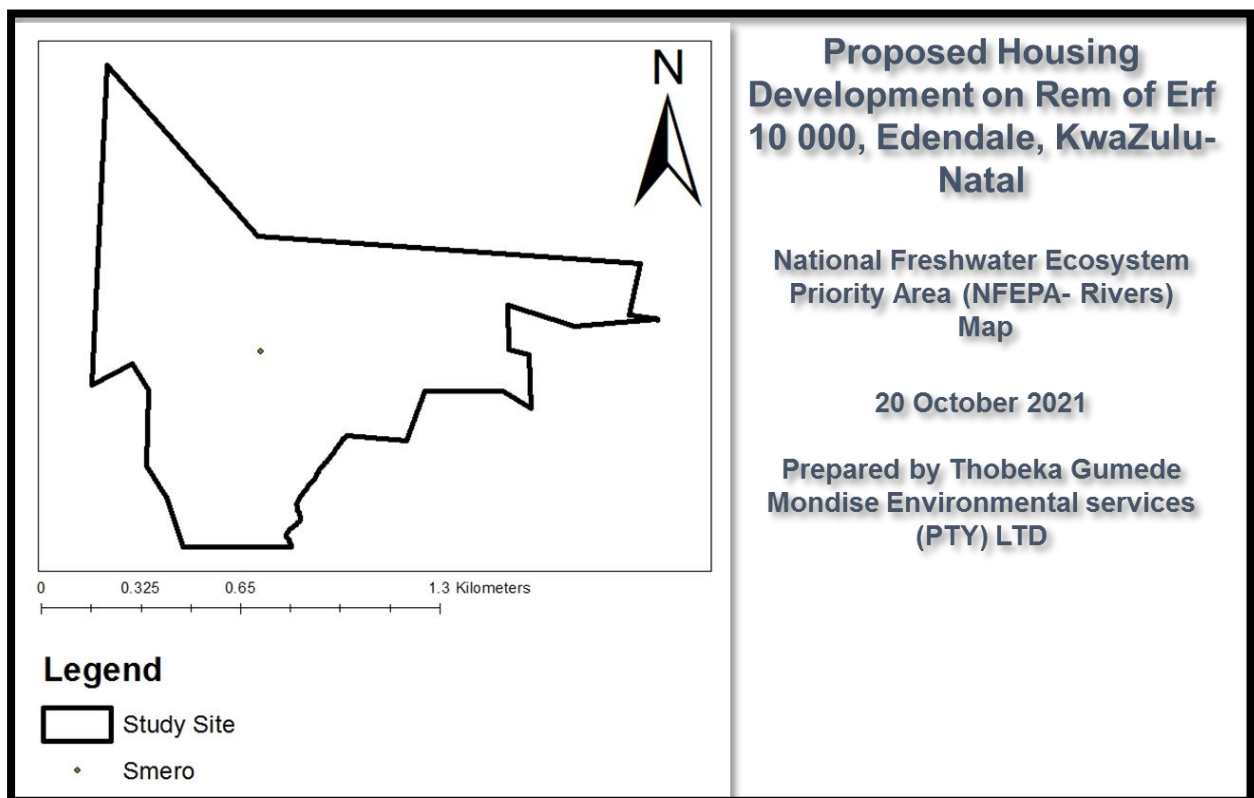


Figure 4.6.1.1: National Freshwater Ecosystem Priority Area (NFEPA - Rivers) map shows the study area at Smero, Edendale, Pietermaritzburg Msunduzi Municipality.

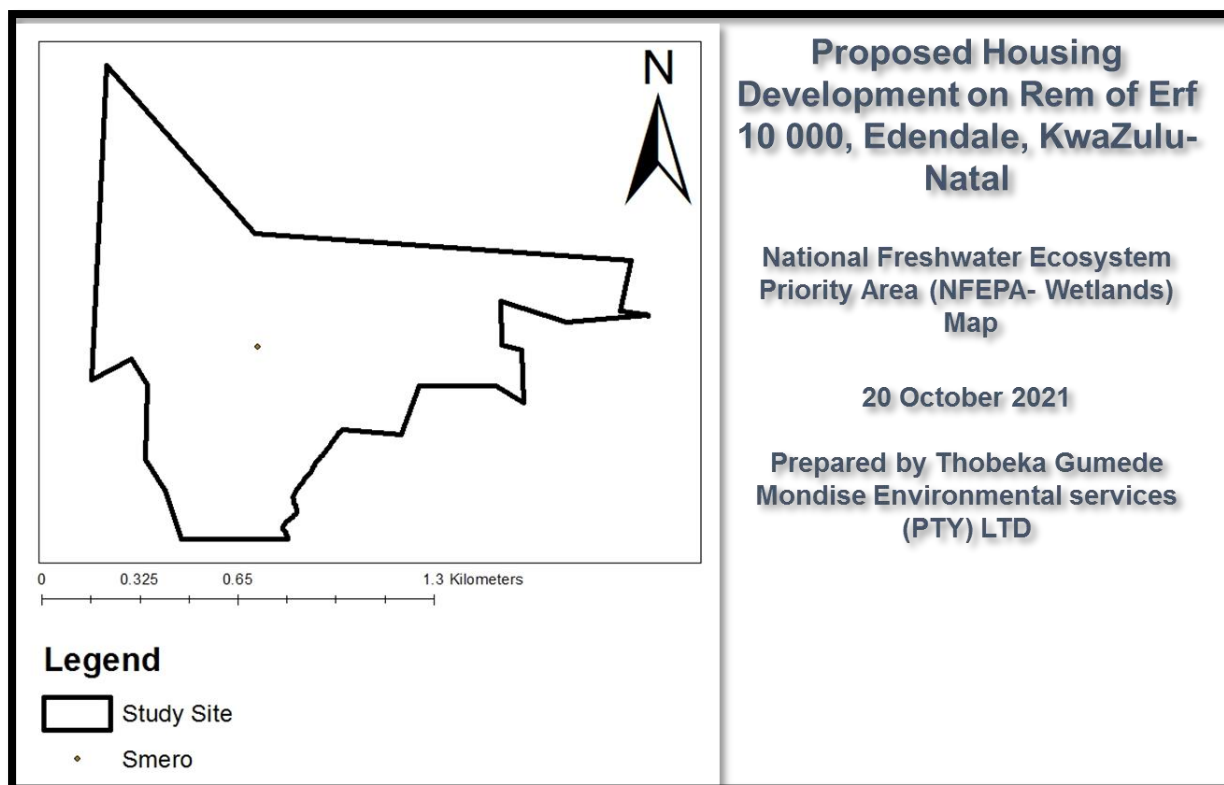


Figure 4.8.1.2: National Freshwater Ecosystem Priority Area (NFEPA - Wetlands) map shows the study area at Smero, Edendale, Pietermaritzburg, Msunduzi Municipality.

4.8.2 Provincial conservation plan status - FSCP

The KwaZulu-Natal Freshwater Systematic Conservation Plan (FSCP) was derived using generic conservation planning software (MARXAN). A two-step hierarchical process was followed to capture catchment and local scale freshwater dynamics, where priority primary catchments were first identified, then used in a second level for selecting priority sub-catchments, which served as planning units at a finer scale. Quantitative targets were set for defined freshwater biodiversity features, where primary catchment targets were based on the number of catchment types, river targets were based on total length of each river type, wetland targets were based on the total area of different wetland types, and species targets were set according to the total number of planning units containing lotic and lentic associated species. Selection of priority planning units at both levels was manipulated using modified area weighted costs. Costs were modified using discounts and penalties, which included, inter alia, the presence of priority estuaries and free-flowing rivers, planning units falling within priority primary catchments, planning units identified as important in an existing terrestrial conservation plan for KwaZulu-Natal, and the degree of catchment degradation. Upstream-downstream connectivity was achieved using boundary length costs for adjoining sub-catchments associated with main rivers and wetlands, and enhanced by setting high targets for sub-catchments through which diadromous eels (*Anguilla mossambica*) must migrate to

reach upper river reaches. Ecological processes were incorporated, as far as possible, by discounting planning units important for surface and groundwater yield.

The conservation status of the catchment at the study site is **Earmarked**, which is a Biodiversity important sub-catchment selected in the prioritizing process for conservation (Figure 4.8.2.1).

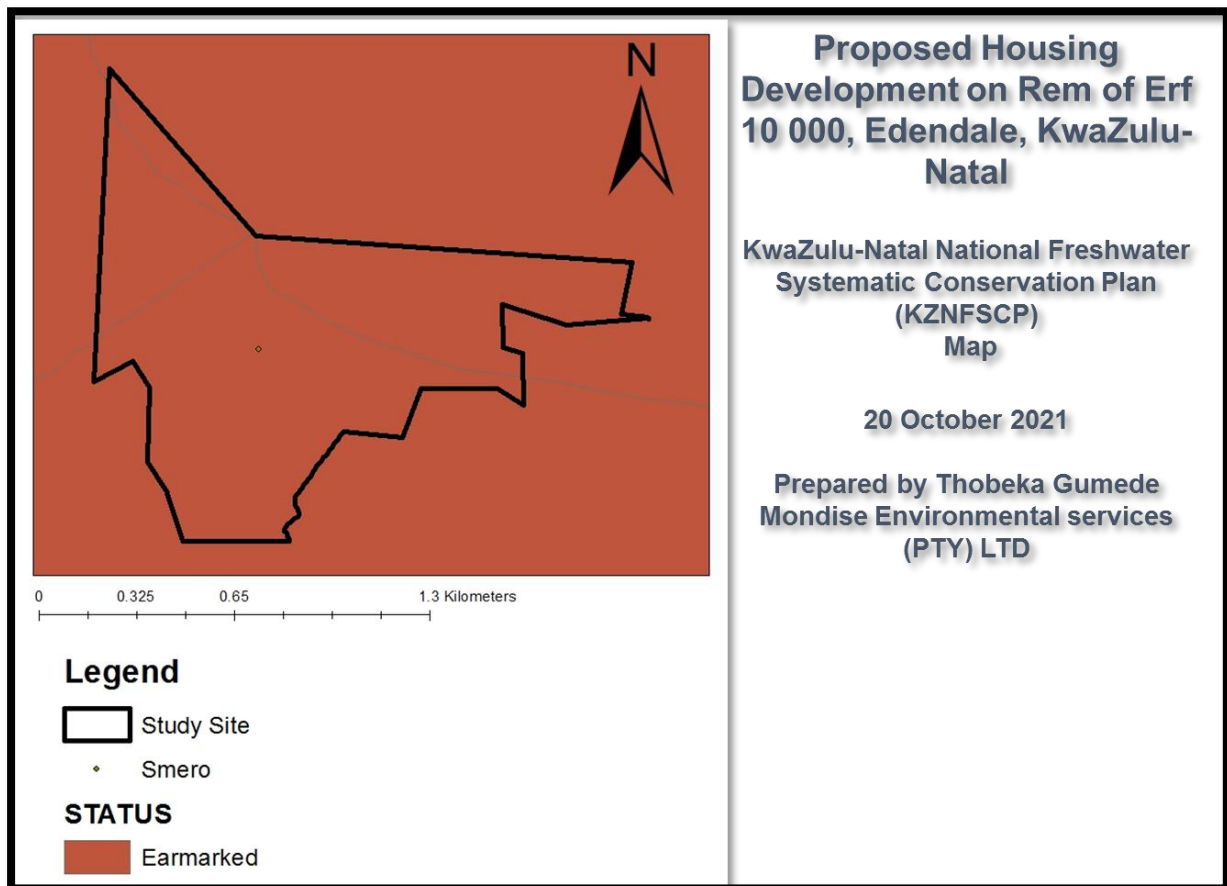


Figure 4.6.2.1: KwaZulu-Natal Freshwater Systematic Conservation Plan (FSCP) map of the study area at the Pietermaritzburg Msunduzi Municipality project.

5 SITE ASSESSMENT

5.1 Vegetation description

The vegetation of the proposed Smero housing development project area in Pietermaritzburg, mainly consisted of an open natural grassland dominated by *Sporobolus pyramidalis* (Cat's tail dropseed) as well as *Aristida junciformis* (Ngongoni) and some of the area was covered by an indigenous forest patch (Figure 5.1.1A). There was also an extensive natural forest

patch that was not easily accessible and on the edges of it there were some alien species (Figure 5.1.2B).

Pictures of some trees, grasses, forbs, and alien invasive plants observed onsite are also shown on Figures 5.1.2 - 5.1.4. The vegetation condition of the study site in the open grasslands was relatively in bad condition due to the dominance of *Sporobolus pyramidalis*.

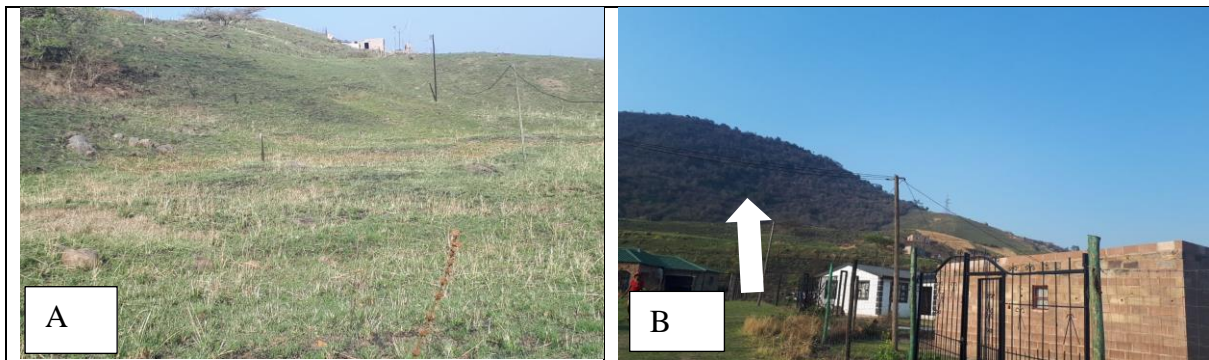


Figure 5.1.1: Section of the study site at Smero, showing an open natural grassland dominated by cat's tail dropseed grass (A) and there was a section with indigenous forest (B).

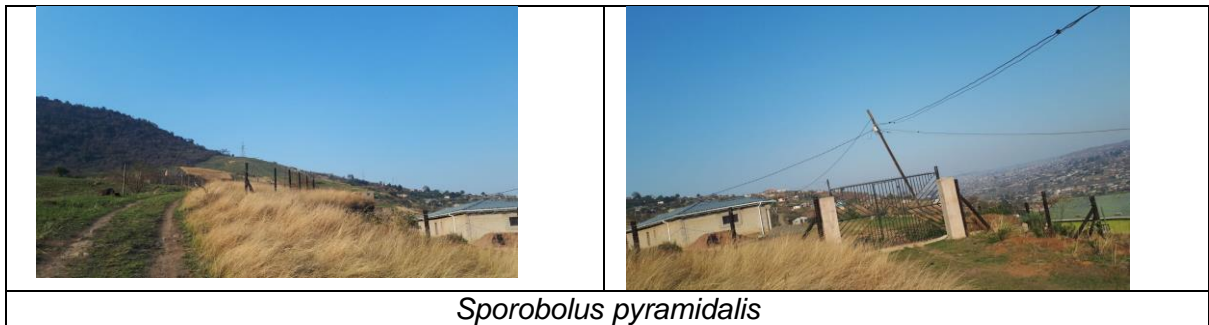


Figure 5.1.2: Some of the grass species identified at the proposed Smero housing project in Pietermaritzburg.



<i>Spermacoce natalensis</i>	<i>Aloe maculata</i>
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Figure 5.1.3: Some of the forb species identified at the proposed Smero housing project in Pietermaritzburg.

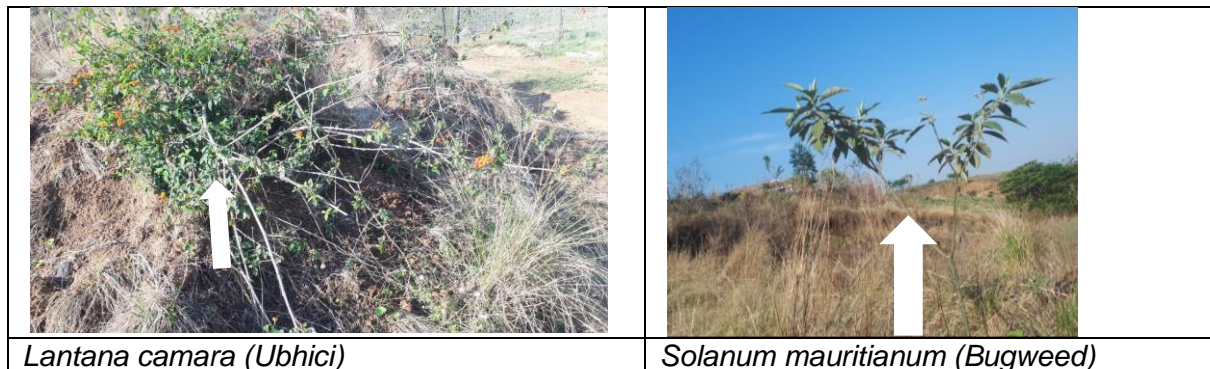


Figure 5.1.4: Some of the alien invasive species identified at the proposed Smero housing project in Pietermaritzburg.

5.2 Plant species

There were 26 common species of trees, grasses, forbs and trees identified onsite at Smero housing project (Table 5.2). It is important to note that this is not a complete list of species onsite but rather a representative of the species. Additionally, some seasonal species may have gone undetected and the natural forest was not easily accessible.

Table 5.2 List of common plant species encountered onsite

Plant species name	Common name	Indigenous or alien
Grasses		
<i>Aristida junciformis</i>	Ngongoni three-awn	Indigenous
<i>Cynodon dactylon</i>	Couch grass	Indigenous
<i>Eragrostis curvula</i>	Weeping love grass	Indigenous
<i>Eragrostis plana</i>	Tough love grass	Indigenous
<i>Sporobolus Africanus</i>	Rat's tail dropseed	Indigenous
<i>Sporobolus pyramidalis</i>	Cat's tail dropseed	Indigenous
<i>Seteria nigrirostris</i>	Large seed setaria	Indigenous
Forbs		
<i>Aloe maculata</i>	Zebra aloe	Indigenous
<i>Berkheya umbellata</i>	Ikhakhasana elincane	Indigenous

<i>Bidens pilosa</i>	Black jack	Alien
<i>Conyza floribunda</i>	Asthmaweed	Alien
<i>Diclis reptans</i>	Dwarf Snapdragon or Isinama	Indigenous
<i>Gerbera piloselloides</i>	Uhlango olumpofu	Indigenous
<i>Helichrysum sp</i>		Indigenous
<i>Rhynchosia cooperi</i>	Could not find common name	Indigenous
<i>Senescio sp.</i>		Alien
<i>Solanum sp.</i>		Indigenous
<i>Spermacoce natalensis</i>	Could not find common name	Indigenous
Shrubs		
<i>Caesalpinia decapetala</i>	Mauritius thorn	Alien
<i>Lantana camara</i>	Tickberry	Alien
<i>Senna didymobotrya</i>	Peanut butter cassia	Alien
<i>Solanum mauritianum</i>	Bugweed	Alien
Trees		
<i>Cussonia spicata</i>	Cabbage tree	Indigenous
<i>Eucalyptus</i>	Gum tree	Alien
<i>Melia azedarach</i>	Syringa tree	Alien
<i>Vachellia sp</i>		Indigenous

5.2.1 Plant SCC

The plant species of conservation concern (SCC) predicted to occur at the study site as per the DFFE Screening report were not encountered.

5.2.2 Invasive alien plants

The study area had alien invasive plants such as *Tickberry* and gum trees. Invasive alien plants are those which are non-indigenous to an area but which have been introduced from other countries and have the ability to spread without the direct assistance of people into natural or semi-natural habitats. They represent a significant threat to both biodiversity and human interests (Richardson et al., 2000). The Conservation of Agricultural Resources Act Table 3 (Regulation 15) Declared Weeds and Invader Plants for the Republic of South Africa lists 198 plant species that are legally declared alien weeds and invader plants, 3 of which were recorded at the site in question (Table 5.3.2). Species are ranked according to their level of threat and the legislation concerning each:

- Category 1 – Plant species that may not be grown and must be eradicated.

- Category 2 – Plant species with commercial or utility value, which may only be grown with a permit under controlled circumstances in a demarcated area and not within 30 metres of the 1:50 year flood-line of watercourses, lakes, dams or wetlands.
- Category 3 – Plant species that have amenity value but may no longer be planted, propagated, imported or traded. Existing plants may remain, except within the 1:50 year flood-line of watercourses, lakes, dams and wetlands and provided steps are taken to prevent their spread.

Table 5.3.2 List of declared weeds and invader plants recorded within the study area at the time of the survey.

Plant species name	Common name	Invasive status	Plant type
<i>Caesalpinia decapetala</i>	Mauritius thorn	Category 1	Shrub
<i>Eucalyptus</i>	Gum tree	Category 1	Tree
<i>Lantana camara</i>	Tickberry	Category 1	Shrub
<i>Senna didymobotrya</i>	Peanut butter cassia	Category 1	Shrub
<i>Solanum mauritianum</i>	Bugweed	Category 1	Shrub
<i>Bidens pilosa</i>	Black jack	Weed	Forb

5.3 Animal species

The SCC animal species predicted to occur on site as per the DFFE Screening Report tool were not located on site. Additionally, there were no other wild animals observed on site during the site visit. Small mammals such as rodents, ground squirrels, bats and a variety of insects, amphibians and reptiles are expected to occur on site.

5.4 Issues identified

The following issues were identified during the site assessment of the proposed Smero housing project in Pietermaritzburg.

Table 5.5 Issues identified during the site assessment of the proposed Smero housing project in Pietermaritzburg

ISSUES IDENTIFIED	DESCRIPTION OF IMPACTS
Loss of indigenous vegetation	Construction must be done with extreme caution and disturbances must be kept minimal and within the project footprints. This is because the vegetation is endangered. A buffer of 50 m needs to be maintained on the boundaries natural vegetation and the natural forest. Extra caution is also needed to

	ensure that these areas are not disturbed.
Invasion of alien plant species	The removal of existing natural vegetation creates “open” habitats that favours the establishment of undesirable species in the area that are typically very difficult to eradicate and may pose a threat to neighbouring ecosystems.

5.5 Discussion

The proposed Smero housing development project in Pietermaritzburg is found on Midlands Mistbelt grassland, Moist Coast Hinterland Grassland vegetation type and Eastern Mistbelt Forest vegetation type. They are all classified by SANBI as “Endangered”. Based on the provincial KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) for terrestrial areas, the current study site mainly falls under the Critical Biodiversity Area: Irreplaceable (CBA 1) which represents areas of high biodiversity value. Another portion falls under the Critical Biodiversity Area: Optimal (CBA 3) which has been identified as a Biodiversity Priority area with a lower irreplaceability score compared to CBA 1 and CBA 2. It is important to note that although these areas are critical biodiversity areas but they have already been transformed as residential built-up areas. Hence, development is recommended in the open grassland with caution in these areas and mitigation measures as outlined in this document needs to be adhered to, to safeguard this feature(s). Another portion is 100% transformed into a residential area. Small portions of the study area fall under the biodiversity area. These are areas that were not selected as critical biodiversity areas. It is important to note that this lack of selection should not be misinterpreted as reflecting areas of no biodiversity value. Whilst it is preferred that development be focussed within these areas, this still has to be conducted in an informed and sustainable manner.

There was no National Freshwater Ecosystem Priority Areas (NFEPA) River within 100m of the study area, and there were no NFEPA wetlands within 500 m of study site. Under the KwaZulu-Natal Freshwater Systematic Conservation Plan (FSCP), the conservation status of the catchment at the study site on the one portion it is **Earmarked** for conservation (Biodiversity Important Catchments Selected in Prioritization Process).

The vegetation condition of the study site was relatively in poor condition, the natural grassland was dominated by Ngongoni, this species dominate in a grassland that is in poor condition. There were also areas that were infested by alien invasive species such as ubhici and bugweed. There was also an extensive natural forest patch observed on site and a 50 m buffer

is recommended from the boundary of the forest. Should some trees from the forest patch need to be removed then a permit needs to be applied for from the Department of Environment, Forestry & Fisheries. There were no species of conservation concern located during the site visit.

It is recommended that construction activities should be restricted to areas demarcated by the plans to minimise impacts on the sensitive biodiversity areas. Additionally, it is recommended that the natural forest should be a no-go area because it is mostly likely to harbour species of conservation concern, i.e. forest invertebrates.

6 SENSITIVITY OF THE RECEIVING ENVIRONMENT

A desktop study was conducted in order to determine the feasibility of this project at the proposed site. The site assessment is required to confirm the ecological integrity of the site at a more detailed level. This section discusses potential sensitive ecosystems.

6.1 Recommendations for sensitive environments

Various mitigations are recommended (based on the level of sensitivity of the affected area) to reduce the impacts of the proposed **Smero Housing Development** on the surrounding natural environment.

6.1.1 High sensitivity areas

The conservation status of the catchment at the study site was **Earmarked** for conservation (Biodiversity Important Catchments Selected in Prioritization Process). Authorisation must be obtained from DWS prior to any construction taking place within the required buffers as indicated below: 32 m from all water courses.

6.1.2 Moderate sensitivity areas

These areas include pristine (undisturbed) and semi-pristine (low level of disturbance) areas as well as areas with high quantities of SCC. Depending on constraints (such as concentrations of protected species, or infrastructure limitations), these areas can withstand a limited loss of, or disturbance to, natural areas. The area with a steep slope leading up to the watercourse is considered moderately sensitive. It is of the utmost importance that erosion mitigation measures are put in place in this section.

The sensitivity of the steep slopes close to the river is moderate, hence the project activities need to be maintained within the project footprint and appropriate mitigation measures, more importantly erosion mitigation measures, need to be applied.

5.1.3 Low sensitivity areas

These areas are considered as severely disturbed or transformed by human activities, including cultivation, urban development and rural settlements, as well as degraded areas. These areas are suitable for development and will only require low level mitigations.

5.1.4 Issues identified

The following issues were identified during the sensitivity assessment of the proposed Smero Housing Development project in Pietermaritzburg Msunduzi Municipality.

Table 5.2: Issues identified during the sensitivity assessment of the proposed Smero Housing Development project in Pietermaritzburg Msunduzi Municipality.

ISSUES IDENTIFIED	DESCRIPTION OF IMPACTS
Unnecessary disturbance of sensitive areas	Erosion and degradation of sensitive plant communities and associated habitats due to poor planning and design (i.e. inappropriate utilization of sensitive systems).
Loss of endangered and protected vegetation	Construction may result in the permanent loss of various plants SCC. Construction must be done with extreme caution and disturbances must be kept minimal and within the project footprints. This is particularly important because all the vegetation types at the study are endangered
Natural forest patch	The natural forest patch may have SCC such as forest invertebrate and hence it is recommended that it is left out of the construction plans and a 50 m buffer be maintained on its boundary.
Poor rehabilitation of moderate and high sensitive areas	Poor rehabilitation of sensitive vegetation may lead to the permanent loss of these ecosystems as well as allow invading alien vegetation species to expand.

6 SENSITIVITY ASSESSMENT AND SITE ECOLOGICAL IMPORTANCE

A site assessment was conducted in order to confirm desktop information and infer accurate descriptions of the current ecological integrity of the site at a more detailed level. A further objective was to assist in impact identification and assessment. The Site Ecological Importance for the project and its related activities was determined using the methodology of the Species Environmental Assessment Guidelines (SANBI 2020) (Table 6). The Guidelines recommend a 200 m buffer around all SCCs, as per Raimondo *et al.* (2009). However, no justification or explanation is provided for the size of the buffer, and it is deemed to be overly conservative, especially in transformed human settlement areas. The function of a buffer is to limit the impact of edge effects on a species population, or community, and to provide enough habitat for pollinators, dispersers and other. Therefore, the buffer has been reduced to 50 m.

This section discusses potential sensitive ecosystems.

The sensitivity map for SEI was combined with the identification of Biodiversity Priority Areas, as identified according to the Protocols for the assessment of impact on terrestrial biodiversity. Conservation and Biodiversity features of the following programmes were identified and combined:

- KZN Biodiversity Plan (CBAs, PAs)
- Threatened Ecosystems

No-Go Areas were identified as the High Sensitivity areas. No development is allowed within these areas.

Table 6 Site Ecological Importance of proposed development corridor, as per SANBI (2020). (BI = Biodiversity Importance, RR = receptor resilience)

HABITAT	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	RECEPTOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE
Forest patch	High Highly likely population of SCC such as forest invertebrates.	High Good habitat connectivity with potentially functional ecological corridors Major threat include AIPs	Low Unlikely to be able to recover fully after a relatively long period.	Very high BI= High RR= Low
Natural open grassland patches	Low Any natural habitat of threatened ecosystem type (Although the natural grassland is endangered but it has already been transformed into a residential area and the remaining small patches are in poor condition)	Low Major threats include AIPs, too frequent fires in the inappropriate seasons.	Low Unlikely to be able to recover fully after a relatively long period as it is species poor.	Low BI= Low RR= Low
Transformed vegetation	Very Low No natural habitat remaining	Very Low Several major current negative ecological impacts e.g. timber plantation, croplands, dwellings and yards.	Low Unlikely to be able to recover fully after a relatively long period as it is species poor.	Very Low BI= Very Low RR= Low

6.1 Recommendations for sensitive environments

Various mitigations are recommended (based on the level of sensitivity of the affected area see Table 6) to reduce the impacts of the proposed Smero housing project on the surrounding natural environment.

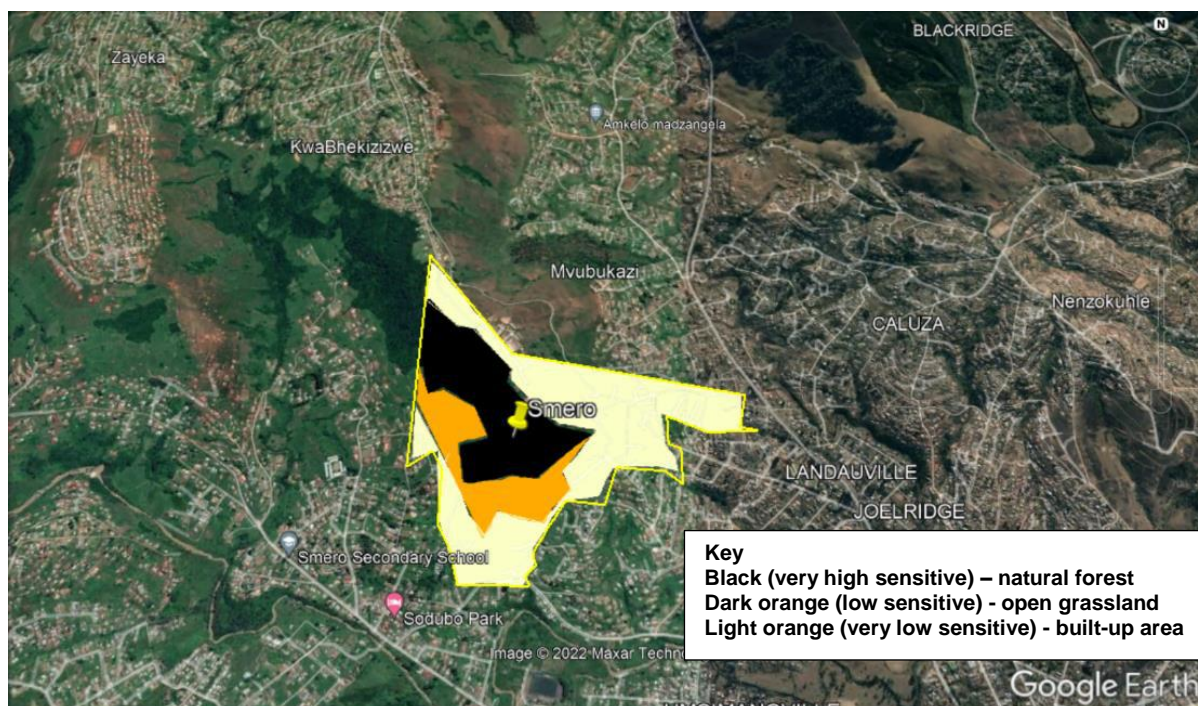


Figure 6.1: The sensitivity map for the study area at Smero housing project in Pietermaritzburg, black = very high sensitive/ no-go area (natural forest patch); dark orange = low sensitive (open grassland) and light orange = very low sensitive (built-up area).

6.1.1 High sensitivity areas

These are areas that are highly sensitive and recommended as no-go areas.

The natural forest patch at the study site is regarded as very high sensitive and recommended as a no-go area due to the likely presence of forest invertebrate (Figure 6.1)

6.1.2 Moderate sensitivity areas

These areas include pristine (undisturbed) and semi-pristine (low level of disturbance) areas as well as areas with high quantities of SCC. Depending on constraints (such as concentrations of protected species, or infrastructure limitations), these areas can withstand a limited loss of, or disturbance to, natural areas. The area with a steep slope leading up to

the watercourse is considered moderately sensitive. It is of the utmost importance that erosion mitigation measures are put in place in this section.

6.1.3 Low and very low sensitivity areas

These areas are considered as severely disturbed or transformed by human activities, including cultivation, urban development and rural settlements, as well as degraded areas. These areas are suitable for development and will only require low level mitigations.

The open grassland and built-up area in the study site are regarded as low and very low sensitive, respectively (Figure 6.1).

7 IMPACT ASSESSMENT

7.1 Assessed impacts

Ecological impacts were assessed, in terms of the criteria described in Section 3.3, for the Planning and Design, Construction and Operational Phases of the proposed Smero Housing project in Pietermaritzburg Msunduzi Municipality.

Three types of impacts were assessed:

- Direct impacts: Impacts occurring directly on the vegetation of the site as a result of the proposed quarry expansion.
- Indirect impacts: Impacts that are not a direct result of the proposed activity but occur away from the original source of impact.
- Cumulative impacts: impacts caused by several similar projects, related strategic actions and existing trends.

Table 7.1: Impact assessed during the phases of the proposed Smero Housing Development project in Pietermaritzburg Msunduzi Municipality.

Phases	Issue	Nature of Impact	Description of Impact
Planning & Design	Unnecessary damage and disturbance to natural vegetation due to poor planning.	Direct, indirect, cumulative	Erosion and degradation of sensitive plant communities and associated habitats due to poor planning and design (i.e. inappropriate utilization of sensitive systems).

	Loss of endangered and protected vegetation	Direct, indirect, cumulative	Construction may result in the permanent loss of various plant SCC.
Construction	Loss of vegetation during construction	Direct, indirect, cumulative	Unnecessary damage and disturbance to natural vegetation due to uncontrolled construction activities beyond the required footprint of the project area and associated access roads
		Direct, indirect, cumulative	Inadvertent or excessive damage and loss of vegetation beyond the footprint of the proposed project boundary
	Disturbance to surrounding wildlife and fauna	Direct, indirect, cumulative	During the construction phase vehicular movement, noise and habitat destruction will disturb animals in the area
		Direct	Poaching of wild animals during construction
		Permanent	Construction may result in the permanent loss of unidentified animal SCC.
Post-construction	Soil erosion due to loss of vegetation cover	Direct, indirect, cumulative	Erosion and degradation of habitats due to poor planning and design (i.e. clearing of vegetation and removal of sand).
	Invasion of alien species	Direct, indirect, cumulative	Allowing invading species to expand will lead to a large scale alien invasion.
	Poor rehabilitation of moderate and high sensitive areas	Direct, indirect, cumulative	Poor rehabilitation of high and moderately sensitive areas may lead to the permanent degradation of these ecosystems as well as allow invading alien vegetation species to expand.

7.2 Assessment and mitigation of impacts

The assessed impacts in Section 7.1 and the mitigations are summarized in the tables below (Table 7.2.1 - 7.2.3).

Table 7.2.1: Assessment and mitigation of impacts in the Planning and Design Phase of the proposed Smero Housing Development project in Pietermaritzburg Msunduzi Municipality.

DESCRIPTION OF IMPACTS	SPATIAL SCALE	TEMPORAL SCALE (DURATION)	CERTAINTY SCALE/ LIKELIHOOD	SEVERITY/ BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Issue: Unnecessary damage and disturbance to natural vegetation due to poor planning.							
Erosion and degradation of sensitive plant communities and associated habitats due to poor planning and design (i.e. inappropriate utilization of sensitive systems).	Localised	Short-term	Definite	Moderately severe	HIGH	<ul style="list-style-type: none"> An Environmental Control Officer (ECO) must be appointed to oversee construction activities A plan to actively rehabilitate the construction area post-construction needs to be developed 	LOW
Issue: Loss of endangered and protected vegetation							
Construction may result in the permanent loss of various plant SCC.	Localised	Short-term	Possible	Moderately severe	MODERATE	<ul style="list-style-type: none"> The construction activities must be limited to the designated footprint of the project area. Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be 	LOW

						undertaken.	
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Table 7.2.2: Assessment and mitigation of impacts identified in the Construction Phase of the proposed Smero Housing Development project in Pietermaritzburg Msunduzi Municipality.

DESCRIPTION OF IMPACTS	SPATIAL SCALE	TEMPORAL SCALE (DURATION)	CERTAINTY SCALE (LIKELIHOOD)	SEVERITY/ BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Issue: Loss of vegetation during construction							
Unnecessary damage and disturbance to natural vegetation due to uncontrolled construction activities beyond the required footprint of the project area and associated access roads	Localised	Short-term	Probable	Highly severe	HIGH	<ul style="list-style-type: none"> The construction activities need to be restricted to the areas demarcated by the project plans. No indigenous vegetation outside the demarcated project boundaries must be removed. Only the approved haul road must be used and vehicles must not traverse virgin land. There should be minimal disturbance to areas in the immediate vicinity as successful vegetation recovery will depend on the remaining vegetation. 	LOW

Inadvertent or excessive damage and loss of vegetation beyond the footprint of the proposed project boundary	Study area	Short-term	Possible	Severe	MODERATE	The project boundary must be demarcated and vegetation clearing and top soil removal limited to these areas.	LOW
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DESCRIPTION OF IMPACTS	SPATIAL SCALE	TEMPORAL SCALE (DURATION)	CERTAINTY SCALE (LIKELIHOOD)	SEVERITY/ BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Issue: Disturbance to surrounding wildlife and fauna							
During the construction vehicular movement, noise and habitat destruction will disturb animals in the area	Localised	Short-term	Probable	Moderately severe	MODERATE	Construction activities must be limited to the designated development footprint.	MODERATE
Poaching of wild animals during construction	Localised	Short-term	Possible	Severe	HIGH	No poaching of any wild animals should be allowed.	LOW
The construction may result in the permanent loss of unidentified animal SCC.	Localised	Permanent	Possible	Moderately Severe	MODERATE	<ul style="list-style-type: none"> The development area must again be surveyed prior to construction and initial cultivation in order to locate and capture any SCC and relocate them. 	LOW

Table 7.2.3: Assessment and mitigation of impacts identified Post-Construction Phase for all alternatives

DESCRIPTION OF IMPACTS	SPATIAL SCALE	TEMPORAL SCALE (DURATION)	CERTAINTY SCALE/ LIKELIHOOD	SEVERITY/ BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Issue: Soil erosion due to loss of vegetation cover							
Erosion and degradation of habitats due to poor planning and design (i.e. clearing of vegetation and topsoil removal).	Study area	Long-term	Possible	Moderately severe	HIGH	<ul style="list-style-type: none"> All sloping areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover. Disturbed areas must be re-vegetated by seeding with plants that are natural to the area. 	LOW
Issue: Invasion of alien species							
Allowing invading species to expand will lead to a large scale alien invasion.	Project level	Long-term	Probable	Moderately severe	MODERATE	<ul style="list-style-type: none"> An alien removal plan must be implemented and run during operational phase. 	LOW
Issue: Poor rehabilitation of moderate and high sensitive areas							
Poor rehabilitation of high and moderately sensitive areas may lead to the permanent degradation of these ecosystems as well	Project level	Long-term	Probable	Moderately severe	MODERATE	<ul style="list-style-type: none"> A Rehabilitation Management Plan must be implemented. An Alien Removal Plan must be implemented and run during the operational phase. 	LOW

as allow invading alien vegetation species to expand.							
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7.3 Summary of pre- and post-mitigation impact

The change in impacts from pre- to post- mitigation for the construction are summarised in the table below (Table 7.3).

Table 7.3 Assessment of pre- and post-mitigation impact significance

STAGES	PRE-MITIGATION			POST-MITIGATION		
	LOW	MODERATE	HIGH	LOW	MODERATE	HIGH
Planning and Design	0	1	1	2	0	0
Construction	0	3	2	4	1	0
Post-constriction	0	2	1	3	0	0
TOTAL	0	6	4	9	1	0

8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

The significant biodiversity concerns identified at the proposed Smero Housing development project in Pietermaritzburg Msunduzi Municipality was that the conservation status of the vegetation is endangered. Additionally, the natural forest patch, which is not easily accessible, likely had species of conservation concern identified by the screening report i.e. forest invertebrates and it was recommended as a no-go area with a 50 m buffer on its boundary. There were no species of conservation concern identified during the site visit. There were no NFEPA rivers and wetlands but the catchment area has been earmarked for conservation by the KZNBCP. Based on the overall findings and if the recommendations in this report are adhered to, limited constraints to the proposed activity exist. This does not suggest that the activity would be free from ecological impacts, and a net loss of biodiversity would inevitably result. In order to mitigate against such impacts and minimize the adverse effects to biodiversity, the application of the following measures is strongly advised:

8.2 Recommendations for the proposed activity

During the Planning and Design, construction and Post-Construction Phases of the proposed project, all mitigations outlined below need to be adhered to.

Planning and design phase

- An Environmental Control Officer (ECO) must be appointed to oversee construction activities.
- A plan to actively rehabilitate the area used for construction post-construction needs to be developed.
- Construction activities must be limited to the designated footprint of the project area.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilization and re-vegetation must be undertaken.

Construction phase

- Construction activities need to be restricted to the areas demarcated by the project plans.
- No indigenous vegetation outside the demarcated project boundaries must be removed.
- Only the approved haul road must be used and vehicles must not traverse virgin land.

- There should be minimal disturbance to areas in the immediate vicinity as successful vegetation recovery will depend on the remaining vegetation.
- Construction boundary must be demarcated and vegetation clearing and top soil removal limited to these areas.
- Construction activities must be limited to the designated development footprint.
- No poaching of any wild animals will be allowed.
- The development area must again be surveyed prior to construction in order to locate and capture any SCC and relocate them.

Operational phase

- All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.
- Disturbed areas must be re-vegetated by seeding with plants that are natural to the area.
- An alien removal plan must be implemented and run during operational phase.
- A Rehabilitation Management Plan must be implemented.

8.2.1 Management plans proposed as part of EMPr

As part of the final EMPr and project monitoring, the following plans need to be developed incorporating all the issues, conclusions and recommendations of this report:

- Erosion Action Plan
- Plant Rescue & Protection Plan
- Rehabilitation Management Plan
- Alien Vegetation Removal Plan

8.3 Environmental Statement and Opinion of the Specialist

Based on findings and summary table of impacts, the impacts of the proposed project on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. The construction is recommended and mitigations as well as recommendations outlined in this report need to be adhered to. If the above measures and recommendations are adhered to, then it is not expected that there will be any unacceptable impacts on the vegetation of the receiving environment.

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Victor, J.E. & Marx, G. 2005. *Haworthiopsis fasciata* (Willd.) G.D.Rowley. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/07/15.

DECLARATION OF INTEREST BY SPECIALIST



KWAZULU-NATAL PROVINCE

ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

	(For official use only)
Provincial Reference Number:	
NEAS Reference Number:	KZN / EIA /
Waste Management Licence Number (if applicable):	
Date Received by Department:	

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **May 2021**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20 EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY.

DISTRICT MUNICIPALITY

uMgungundlovu District Municipality

1. SPECIALIST INFORMATION

Specialist name:	Palaeontology		
Contact person:	Prof Marion Bamford		
Postal address:	P O Box 652, WITS		
Postal code:	2050	Cell:	082 555 6937
Telephone:	011 717 6690	Fax:	-
E-mail:	Marion.bamford@wits.ac.za		
Professional affiliation(s) (if any)	FRSSAf, mASSAf, PSSA, SASQUA, INQUA, IOP, IAWA		

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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DECLARATION OF INTEREST BY SPECIALIST

Project Consultant / EAP:	Sinohydro Consultants (PTY) Ltd		
Contact person:	Mr Hebert Nemato		
Postal address:	No. 49 Peter Kerchhoff (Chapel Str.), Office no. 105/106/119, Pietermaritzburg,		
Postal code:	3201	Cell:	076 262 9420
Telephone:	0339409635 or 0736292617	Fax:	
E-mail:	info@amathongagroup.co.za		

2. DECLARATION BY THE SPECIALIST

I, Marion Bamford are that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist:

Marion Bamford Consulting

Name of company:

27 March 2023

Date:

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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**Palaeontological Impact Assessment for the
proposed Smero Housing project, west of
Pietermaritzburg, uMsunduzi Local Municipality,
KwaZulu Natal Province**

Desktop Study (Phase 1)

For

JLB Consulting

14 March 2022

Prof Marion Bamford

Palaeobotanist

P Bag 652, WITS 2050

Johannesburg, South Africa

Marion.bamford@wits.ac.za

Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf
Experience: 33 years research and lecturing in Palaeontology
25 years PIA studies and over 300 projects completed

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by JLB Consulting, Durban, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

Specialist: Prof Marion Bamford

A handwritten signature in blue ink, appearing to read 'MKBamford', with a horizontal line underneath it.

Signature:

Executive Summary

A Palaeontological Impact Assessment was requested for the construction of civil infrastructure and 1400 low-income housing and 600 sites for GAP market housing for the Caluza/Smero Human Settlements project. The applicant is the uMsunduzi Local Municipality, KwaZulu Natal.

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

The proposed site lies on non-fossiliferous dolerite and Quaternary alluvium, and on the Pietermaritzburg Formation that rarely has trace fossils. Part of the area is on potentially fossiliferous shales of the Vryheid Formation (Ecca Group, Karoo Supergroup). The area is already very disturbed and covered by soils and vegetation so it is unlikely to find fossils until the ground is broken. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer or any other designated responsible person once excavations for foundations, amenities and roads have commenced. As far as the palaeontology is concerned, the project should be authorised.

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1. Background

The uMsunduzi Local Municipality is planning the construction of civil infrastructure and 1400 low-income housing and 600 sites for GAP market housing for the Caluza/Smero Human Settlements project. This section is known as the Smero Housing project.

The site is about 8km west of uMsunduzi (Pietermaritzburg) and north of Edendale (Figures 1, 2). Some of the land is vacant but some of the project area has been disturbed by peri-urban and rural activities.

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

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6).

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
ai	Details of the specialist who prepared the report,	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
k	Any mitigation measures for inclusion in the EMPr	Section 8, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 6
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 6, 8
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A



Figure 1: Google Earth map of the general area to show the relative land marks. The Smero Housing project is shown by the yellow polygon.



Figure 2: Google Earth Map of the proposed development of housing for the Smero / Caluza area with the project area shown by the yellow outline.

2. Methods and Terms of Reference

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

The methods employed to address the ToR included:

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

3. Geology and Palaeontology

i. Project location and geological context

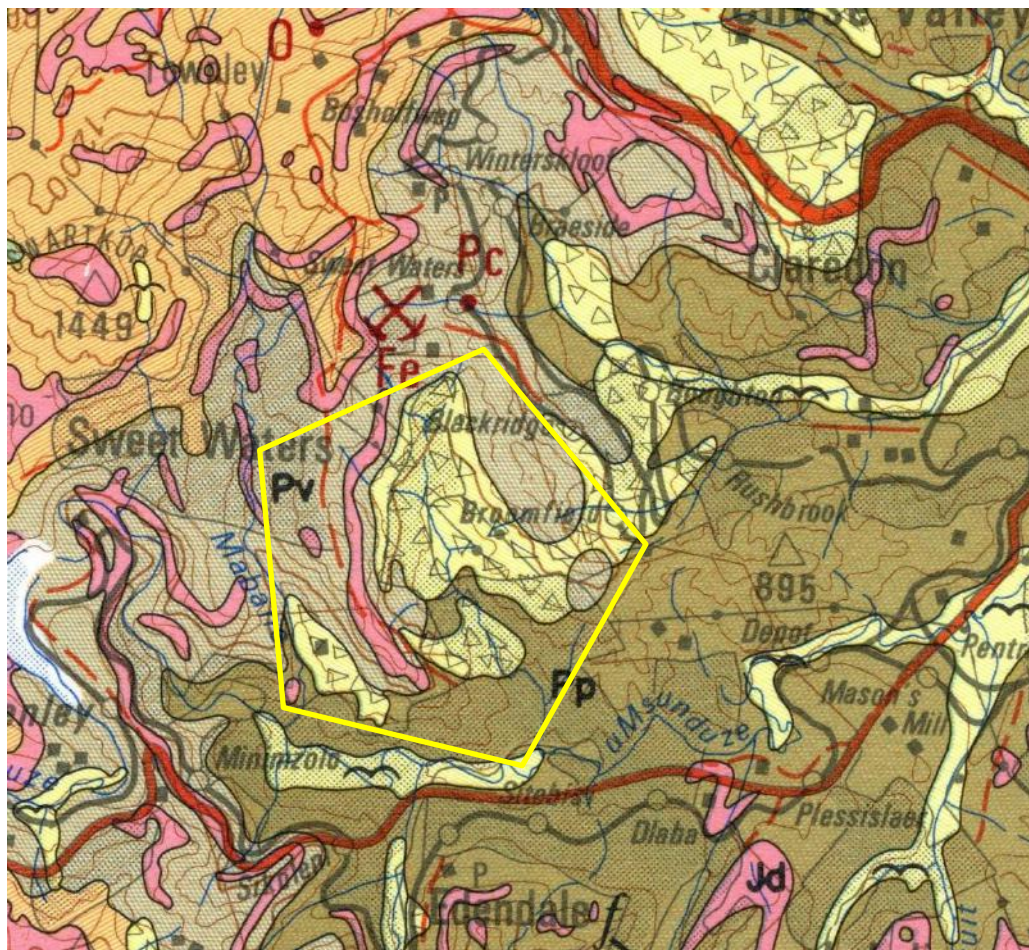


Figure 3: Geological map of the area around the Smero Housing project. The location of the proposed project is indicated within the yellow outline. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2930 Durban.

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

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pvo	Volksrust Fm, Eccca Group, Karoo SG	Fine-grained shales, mudstone	Middle Permian, upper Eccca
Pv	Vryheid Fm, Eccca Group, Karoo SG	Shales, sandstone, coal	Early Permian, Middle Eccca
Pp	Pietermaritzburg Fm, Eccca Group, Karoo SG	Grey-black fine-grained shales, mudstone	Early Permian, lower Eccca

The project lies in the south-eastern part of the Karoo Basin where the Ecca Group rocks are well exposed. Much younger alluvium and landslip rubble occurs on the hillsides and valleys.

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa. Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin, and are known as the Dwyka Group (Johnson et al., 2006).

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. In the Free State and KwaZulu Natal, from the base upwards are the Pietermaritzburg Formation, Vryheid Formation and the Volksrust Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Overlying the Ecca Group are the rocks of the Beaufort Group, and then the Stormberg Group. Large exposures of Jurassic dolerite dykes occur throughout the area. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption.

Unconformably overlying the Karoo Supergroup rocks are the considerably younger Quaternary sands, soils and alluvium.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 4. The site for development is in the non-fossiliferous Jurassic dykes and alluvium (grey and blue respectively on the map). The moderately fossiliferous Pietermaritzburg Formation is present in the southern part of the area to be developed (green). There is a small area lying on the potentially very highly fossiliferous Vryheid Formation (red).

Alluvium and dolerites do not preserve fossils. The Pietermaritzburg Formation was deposited in shallow to deep water conditions and only in the ancient shoreline facies would there be a chance of finding trace fossils such as worm burrows.

The Vryheid Formation in some parts of the basin has coal seams and associated carbonaceous shales. There are no known coal deposits this far south in the Karoo Basin

although there is an abandoned mine to the north of the project area. Vryheid Formation fossils are typical of the *Glossopteris* flora and include other plants such as lycopods, sphenophytes, ferns and early conifers (Plumstead, 1969; Anderson and Anderson, 1985). Vertebrates were not common at this time and moreover they require different conditions for preservation from those required by plants.

It should be noted that the area is densely vegetation in parts or has been disturbed by human activity.

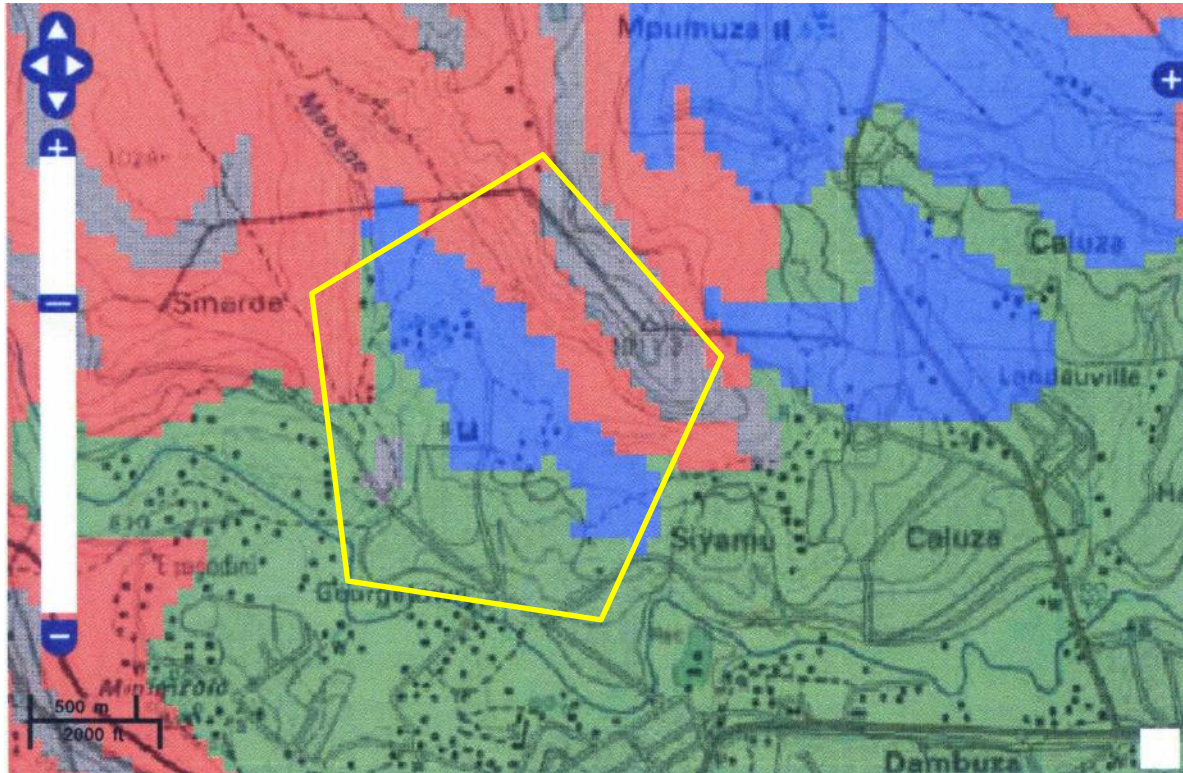


Figure 4: SAHRIS palaeosensitivity map for the site for the proposed Smero Housing project shown within the yellow outline. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

4. Impact assessment

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

Table 3a: Criteria for assessing impacts

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

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	M	-
	L	Dolerite and alluvium do not preserve fossils; so far there are no records from the Vryheid Fm of plant or animal fossils in this site so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-

PART B: Assessment		
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be plant fossils in the shales of the Vryheid Fm, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the dolerite. There might be fossils below the ground, therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr.
	L	

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the right age to contain fossils but these would only be below ground or in rocky outcrops, not in the soil cover. Since there is a small chance that fossils from the Vryheid Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

5. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and some might contain fossil plant material. The covering sands and soils of the Quaternary period would not preserve fossils. The area is highly disturbed and any intact fossils would be underground. A surface survey would not reveal fossils. Only excavations would reveal fossils.

6. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the covering soils and sands of the Quaternary. There is a small chance that fossils may occur below ground in the shales of the early Permian Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the developer, contractor, environmental officer, or other responsible person once excavations for amenities, roads and foundations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low so, as far as the palaeontology is concerned, the project should be authorised.

7. References

Anderson, J.M., Anderson, H.M., 1985. Palaeoflora of Southern Africa: Prodrumus of South African megafloras, Devonian to Lower Cretaceous. A.A. Balkema, Rotterdam. 423 pp.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.

8. Chance Find Protocol

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

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

9. Appendix A – Examples of fossils from the Vryheid Formation



Figure 5: Photographs of fossil plants from the Vryheid Formation

10. Appendix B – Details of specialist

Curriculum vitae (short) - Marion Bamford PhD January 2022

I) Personal details

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

ii) Academic qualifications

Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.
1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.
NRF Rating: C-2 (1999-2004); B-3 (2005-2015); B-2 (2016-2020); B-1 (2021-2026)

iii) Professional qualifications

Wood Anatomy Training (overseas as nothing was available in South Africa):
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) Membership of professional bodies/associations

Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+
Botanical Society of South Africa
South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative

ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

vii) Supervision of Higher Degrees

All at Wits University

Degree	Graduated/completed	Current
Honours	13	0
Masters	11	3
PhD	11	6
Postdoctoral fellows	15	1

viii) Undergraduate teaching

Geology II – Palaeobotany GEOL2008 – average 65 students per year

Biology III – Palaeobotany APES3029 – average 45 students per year

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

Micropalaeontology – average 12-20 students per year.

ix) Editing and reviewing

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

Guest Editor: *Quaternary International*: 2005 volume

Member of Board of Review: *Review of Palaeobotany and Palynology*: 2010 –

Associate Editor *Open Science UK*: 2021 -

Review of manuscripts for ISI-listed journals: 30 local and international journals

Reviewing of funding applications for NRF, PAST, NWO, SIDA, National Geographic,

Leakey Foundation

x) Palaeontological Impact Assessments

Selected from the past five years only – list not complete:

- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klippoortjie and Finaalspan 2017 for Delta BEC
- Ledjadja borrow pits 2018 for Digby Wells
- Lungile poultry farm 2018 for CTS
- Olienhout Dam 2018 for JP Celliers
- Isondlo and Kwasobabili 2018 for GCS
- Kanakies Gypsum 2018 for Cabanga
- NababEEP Copper mine 2018
- Glencore-Mbali pipeline 2018 for Digby Wells
- Remhoogte PR 2019 for A&HAS
- Bospoort Agriculture 2019 for Kudzala
- Overlooked Quarry 2019 for Cabanga
- Richards Bay Powerline 2019 for NGT
- Eilandia dam 2019 for ACO
- Eastlands Residential 2019 for HCAC
- Fairview MR 2019 for Cabanga
- Graspan project 2019 for HCAC
- Lielifontein N&D 2019 for EnviroPro
- Skeerpoort Farm Mast 2020 for HCAC

- Vulindlela Eco village 2020 for 1World
- KwaZamakhule Township 2020 for Kudzala
- Sunset Copper 2020 for Digby Wells
- McCarthy-Salene 2020 for Prescali
- VLNR Lodge 2020 for HCAC
- Madadeni mixed use 2020 for EnviroPro
- Frankfort-Windfield Eskom Powerline 2020 for 1World
- Beaufort West PV Facility 2021 for ACO Associates
- Copper Sunset MR 2021 for Digby Wells
- Sannaspos PV facility 2021 for CTS Heritage
- Smithfield-Rouxville-Zastron PL 2021 for TheroServe

xi) Research Output

Publications by M K Bamford up to January 2022 peer-reviewed journals or scholarly books: over 160 articles published; 5 submitted/in press; 10 book chapters.

Scopus h-index = 30; Google scholar h-index = 35; -i10-index = 92

Conferences: numerous presentations at local and international conferences.

DECLARATION OF INTEREST BY SPECIALIST



KWAZULU-NATAL PROVINCE
ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

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Provincial Reference Number:	
NEAS Reference Number:	KZN / EIA /
Waste Management Licence Number (if applicable):	
Date Received by Department:	

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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KINDLY NOTE:

1. This form is current as of **May 2021**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

PROPOSED SMERO/CALUZA LOW-COST HOUSING DEVELOPMENT ON ERF 770 EDENDALE RR REGISTRATION DIVISION FT IN WARD 20 EDENDALE LOCATED WITHIN MSUNDUZI LOCAL MUNICIPALITY.

DISTRICT MUNICIPALITY

uMgungundlovu District Municipality

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Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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I, Nhlakanipho Nkululeko Zondi are that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist:

Zonhla Hydro and Enviro Consulting

Name of company:

05 April 2023

Date:

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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DECLARATION OF INTEREST BY SPECIALIST

Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal	Details of the Specialist and Declaration of Interest	May 2021 V1
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WETLANDS IDENTIFICATION AND DELINEATION STUDY OF THE PROPOSED SMERO HOUSING DEVELOPMENT SCHEME, KWAZULU NATAL

November 2021
Version 01

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Report Number		ZN- 2111	
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DECLARATION

I, Nhlakanipho Nkululeko Zondi, declare that

- I act as the independent specialist in this matter;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist assessment relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998) (NEMA) and the National Water Act (Act 36 of 1998), regulations and any guidelines that have relevance to the proposed activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; all the particulars furnished by me in this report are true and correct;
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B (1) of the National Environmental Management Act, 1998 (Act 107 of 1998); and
- I understand that any false information published in this document is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act

Nhlakanipho Nkululeko Zondi



WETLANDS IDENTIFICATION AND DELINEATION STUDY OF THE PROPOSED SMERO HOUSING DEVELOPMENT SCHEME, KWAZULU NATAL

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1 INTRODUCTION

Zonhla Hydro & Enviro Consulting (Pty) Ltd were appointed by Sphe Consulting Services (Pty) Ltd to conduct a Wetland Identification and Assessment Specialist Study for the activities associated with the proposed Smero Housing Development Scheme within the Msunduzi Local Municipality, KwaZulu-Natal.

In order to cover the scope of work for the proposed project (i.e. construction of housing infrastructure), a wetland specialist study is required to support environmental approvals in terms of the requirements of the National Environmental Management Act (Act 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations of 2014, as amended on 07 April 2017. The study also aims to determine if the proposed project meets the requirements of Section 21 of the National Water Act (NWA) No. 36 of 1998, Water Use Licence Application (WULA) process, “*General Authorisation in terms of Section 39 of the NWA No. 36 of the 1998 Water Uses as defined in Section 21(c) and (i)*”, Notice 509 of 26 August 2016.

The report outlines the methodologies applied in identifying the natural wetlands within a 500 m radius of the study area, with modelling only conducted on the ones that are considered to be directly impacted by the proposed activity.

1.1 Project Background Description

The Msunduzi Local Municipality proposes constructing low cost houses for the community of Smero. The project will only focus on the construction of houses and other relative infrastructure.

1.2 Site Description

The location of the project site is presented in **Figure 1-1**. As depicted in this map, the study area is located in the Smero informal settlement within the Msunduzi Local Municipality of the KwaZulu-Natal Province. The study site is located approximately eight kilometres from the south east of the Pietermaritzburg town. A site plan of the project site, showing the proposed housing scheme boundary, is provided in **Figure 1-2**.

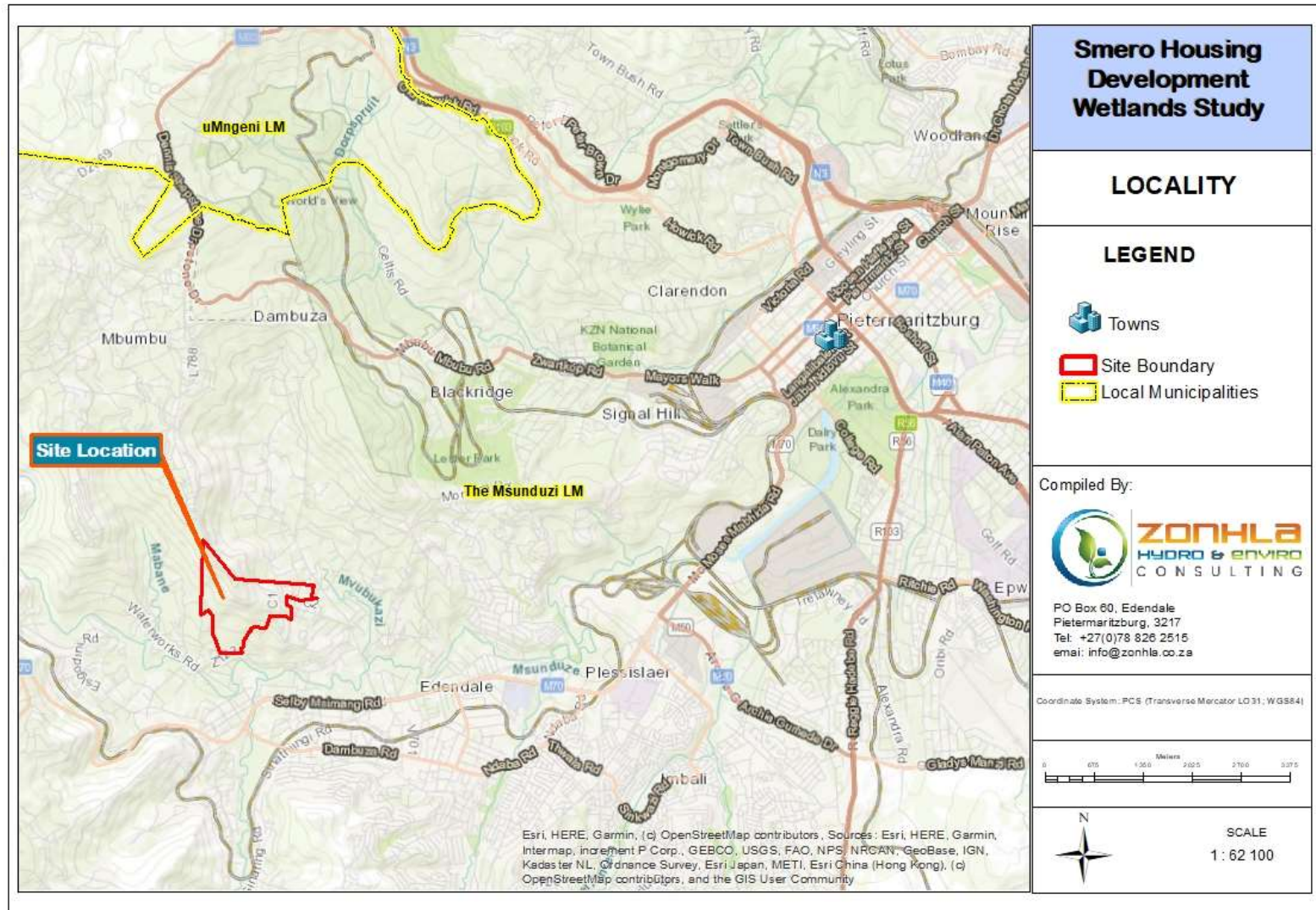


Figure 1-1: Locality Map of the Project Area

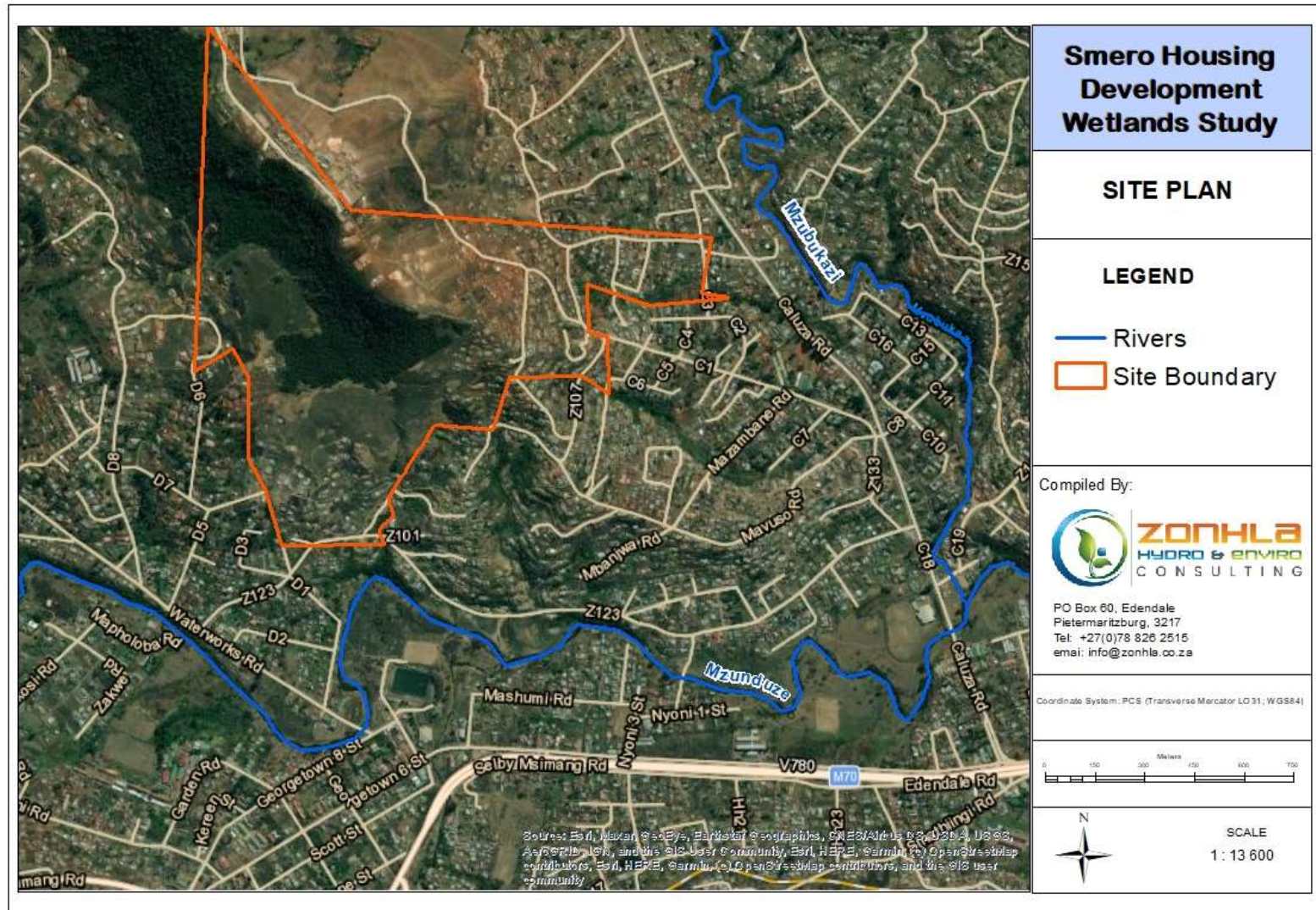


Figure 1-2: Site Plan of the Project Area

2 LEGISLATIVE FRAMEWORK

The following legislations are relevant to the scope of wetlands assessment for this project.

2.1 The National Environmental Management Act (No. 107 of 1998)

The NEMA No. 107 of 1998 and the associated Environmental Impact Assessments Regulations, 2014), states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the Environmental. Impact Assessment (EIA) process depending on the nature of the activity and scale of the impact.

2.1.1 Environmental Impact Assessment (EIA) regulations

New regulations have been promulgated in terms of Chapter 5 of NEMA No. 107 of 1998, EIA Regulation of 2014, as amended on 7 April 2017 in Government Notice No. 40772. In addition, listing notices (GN 324-327) lists activities which are subject to an environmental assessment. Government Notice 327 (GNR.327), Listing Notice 1 specifies under Activity 12 (ii) that environmental authorisation is required in the event that “The development of Infrastructure or structures with a physical footprint of 100m² or more - where such development occurs:

- Within a watercourse; and
- If no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse.”

2.2 The National Water Act (No 36 of 1998)

The NWA No. 36 of 1998 recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserve. It is important to note that water resources, including wetlands are protected under the NWA No. 36 of 1998. “Protection” of a water resource, as defined in the Act entails:

- “maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way;
- prevention of the degradation of the water resource; and
- the rehabilitation of the water resource;”

Chapter 4 of the NWA is of particular relevance to watercourses (i.e. wetlands and streams), and addresses the use of water and stipulates the various types of licensed and unlicensed entitlements to the use of water. Water use is defined very broadly in the Act and effectively requires that any activities with a potential impact on wetlands (within a distance of 500m upstream or downstream of a wetland) and streams (working within 1in100 year flood line or in absent of the floodline, area within 100m from the edge of the stream) be authorized.

2.2.1 General Authorisation

In terms of Section 22(1) of the NWA No. 36 of 1998, a person may use water without a licence if that water use is permissible in terms of a General Authorisation (GA) issued under Section 39 of the Act. The applicable regulation for this study is the GA No. 509, dated 26 August 2016 in terms of Sections 21 (c) and (i) water uses. which specifies that the “regulated area of a watercourse” is:

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

3 TERMS OF REFERENCE

The focus of this assessment was to undertake a specialist wetland assessment of the wetlands that could potentially be impacted by the proposed activities associated with the housing development.

It is understood that this Wetland Assessment Study will be submitted as a specialist study for the proposed project to support the required authorisation under the NEWA No. 107 of 1998, EIA Regulation of 2014 as amended on 7 April 2017 and WULA processes as per Section 21 of the NWA No. 36 of 1998.

To this end, the specific terms of reference for this assessment is based on the requirements of Annexure 6 “Wetland Delineation Report” of the Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals of 24 March 2017.

In brief, these requirements have as an outcome to achieve the following:

- A methodology of the site visit and the techniques used to assess the specific aspect of the site;
- Classification of wetlands and assessment of conservation significance based on available datasets;
- Classification of wetlands functionality;
- Assessment of PES (Present Ecological State/Condition) and EIS (Ecological Importance and Sensitivity) of wetlands;
- Details of an assessment of the specific identified sensitivity of the wetlands areas related to the proposed activity or activities and its associated structures and infrastructure;
- An identification of any areas that are to be avoided;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity;
- Any mitigation measures for inclusion in the Environmental Management Programme Report (EMPr);
- Any conditions for inclusion in the rehabilitation plan;
- Any monitoring requirements for inclusion in the EMPr; and
- A reasoned opinion whether the activity should be authorised based on the findings of the study.

4 AIMS AND OBJECTIVES

The aim and objectives of this study are as follows:

- Identification and classification of any wetlands that are located within a 500m radius from the boundary of the project sites;
- Assessment of the identified wetlands within the boundaries of the project;
- Modelling of the identified wetlands and other aquatic features that may be directly impacted by the proposed activities;
- Identification of potential impacts on the wetlands; and

-
- Management and mitigation measures to be implemented to limit or mitigate these impacts.

5 ASSUMPTIONS AND LIMITATIONS

The assumption and limitations are as follows:

- The information provided by the client forms the basis of the planning and layouts discussed.
- The conditions presented in this report are representative of those present at the time of the site inspection;
- Only surface water features within the immediate surrounds of the project site boundary (i.e. within 500m buffer of the project boundary), were assessed in the field as part of this study.
- The study does not include an assessment of the wider catchment within which the surface water resources on the proposed activity site are located.
- The survey was conducted on the 18th of August 2020, during the wet season and wetland vegetation could be accurately identified.
- The recreation grade GPS used for wetland and riparian delineations is accurate to within five meters.
- Wetland delineation plotted digitally may be offset by at least five meters to either side. Furthermore, it is important to note that, during the course of converting spatial data to final drawings, several steps in the process may affect the accuracy of areas delineated in the current report. It is therefore suggested that the no-go areas identified in the current report be pegged in the field in collaboration with the surveyor for precise boundaries. The scale at which maps and drawings are presented in the current report may become distorted should they be reproduced by for example photocopying and printing.

6 DESKTOP ASSESSMENT AND METHODOLOGY

6.1 Desktop Wetland Identification

In order to attain background information relating to the study area, a desktop study was undertaken, so as to guide the site assessment which followed (as elaborated on in the

following chapters). Attention was given to a number of conservation-related databases including the following:

- National Freshwater Ecosystem Priority Areas (NFEPA) wetland mapping as managed and updated by the South African National Biodiversity Institute (SANBI);
- Ezemvelo KZN Wildlife wetlands; and
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) wetlands.

In addition to the database interrogation, the most recent Google Earth and Zoom Earth Imagery of the project site was considered to see if any wetland areas or “anomalies” within the site are visible.

6.2 Wetland Assessment Methodology

The following standardised and accepted methods to determine the various aspects of the study were used:

- The Department of Water Affairs (now known as the Department of Water and Sanitation) wetland delineation manual ‘*A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas*’ (DWAf, 2005a);
- Wetland Offset (Water Research Commission report TT660/16);
- High Risk Wetland Atlas (Water Research Commission report TT659/16); and
- The Department of Water and Sanitation (DWS) “*Risk Assessment Protocol and Associated Matrix Procedure*” (2016).

6.2.1 Wetland Delineation

The delineations of the wetland areas were conducted according to the Department of Water Affairs wetland delineation manual ‘*A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas*’ (DWAf, 2005a). Five specific wetland indicators were used in the detailed field delineation of wetlands, which include:

- **Terrain Unit Indicator** – A practical index used for identifying those parts of the landscape where wetlands are likely to occur based on the general topography of the area.
- **Soil Form Indicator** – Identification of the soil types which are associated with prolonged and frequent saturation;

- **Soil Wetness Indicator** – Identification of the morphological signatures that develop in soil profiles as a result of prolonged and frequent saturation; and
- **Vegetation Indicator** – Identification of the hydrophilic vegetation associated with frequently saturated soil.

An example of soil criteria used to assess the presence of wetland soils is provided in **Table 6-1**, while **Figure 6-1** provides a conceptual overview of soil and vegetation characteristics across the different wetness zones.

Table 6-1: Soil Criteria Used to Inform Wetland Delineation Using Soil Wetness as an Indicator (after DWAF, 2005a)

Soil depth	Temporary wetness zone	Seasonal wetness zone	Permanent wetness zone
0 – 10cm	Matrix chroma: 1- 3 (Grey matrix <10%) Mottles: Few/None high chroma mottles Organic Matter: Low Sulphidic: No	Matrix chroma: 0- 2 (Grey matrix >10%) Mottles: Many low chroma mottles Organic Matter: Medium Sulphidic: Seldom	Matrix chroma: 0- 1 (Prominent grey matrix) Mottles: Few/None high chroma mottles Organic Matter: High Sulphidic: Often
30 – 50cm	Matrix chroma: 0 – 2 Mottles: Few/Many	As Above	As Above

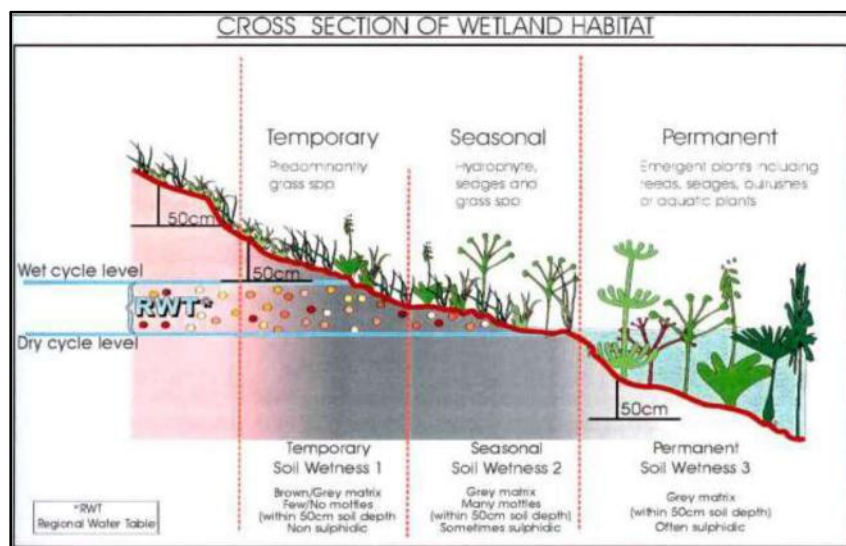


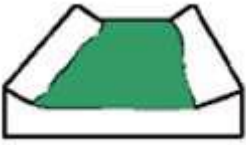





Figure 6-1: Diagram Representing the Cross Section Through a Wetland, Indicating the Interaction Between the Soil Wetness and Vegetation (from DWAF, 2005a).

Following the identification of the wetland areas on the site, these are then classified into specific hydrogeomorphic (HGM) units, as presented in **Table 6-2**.

Table 6-2: Wetland Hydrogeomorphic (HGM) Types Typically Supporting Inland Wetlands in South Africa (modified from Brinson, 1993; Kotze, 1999; and Marneweck and Batchelor, 2002)

Hydrogeomorphic types		Description
Floodplain		Valley bottom areas with a well-defined stream channel, gently sloped and characterised by floodplain features such as oxbow depressions and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom with channel		Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterised by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom without a channel		Valley bottom areas with no clearly defined stream channel, usually gently sloped and characterized by alluvial sediment deposition generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and also from adjacent slopes.
Hillslope seepage linked to a stream channel		Slopes on hillsides, which are characterised by the colluvial (transported by gravity) movement of materials. Water inputs are mainly sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.
Isolated Hillslope seepage		Slopes on hillsides, which are characterised by the colluvial (transported by gravity) movement of materials. Water inputs mainly from sub-surface flow and outflow wither very limited or through diffuse sub-surface and/or surface flow but with no direct surface water connection to a stream channel.
Depression (includes Pans)		A basin shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. it is inward draining). It may also receive sub-surface water. An outlet is usually absent, and therefore this type is usually isolated from the stream channel network.

6.2.2 Wetland Functional Assessment

Wetlands are known to perform a number of important functions within the landscape from attenuating flood waters and providing habitat for a number of biota to storing carbon, purifying

water and providing a direct supply of natural resources for human use. An understanding of these functionality of the wetlands contributes directly to the level of importance that is attributed to the specific wetland.

The effectiveness and importance of wetlands in providing ecosystem goods and services was conducted using the WET-EcoServices (Donovan *et al.* 2008). The WET-EcoServices tool makes provision for the rapid assessment of the ecosystem services provided by a wetland and is designed for inland palustrine wetlands, i.e. marshes, floodplains, vleis and seeps. The process of applying the tool is based on the characterisation of hydrogeomorphic wetland types based on desktop and field assessment and observations of identified and delineated wetland areas. Common wetland ecosystem goods and services assessed are described in **Table 6-3**, below. The maximum score for any service is a value of 4 and the rating of the probable extent of the service is shown in the table below.

Table 6-3: Ecoservices Rating Table Used to Rate Level of Importance in Terms of Ecosystem Service Provision.

Score	Rating of likely extent to which a benefit is being supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate
2.1 - 3.0	Moderately High
> 3.0	High

6.2.3 Determining the Present Ecological State of Wetlands

The determination of the present ecological state (PES) of wetlands was conducted by using a tool from the WET-Management Series (issued by the Water Research Commission), the WET-Health (Macfarlane *et al.* 2008).

This tool is designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. The tool therefore attempts to assess the hydrological, geomorphological and vegetation impacts that has been imparted on the wetland at the time of assessment.

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a PES score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately

assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The impact scores and Present State categories are provided in the **Table 6-4** and **6-5** below.

Table 6-4: The magnitude of Impacts on Wetland Functionality (Macfarlane et al, 2008)

Impact Category	Description	Score
None	No Discernible modification or the modification is such that it has no impacts on the wetland integrity	0 to 0.9
Small	Although identifiable, the impact of this modification on the wetland integrity is small.	1.0 to 1.9
Moderate	The impact of this modification on the wetland integrity is clearly identifiable, but limited.	2.0 to 3.9
Large	The modification has a clearly detrimental impact on the wetland integrity. Approximately 50% of wetland integrity has been lost.	4.0 to 5.9
Serious	The modification has a highly detrimental effect on the wetland integrity. More than 50% of the wetland integrity has been lost.	6.0 to 7.9
Critical	The modification is so great that the ecosystem process of the wetland integrity is almost totally destroyed, and 80% or more of the integrity has been lost.	8.0 to 10

The level of impacts on the Hydrology, geomorphology and Vegetation wetland parameters is a direct indication of the PES of the wetland as well as the functioning of the wetland. A wetland area that has undergone severe impacts on its hydrology, geomorphology or vegetation or a combination of all three will reflect a low present ecological state while the converse is also true for pristine wetlands. Since hydrology, geomorphology and vegetation are interlinked in the model, their scores are aggregated to obtain the overall PES health score using the formula:

$$PES\ Health = ((Hydrology\ value) \times 3 + (Geomorphology\ value) \times 2 + (Vegetation\ value) \times 2) \div 7$$

Table 6-5: Definitions of the PES categories (Macfarlane et al, 2008)

Impact Category	Description	Impact Score Range	Present State Category
None	Unmodified, natural	0 to 0.9	A
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B

Impact Category	Description	Impact Score Range	Present State Category
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

6.2.4 Determining the Ecological Integrity of the Wetlands

The ecological integrity (EI) of a wetland is determined by a combining the findings of the WET-EcoServices and WET-Health tool as both these tools provide considerations in this regard. For instance, a wetland that makes very little ecosystem services contribution to the hydraulic system that it is linked to and has a low PES score will consequently have a low ecological integrity. The converse is also therefore true for wetlands making a large ecological contribution to the hydraulic system it is linked to as well as a high PES score.

6.2.5 Determining the Ecological Importance and Sensitivity of Wetlands

The outcomes of the implementation of the WET-EcoServices tool discussed in **Section 6.2.2, above**, is key in the determination of the ecological importance and sensitivity of wetlands as the results is a direct indication of the contribution that the wetland is making to the hydraulic system with which it is linked. This contribution is linked to the sensitivity of this wetland to any possible change and how this will impact on the hydraulic system it is linked to.

The Ecological Importance and Sensitivity (EIS) for riparian systems is a DWS Tool developed by Kleynhans (1999) assessing the riparian and instream biota and habitats (both abiotic and biotic components of the system are taken into consideration in the assessment of ecological importance and sensitivity). This determines the systems importance to the maintenance of biological diversity and ecological functioning on local and wider scales. The mean of the determinants used to assign the EIS category as listed in **Table 6-6**.

Table 6-6: Description of EIS Categories

EIS Category	Range of Mean	Recommended Ecological Management
Very High	3.1 to 4.0	A
High	2.1 to 3.0	B
Moderate	1.1 to 2.0	C
Low Marginal	<1.0	D

6.2.6 Ecological Classification and Description

The ecological classification and description are direct result of the implementation of the methodology and tools described in **Section 6.2.2 to 6.2.5** as the results of these determinations contribute to the understanding of the ecology of the wetland. The description of the wetland will therefore make provision for a description of the physical attributes of the wetland (location, size, etc.), the ecosystem services that the wetland provides, the current ecological state of the wetland and the importance of the wetland as well as its sensitivity.

6.3 Impact and Risk Assessment

In order to be compliant with statutory requirements, an impact assessment on the wetland was undertaken as per the DWS Risk Assessment Matrix, 2016.

The risk rating matrix methodology used is based on the following quantitative measures:

- The severity of each impact.
- The spatial extent or geographic sense of each impact occurring.
- Duration of occurrence.
- The frequency of each activity.
- The frequency of each impact.
- Legal issues of the activity.
- Detection of the impact.

In order to determine the significance of each identified potential impact, a numerical value has been linked to the respective factor. **Table 6-7** provides the ranking scales used in this study.

Table 6-7: Risk Rating Matrix

RISK ASSESSMENT KEY (REFERENCED FROM DWS RISK-BASED WATER USE AUTHORISATION APPROACH AND DELEGATION GUIDELINES)	
RATINGS	
SEVERITY	
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
SPATIAL SCALE	
Area specific (at impact site)	1
Whole site (entire surface)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5
DURATION	
One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, an E or F	5
FREQUENCY OF THE ACTIVITY	
Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5
FREQUENCY OF THE INCIDENT/IMPACT	
Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5
LEGAL ISSUES	
No legislation	1

RISK ASSESSMENT KEY (REFERENCED FROM DWS RISK-BASED WATER USE AUTHORISATION APPROACH AND DELEGATION GUIDELINES)	
RATINGS	
Fully covered by legislation (wetlands are legally governed)	5
DETECTION	
Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

Based on the ranking scales presented in **Table 6-7**, the significance of each impact is calculated using the following formula:

$$\text{Significant Value} = (\text{Severity} + \text{Spatial Scale} + \text{Duration}) \times (\text{Frequency of Activity} + \text{Frequency of Incident} + \text{Legal Issues} + \text{Detection}).$$

The risk significance rating has been subdivided into three categories, as presented in **Table 6-8**. This ranking system is based on the DWS risk assessment requirements and has therefore been used to determine risk significances in this study.

Table 6-8: Risk Assessment Significance Value

RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low Risk	Low potential impact on the receiving environment and downstream water resources. No mitigation measures required.
56 – 169	(M) Moderate Risk	Moderate risk for impact to the receiving environment and downstream water resources. Mitigation measures are required to reduce the risk of the anticipated potential impact.
170 – 300	(H) High Risk	High risk for impact to the receiving environment and downstream water resources with potentially long-term consequences. Mitigation measures are required to reduce the risk of the anticipated potential impact.

7 STUDY AREA

7.1 Extent of the Study Area

The project infrastructure is located in the Smero area within the Msunduzi Municipality. Surrounding activities includes grasslands, natural forest and residential areas.

7.2 Description of the Study Area

7.2.1 Catchment Hydrology Characteristics

The study area is located in the Quaternary Catchments U20J, within the Pongola to Mtamvuna Water Management Area (WMA) 4. The Mean Annual Precipitation (MAP) of the study area is 840mm and the Mean Annual Evaporation (MAE) of the study area is 1 400mm (WR 2012).

7.2.2 Surface and vegetation

The predominant land cover within the catchment area, in close proximity to the project site, is predominately grassland, forest, low cost housing and informal settlements as presented in **Photo 7-1**. The study site falls within the Midlands Mistbelt Grassland (Gs9), Moist Coast Hinterland Grassland (Gs20) and Eastern Mistbelt Forests (FOz3) vegetation types as per the South African National Biodiversity Institute (SANBI) vegetation classification (2012), as presented in **Figure 7-1**. This vegetation types are listed as Endangered



Photo 7-1: Depiction of Land Cover in the Vicinity of the Project Site

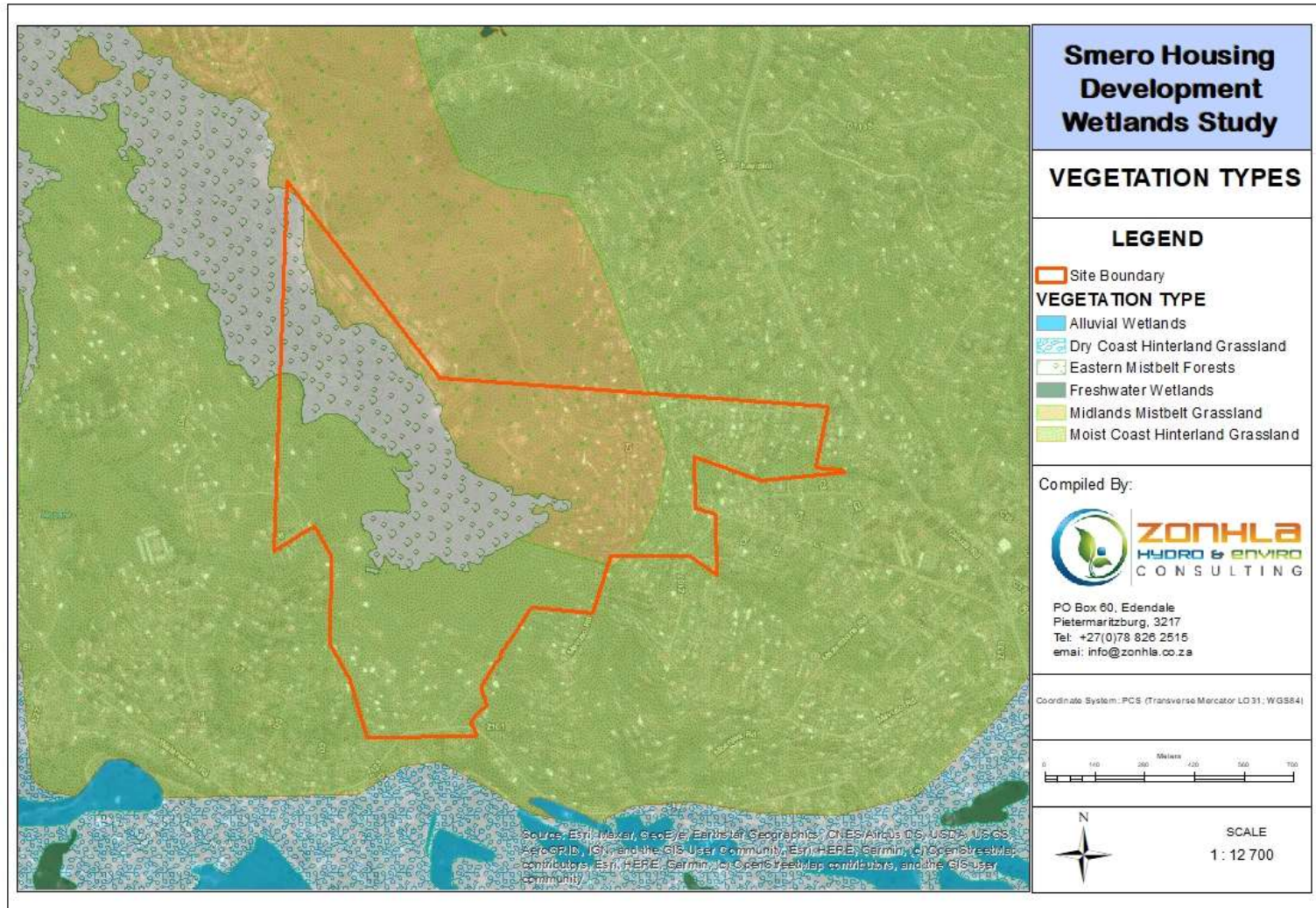


Figure 7-1: Vegetation Cover of the Project Site

7.2.3 Topography

The elevation of the study site is lowest at 729 meters above mean sea level (mAMSL) from the south and is highest on the northern boundary with an elevation of 1 000 mAMSL.

7.3 Soils and Geology

The project area falls within the Ab119 and Ac222 land types. The soil forms within this landscape position are the Gs1716/Gs18 Glenrosa soil form and has soil texture of Sandy Clay Loam (SaCILm). The geology of the study area is Mainly sandstone siltstone and shale of the Vryheid Formation, Ecca Group with small areas of dolerite.

8 WETLANDS ASSESSMENT FINDINGS

The NWA No. 36 of 1998 defines a wetland as “land that is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

The results presented below are based on the findings of the desktop assessment as well as the field investigation conducted for the study.

8.1 Desktop Wetland Identification

The initial wetland identification process was conducted at a desktop level during which available NFEPA and KZN Ezemvelo Wildlife wetland and SAIIE wetlands databases were interrogated to determine the presence of any wetland areas that has been determined in the past. The NFEPA, KZN Ezemvelo Wildlife and SAIIE wetland databases indicated the presence of potential three wetlands and two rivers within a 500m radius of the proposed project boundary, as presented in **Figure 8-1**. In addition to the database interrogation, the most recent Google Earth and Zoom Earth Imagery of the site was considered to see if any wetland areas or “anomalies” within the site are visible.

The NFEPA is a tool developed to assist in the conservation and sustainable use of South Africa’s freshwater ecosystems, including rivers, wetlands and estuaries. Nel *et al.* (2011) classified the freshwater ecosystem conditions according to their Present Ecological State ‘AB’, ‘C’, and ‘DEF’ or ‘Z’ (**Table 8-1**).

The results of the desktop study indicated the wetland types in close proximity, within the 500m buffer of the project area as described the NFEPA, KZN Ezemvelo Wildlife and SAIIE wetlands datasets are the Channelled Valley Bottom wetland systems. This is illustrated in **Table 8-2** together with its associated condition.

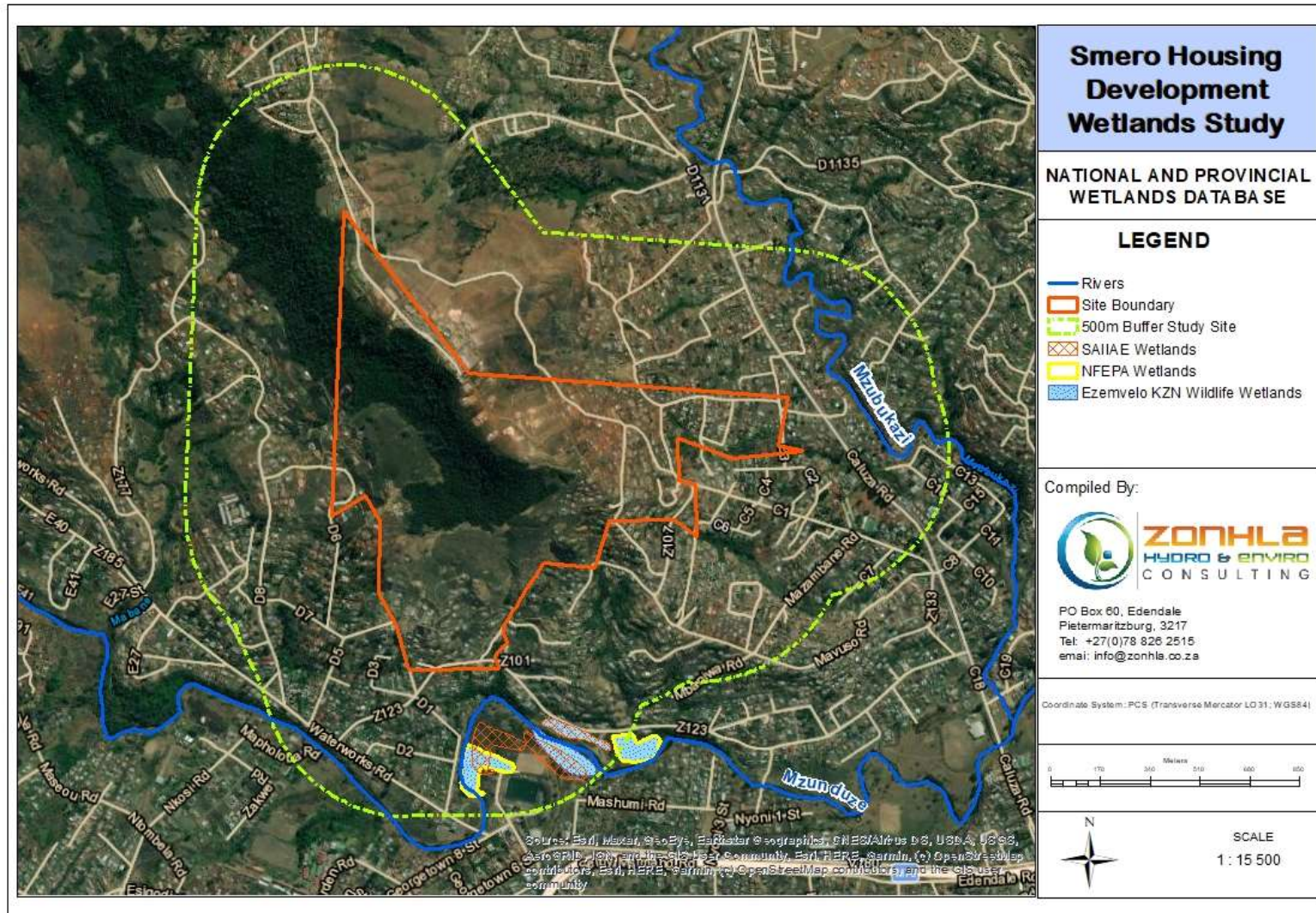


Figure 8-1: Location of the Wetlands as Indicated by the NFEPA and KZN Ezemvelo Wildlife and SAIIAE Wetlands Database.

Table 8-1: Description of NFEPA Wetland Conditions Categories

PES Equivalent	NFEPA Condition	Description
Natural or Good	AB	Percentage natural land cover \geq 75%
Moderately Modified	C	Percentage natural land cover 25-75%
Heavily to critically modified	DEF	Riverine wetland associated with a D, E, F or Z ecological category river
	Z1	Wetland overlaps with a 1:50 000 'artificial' inland water body from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (2005-2007)
	Z2	Majority of the wetland unit is classified as 'artificial' in the wetland locality GIS layer
	Z3	Percentage natural land cover \leq 25%

Table 8-2: Wetland Identified and NFEPA Condition

Wetland HGM	NFEPA Condition
Channelled Valley-bottom	Z1
Channelled Valley-bottom	Z1
Channelled Valley-bottom	Z1

Following the desktop assessment of the site, a site visit was conducted on the 18th of August 2021. During the site visit, areas within the 500m radius of the study site boundary, classified as wetland and rivers as per the NFEPA, KZN Ezemvelo Wildlife and SAIIE wetlands database were accurately assessed for wetlands characteristics and delineated, as discussed in the following **Section 8.2**.

8.2 Field Wetlands Systems Delineation and Classification

The delineation of the wetlands areas was conducted in accordance with the Department of Water and Sanitation document, “*A practical field procedure for identification and delineation of wetlands and riparian areas*” (2005).

The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation;
 - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group 1991):
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

The potential wetlands identified during the desktop, as per NFEPA, Ezemvelo KZN Wildlife and SAIIAE wetlands dataset (*cf. Section 8-1 and Figure 8-1*) and through google earth image, were verified during site assessment. This included the collection of soil samples within the identified wetland areas and observations of the vegetation and hydrological characteristics of the wetland areas.

8.3 Identified Wetland Area

During the site visit, it was observed the wetlands areas, published on the NFEPA, Ezemvelo KZN Wildlife and SAIIE wetlands dataset, located on the right bank of the Msunduze River are utilised as the cemetery sites, as presented in **Photo 8-1**. These areas have been used as gravesites since the early 70' (based on the communication with the local community). For this reason, these areas could not be assessed for any wetlands like conditions (i.e. soil sampling). Therefore, these areas were excluded from this assessment.

The site visit confirmed the presence of the wetland area on the left bank of the Msunduze River, as published from the NFEPA, Ezemvelo KZN Wildlife and SAIIE wetlands dataset. The identified wetlands areas included the collection of soil samples (S1 and S2) as depicted in **Table 8-3** and presented **Figure 8-2**, together with observation of vegetation present. A total of one wetland system was identified and delineated as presented in **Figure 8-3**. Two Rivers (Msunduze and Mvubukazi) were also identified on the south and east of the proposed housing development boundary, as presented in **Photo 8-2** and **Figure 8-3**.



Photo 8-1: *Depiction of the Gravesites Areas Within the Wetlands Areas Identified from the NFEPA, Ezemvelo KZN Wildlife and SAIIE Wetlands Datasets*

Table 8-3: *Co-ordinates of the Soil Samples*

Samples	Longitude	Latitude
S1	30° 17' 50.538" E	29° 38' 41.210" S
S2	30° 17' 44.722" E	29° 38' 40.148" S

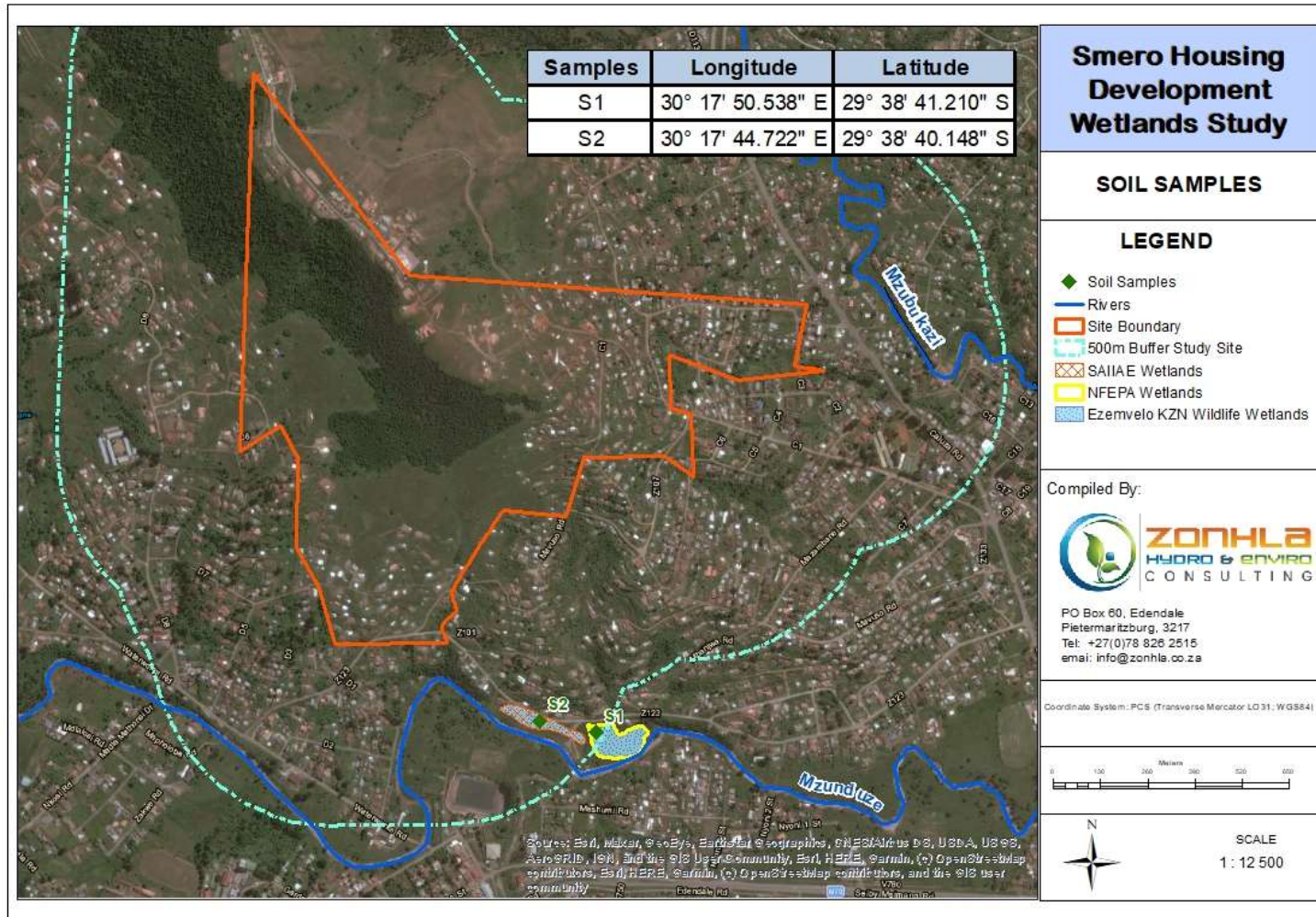


Figure 8-2: Soil Samples Taken on the Wetlands Areas Identified by the NFEPA, Ezemvelo KZN Wildlife and SAIIE Wetlands Dataset Within the 500m Buffer of the Study Site

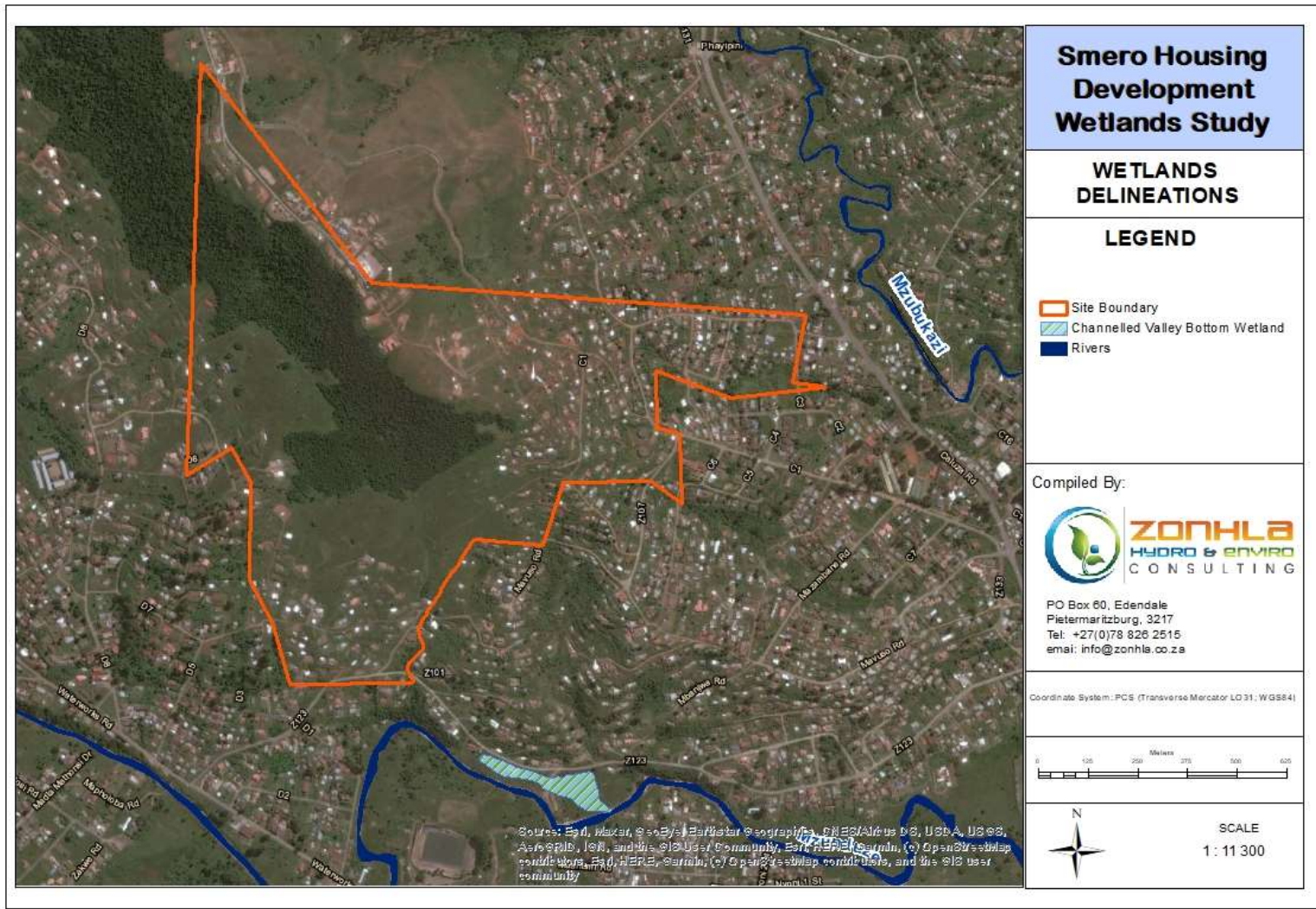


Figure 8-3: Delineated Wetland and Rivers Within the 500m Radius of the Proposed Housing Development Boundary



Photo 8-2: General View of the Rivers Located South and East Within the 500m Buffer of the Study Site Boundary

8.4 Wetlands Units Settings

The delineated wetland was classified as per SANBI guidelines (Ollis *et al.*, 2013).). A total of one (1) Hydrogeomorphic (HGM) unit was identified, as presented in **Figure 8-3** and the setting of this units is depicted in **Table 8-4**. As depicted in **Table 8-4**, the wetland form part of the *Sub-Escarpment Savana* vegetation (NFEPA WetVeg). The landscape setting of the identified wetland is described as valley floor. **Photos 8-3** provides a photographic records of the vegetation associated with the identified wetland area. The HGM 1 wetland was characterised by grasslands, *Phragmites Australis* and *Hardstem Bulrush* vegetation in saturated soils (*cf. Photo 8-3*).

Table 8-4: Delineated Wetland Classification

Unit	Level 1	Level 2	Level 3	Level 4
	System	NFEPA WET Veg Group	Landscape Unit	4A (HGM)
HGM 1	Inland	Sub-Escarpment Savanna	Valley Floor	Channel Valley Bottom



Photo 8-3: General View of the HGM 1 Vegetation

Soil samples taken from various locations with the identified wetland areas (cf. **Table 8-3** and **Figure 8-2**), were examined for the presence of hydric (wetland) characteristics. Hydric soils are defined as those that typically show characteristics (redoximorphic features) resulting from prolonged and repeated saturation. Redoximorphic features include the presence of mottling (i.e. bright insoluble iron compounds); a gleyed matrix; and/or Manganese (Mn)/Iron (Fe) concretions. The soil samples S1 and S2 indicated signs mottling and wetness, which indicates the presence of wetland like conditions as illustrated in **Photo 8- 4**.



Photo 8-4: Depiction of the Soil Samples S1 and S2 Taken at HGM 1 Unit

8.5 Description and Functionality of Wetland Types

8.5.1 Channelled Valley-Bottom

Channelled valley-bottom wetlands are characterised by their location on valley floors, the absence of characteristic floodplain features and the presence of a river channel flowing through the wetland (Ollis *et al.*, 2013). The dominant water inputs to these wetlands are from the river channel flowing through the wetland, either as surface flow resulting from flooding or as subsurface flow, and/or from adjacent valley-side slopes (as overland flow or interflow). Water generally moves through the wetland as diffuse surface flow, although occasional, short-lived concentrated flows are possible during flooding events (Ollis *et al.*, 2013).

Water generally exits a channelled valley-bottom wetland in the form of diffuse surface or subsurface flow into the adjacent river, with infiltration into the ground and evapotranspiration of water from these wetlands also being potentially significant (Ollis *et al.*, 2013). An illustration of the typical features associated with a floodplain wetland are presented in **Figure 8-4**.

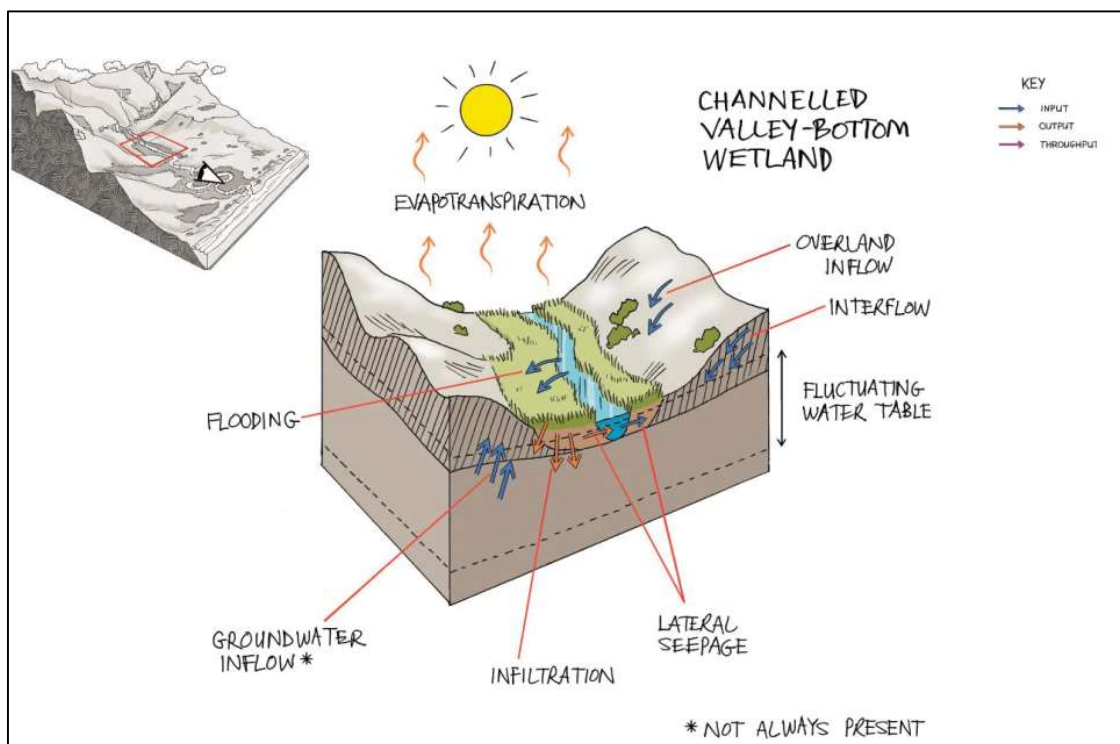


Figure 8-4: Conceptual Illustration of a Channelled Valley-Bottom Wetland (Ollis *et al.*, 2013)

8.6 Wetland Ecological Functionality Assessment

Wetland benefits can be classified into goods/products (directly harvested from wetlands), functions/ services (performed by wetlands), and ecosystem scale attributes. The tool scores the level of importance of a wetland in delivering each of 15 different ecosystem services. These have been associated with a rating class of 0 – 4 (very low to very high) to conceptualise the importance of each good or service. The results of the functional assessment are presented in **Table 8-5**. The spider diagrams in **Figure 8-5** provide a visual depiction of the ecosystem services provided by the HGM 1 unit as well as the level of provision as per the WET-EcoServices Model.

The environmental services provided by the HGM 1 is “**Intermediate**” (1.7) functional levels, as presented in **Table 8-5**.

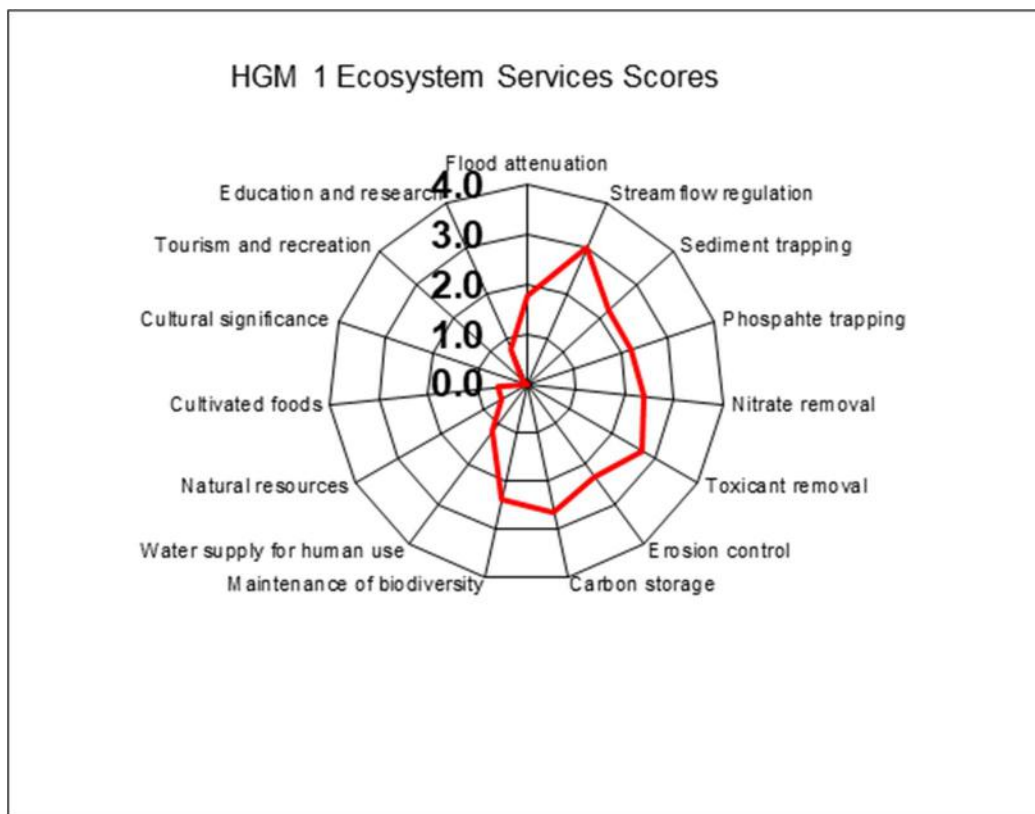


Figure 8-5: Spider Diagram Indicating the Ecosystem Services Provided by the HGM 1 Unit

Table 8-5: Ecosystem Services Provided by the HGM 1 Unit

Wetland Unit			HGM 1		
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation	1.8	
			Streamflow regulation	3.0	
			Water Quality enhancement benefits	Sediment trapping	2.2
				Phosphate assimilation	2.2
				Nitrate assimilation	2.4
				Toxicant assimilation	2.7
				Erosion control	2.3
	Carbon storage	2.7			
	Direct Benefits	Provisioning benefits	Biodiversity maintenance		2.4
			Provisioning of water for human use	1.2	
			Provisioning of harvestable resources	0.6	
			Provisioning of cultivated foods	0.6	
		Cultural benefits	Cultural heritage		0.0
			Tourism and recreation		0.1
			Education and research		0.8
Overall			25.0		
Average			1.7		

8.7 Wetland Present Ecological Sensitivity (PES) and Ecological Importance & Sensitivity (EIS) Assessment

The PES results of the assessment for each HGM units are presented in **Table 8-6** below. The PES score of the HGM 1 is **Category D** (Largely Modified).

Table 8-6: PES Assessment of HGM 1 Unit

Wetland	Hydrology		Geomorphology		Vegetation	
	Impact Score	Rating	Impact Score	Rating	Impact Score	Rating
HGM 1	6.0	E	2.8	C	6.4	E
	Overall PES Score		5.2	Overall PES Rating	D	

The dominant land use within the study area and surroundings is that of semi-rural housing and road infrastructures. These activities have resulted in indirect changes through impacting on the runoff characteristics of the landscape and the hydrology supporting the wetlands.

Reduced vegetation cover due to the above mentioned land uses, together with soil compaction and the additional hardstanding surfaces, has likely resulted in alterations to the natural flow regime.

Other impacts include:

- Disposal of general waste into the wetlands;
- Deposition of toxins to the system through incorrect effluent disposal;
- Dirty stormwater runoff entering the wetlands; and
- Infilling and alteration of the wetlands.

8.8 The Wetland Ecological Importance & Sensitivity (EIS) Assessment

The EIS score associated with the wetland is presented in **Table 8-7**. The wetland was assessed as being of '**High (B class)**' EIS (**Table 8-7**). The biodiversity of this system is sensitive to changes in flows, water quality and habitat modifications. They play a significant role in moderating the quantity and quality of water of major river.

Table 8-7: The EIS Assessment for the HGM 1 Unit

		EIS
HGM 1	Overall Impact Score	2.4
	Category	High

8.9 Recommended Ecological Category

Recommended Ecological Category (REC) is a recommendation from an ecological viewpoint which is considered within the decision-making process in the National Water Resource Classification System (NWRCS). This recommendation is based on either maintenance of the PES or an improvement there-of. The REC was determined based on ecological criteria only and considered the EIS, the restoration potential and attainability there-of (i.e. based on the median PES and highest EI or ES means).

According to DWAF (2007), the PES and EIS of water resources must drive management objectives when there is no water resource classification available. Therefore, for water resources that do not have a REC determined the below table may be utilised (**Table 8-8**). Therefore, the management objective for the assessed wetland is to 'Improve' the current state.

Table 8-8: Recommended Ecological Category of the HGM Units

PES	Ecological Importance and Sensitivity (EIS)			
	Very High	High	Moderate	Low
A	Maintain	Maintain	Maintain	Maintain
B	Improve	Improve	Maintain	Maintain
C	Improve	Improve	Maintain	Maintain
D	Improve	Improve	Maintain	Maintain
E/F	Improve	Improve	Maintain	Maintain

8.10 Buffer Determination

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane et al., 2014) was used to determine the appropriate buffer zones of the delineated wetlands. The buffer tool aims to provide a method for determining appropriate buffer-widths for developments associated with wetlands, rivers or estuaries. This method takes into account a number of different factors in determining the buffer width including the impact of the proposed housing activities on the water resource, climatic factors and the sensitivity of the water resource.

The model is based on desktop inputs and risks, which then becomes more refined based on site conditions. The model shows that the largest risk posed by the project during the construction and operation phase is that of Moderate - to Low.

It is recommended that a conservative buffer of 10m should be implemented for the project in order to protect the ecosystem services provided by the HGM 1 unit, Msunduze River and Mvubukazi River, as presented in **Figure 8-6**. The proposed mitigative measures should be implemented in order to minimise the environmental impact of the project on the identified wetland and rivers.

In addition, for the purpose of the study (i.e. environmental authorisation and WULA), the housing development site boundary was assessed on its proximity to the 32m and 500m buffers of the delineated wetlands and 100m buffer of the delineated river . The definition and motivation for the regulated zones of activities as well as buffer zones for the protection of the wetlands and rivers are summarised in **Table 8-9**.

The delineated wetlands with the applicable regulatory buffer zones in terms of GN327 Listing Notice 1 under the NEMA No. 107 of 1998, EIA Regulations 2014, as emended on 7th April 2017, are depicted in **Figures 8.7**. As presented in **Figure 8.7**, the housing development boundary is located outside of the regulated 32m buffer of the HGM 1, Msunduzi River and Mvubukazi River.

The delineated wetland and rivers with the applicable regulatory buffer zones in terms of the GN509 of 2016 under the NWA No. 36 of 1998, are depicted in **Figures 8-8**. The results show that the housing development boundary is located outside of the 100m buffers of the rives but within the 500m buffer of the HGM 1 Unit, as presented in **Figures 8-8**.

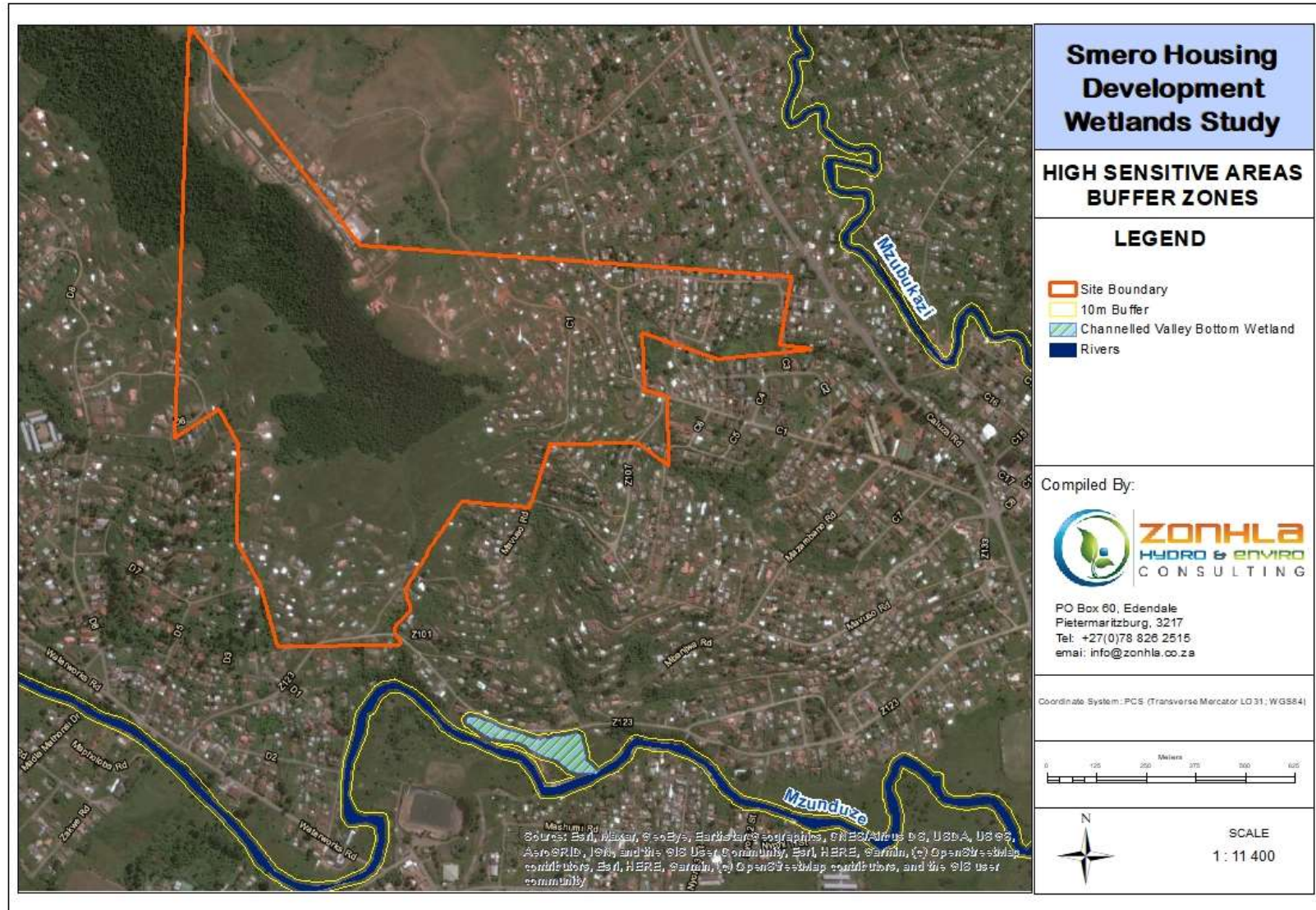


Figure 8-6: Scientific Conservative Buffer Zones

Table 8-9: Articles of Legislation and Buffer Zones of Regulations Applicable to each Article

Regulatory Authorisation	Buffer Zone of Applicability
<p>Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 (as amended).</p> <p>The Department of Economic Development, Tourism and Environmental Affairs</p>	<p>Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment (EIA) regulations, 2014 (as amended) states that:</p> <p><i>The development within f:</i></p> <ul style="list-style-type: none"> ○ within 32 meters of a watercourse, measured from the edge of a watercourse.
<p>Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).</p> <p>Department of Human Settlement, Water and Sanitation</p>	<p>In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), a regulated area of a watercourse for Section 21 (c) and 21 (i) of the National Water Act, 1998 (Act No, 36 of 1998) is defined as:</p> <ul style="list-style-type: none"> • the outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; • in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse(river) where the edge of the watercourse is the first identifiable annual bank fill flood bench; or • a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

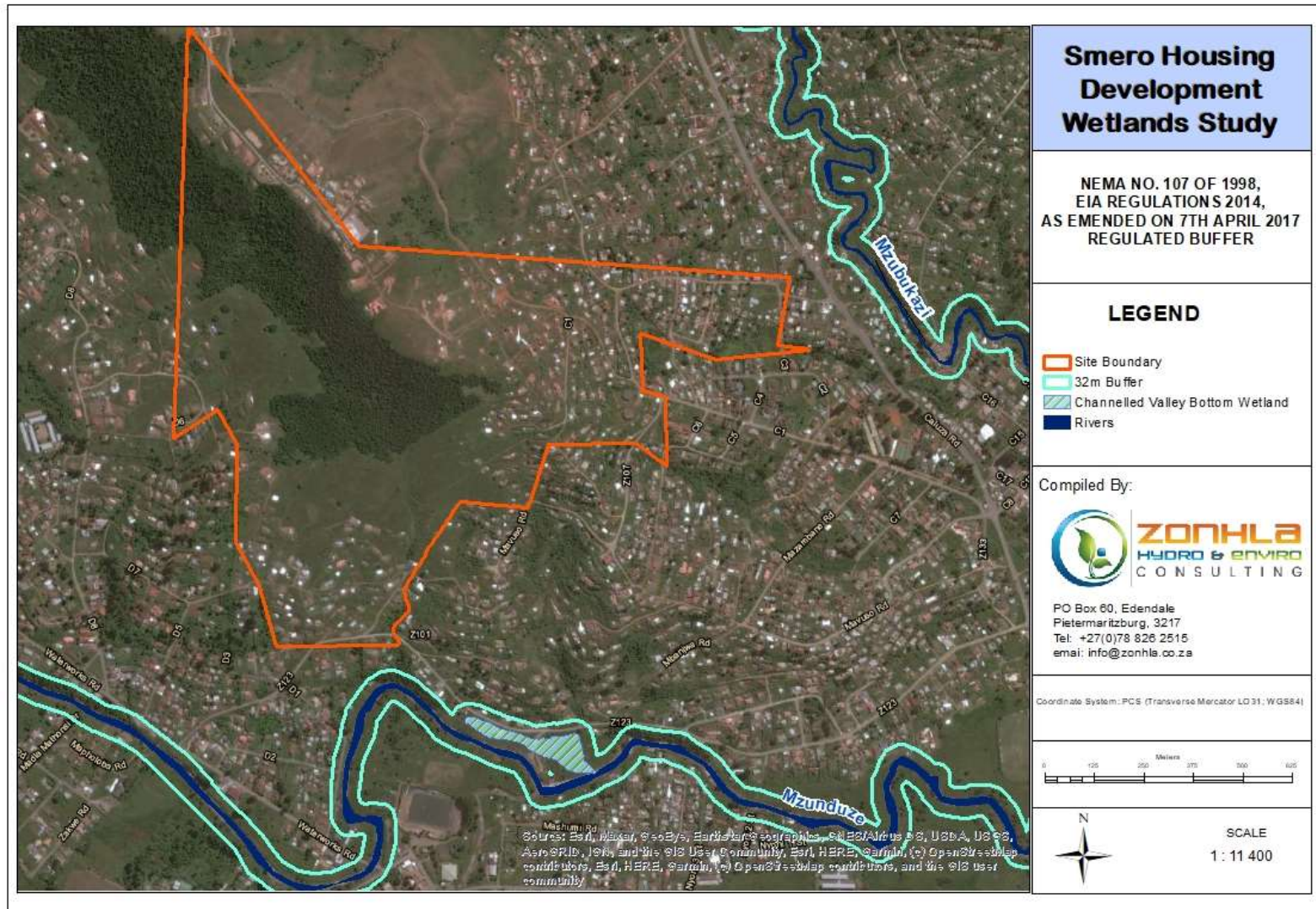


Figure 8-7: NEMA No. 109 of 1998, EIA Regulation of 2014, as Amended on 7 April 2017, 32 Buffer Zones

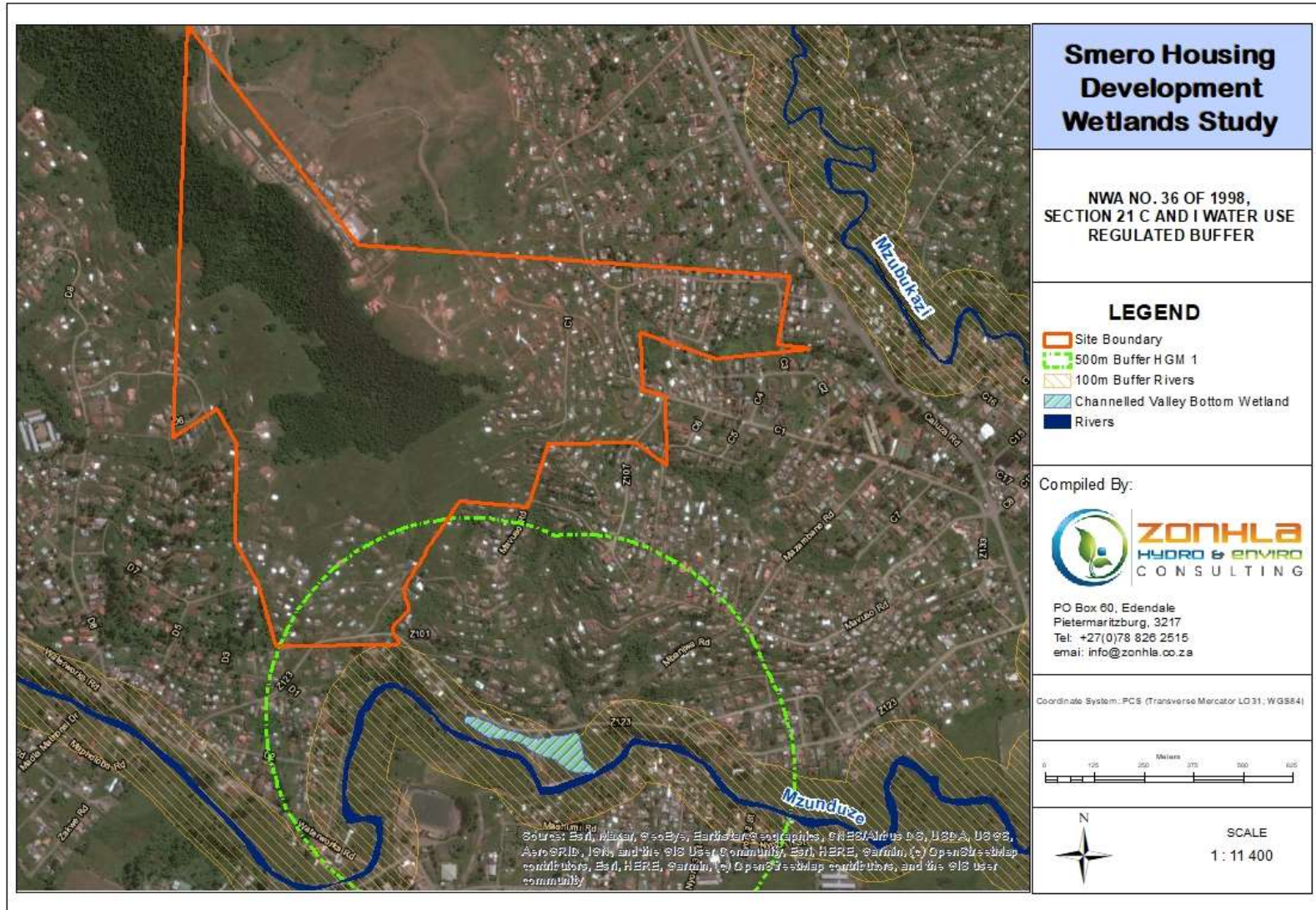


Figure 8-8: NWA No. 36 of 1998, Section 21 C and I Water Use , 100m and 500m Buffer Zones

9 IMPACT AND RISK ASSESSMENT

The risk assessment was conducted in accordance with the DWS risk-based water use authorisation approach and delegation guidelines, as released under a General Notice No. 509 of 26 September 2016, that implemented a risk matrix assessment in terms of Section 21(c) and (i) of the NWA. The significance of the impact is calculated according to **Table 6-8** (cf. **Section 6-3**).

9.1 Impact Assessment

9.1.1 Impacts on Wetland Systems

The impacts associated with the project are outlined below:

- Potential loss of wetland habitat:
 - Increased sediment deposits.
- Deterioration in water quality as a result of:
 - Hydrocarbons from machinery and equipment;
 - Domestic waste and ablution facilities;
 - Hazardous substances entering the wetland systems during construction phase and the operational phase;
 - Increased sediment entering the wetland systems as a result of construction activities.
 - General construction waste; and
 - Resulting from an increase of hardened surfaces within the contributing catchment.
- Alterations to the flow regimes:
 - Resulting from an increase of hardened surfaces within the contributing catchment.

9.2 Risk Assessment

This Risk Assessment was conducted in consideration of the identified watercourses (HGM1, Msunduze River and Mvubukazi River) within the 500m radius of the project boundary, in accordance to the 2016 Risk Assessment Matrix as proposed by the DWS. The impacts are summarised in **Section 9.1** above and **Table 9-1** and **9-2**, respectively, with impact ratings (risk) given for both (i) the unmitigated scenario (i.e. no mitigation undertaken) and (ii) in the

case where relevant mitigation has been applied to reduce impact significance. The overall risk assessment table is presented in **Appendix A**.

The impacts associated with the housing development were considered generic across the entire project site owing to the similarities in construction methods, as such a single assessment was undertaken. Decommissioning of the infrastructure is not anticipated, therefore the risk assessment did not factor decommissioning activities.

9.3 Recommended Mitigative Measures

The following mitigative measures are recommended in order to minimise any potential impact from the project on the wetlands:

- Best practice standards must be followed for the construction of the proposed low cost housing;
- Construction method statements are to be adhered to. These method statements should consider the environmental facets associated with the wetland and rivers such as hydrological flow regimes, flora and fauna. These should be approved by the relevant departments (i.e. EDTEA and DWS);
- Existing access routes must be utilised and heavy machinery should not be allowed to enter the delineated wetland areas;
- The identified wetland areas must be demarcated as a no-go area during construction.
- A site layout plan must be compiled indicating the limits of disturbance associated with the proposed development in relation to the identified sensitive areas (i.e. wetland). No-go areas and any stormwater infrastructure must be indicated on this plan;
- During construction, sediment control measures must be adopted in order to prevent sediments entering the wetland and rivers;
- Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur within the plant site (i.e. outside of the wetland and rivers buffer zones);

Table 9-1: Risk Assessment Matrix (DWS, 2016): Consequence for the Housing Infrastructure

Unit	Phases	Activity	Aspect	Impact	Severity				Severity	Spatial scale	Duration	Consequence
					Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph + Vegetation)	Biota				
HGM 1, Msunduze River and Mvubukazi River	Construction	Construction of the Housing Infrastructure	Biodiversity Losses	Alteration of the wetland functionality due to the increased sediments deposits	0	1	1	0.5	0.625	1	2	3.625
			Water Quality	Potential for increased sediments to enter the system through surface water dispersion. Potential for construction waste and hydrocarbons to enter the system	0	2	0.5	1	0.875	1	2	3.875
			Alteration of flow regimes	Increased harden surfaces from the contributing catchment	2	0	1	0.5	0.875	1	2	3.875
HGM 1, Msunduze River	Operation	Repairs and Maintenance	Water Quality	Potential for effluent generated to enter the system; Potential for domestic waste and hazardous substances to enter the wetland system	0.5	3	0	1	1.125	1	4	6.125

Table 9-2: Risk Assessment Matrix (DWS, 2016): Significance and Risk Rating for the Housing Infrastructure

Unit	Phases	Activity	Aspect	Impact	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating before Mitigation	Mitigations	Risk Rating After Mitigation
HGM 1, Msunduze River and Mvubukazi River	Construction	Construction of the Housing Infrastructure	Biodiversity Losses	Alteration of the wetland functionality due to the increased sediments deposits	3.625	2	1	5	3	11	39.875	L	Refer to Section 9.3	L
			Water Quality	Potential for increased sediments to enter the system through surface water dispersion. Potential for construction waste and hydrocarbons to enter the system	3.875	2	1	5	4	12	46.5	L	Refer to Section 9.3	L
			Alteration of flow regimes	Increased harden surfaces from the contributing catchment	3.875	2	2	0	2	6	23.25	L	Refer to Section 9.3	L
HGM 1, Msunduze River	Operation	Repairs and Maintenance	Water Quality	Potential for effluent generated to enter the system; Potential for domestic waste and hazardous substances to enter the wetland system	6.125	1	1	0	4	6	36.75	L	Refer to Section 9.3	L

-
- Machinery used during the construction must be parked on the designated bunded areas and dip trays must be placed under the machinery when not used to capture any possible oil leaks;
 - Should there be plans to store petrol, oil and diesel on site (construction site boundary), all petrochemical storage tanks must be enclosed in a bunded area that makes provision for 110% of the total volume of tanks that they contain. All these bunded areas must be supplied with a closable valve through which any spillage can be safely removed;
 - A Spill Response Plan must be available for any spills that occur during construction phase;
 - It is recommended that education of workers is key to establishing good pollution prevention practices. Training programs must provide information on material handling and spill prevention and response to better prepare employees in case of an emergency.
 - Stormwater management measures should be implemented in order to minimise the impacts of the disturbed areas. The stormwater management plan should include measures to minimise the transport of sediment from the site; and
 - The activities should be licenced so as to avoid any legal issues (i.e. any activity triggering the NEMA No. 107 of 1998 EIA Regulation of 2014, as amended on 07 April 2017 amended, and Section 21 of the NWA No 36 of 1998, WULA). Where activities have already commenced, the required legislation procedure should be followed (i.e. Section 24G rectification application under NEMA) in order to ensure compliance. An Environmental expert should be consulted to advise if any of the activities (existing or proposed) may need authorisation from EDTEA or DWS).

10 MONITORING PROGRAMME

The objective of monitoring during the construction and operational phases is to ensure that the agreed rehabilitation processes are successful and that the rehabilitation objectives prescribed are met. There is a need to carefully monitor the progress of the physical aspects of rehabilitation during the construction and operational phases, and the progress of re-establishment of the desired final land use.

Maintenance of rehabilitated sites is often the difference between the success or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements have been achieved. Post construction monitoring will be required to ensure rehabilitation, if required, has been successfully achieved and there are no residual impacts.

10.1 Monitoring Responsibility

The responsibility relating to the rehabilitation plan lies with the Contractor and the appointed Environmental Compliance Officer (ECO). If any monitoring event, at any time of the project period, does find a fault or problem, then the issue must be investigated further and be reported on. Remedial action as is appropriate must be undertaken within a time frame specified by the ECO.

10.2 Monitoring Timeframe

The timeframe for monitoring should correlate with the entire duration of the project including the rehabilitation phase.

11 CONCLUSION AND RECOMMENDATIONS

The aim of this study was to conduct the Wetland Identification and Assessment Specialist assessment for the activities associated with the proposed Smero Housing Development Scheme within the Msunduzi Local Municipality, KwaZulu-Natal. The wetlands specialist study was to support environmental approvals in terms of the requirements of the environmental authorisation as per the NEMA No. 107 of 1998, EIA Regulations of 2014, as amended on 7 April 2017, as well as to support the Water Use Licence Application (WULA) processes as per Section 21 of the NWA No. 36 of 1998.

The initial wetland identification process was conducted at a desktop level during which the available SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands dataset were interrogated to determine the presence of any wetland areas that has been determined in the past, within the 500m radius of the project boundary. The SAIIAE, NFEPA and Ezemvelo KZN Wildlife wetlands database showed a presence of three wetlands area within a 500m radius of the proposed project boundary.

During the site visit, two wetlands areas identified at the desktop level were observed to be utilised as cemetery sites, therefore, these were not assessed and were excluded from this study. The site visit yielded one wetland and two rivers. The identified wetland as classified as per SANBI guidelines (Ollis et al., 2013) as the Channelled Valley Bottom wetland (HGM 1). The wetland was assessed to have a PES range between **Category D** (Largely Modified),

owing to the transformed nature of the surrounding land use and its influence on the wetland systems. The EIS of the wetland was assessed as being of **'High (B class)'**.

The wetland habitat risk assessment determined that the project may have the potential to impact the identified wetland and rivers. The impacts to the identified wetland and rivers would be from incorrect construction methods and operational activities of the proposed construction activities. The impacts on the wetland and rivers were assessed to be low significant. Prior to undertaking the proposed activities, construction method statements and emergency response plans must be developed, with specific consideration given to the environment, including wetland and river habitats. It is envisaged that the implementation of these would provide sufficient mitigation measures in order to reduce the environmental impact.

The proposed housing development site boundary is outside of the regulated 32 m buffer of the delineated wetland (HGM 1, Msunduze River and Mvubuzi River. Therefore, the proposed housing development being outside of the 32m buffer of the delineated wetland and river, may not trigger the NEMA No. 107 of 1998, EIA Regulations 2014, Government Notice 327 (GNR.327) Listing Notice 1, Activity 12., requiring exemption from environmental authorisation.

Owing to the section of the proposed housing development site boundary being within the regulated 500m radius of the delineated wetland and outside 100m buffer on the Msunduze and Mvubukazi River, it is therefore the specialist understanding that the proposed activities may trigger the Section 21 (c) and (i) of the NWA No. 36 of 1998, namely:

- Section 21 (c)- Impeding or diverting the flow of water in a watercourse; and
- Section 21 (i) - Altering the bed, banks, course or characteristics of a watercourse

11.1 Environmental Statement and Opinion of the Specialist

The impacts of the housing development on the HGM 1 wetland, Msunduze River and Mvubukazi Rive are Low risk. It is the opinion of the specialists that the project poses minimum flaws to the wetland and rivers. Therefore, the project should be authorised to allow for the construction of the Smero Housing Development. Base d on the low risk significant, it is the specialist opinion then that the project meets the requirements of the “General Authorisation (GA) in terms of Section 39 of the NWA No. 36 of 1998, Water Uses as defined in Section 21(c) and (i)”, Notice 509 of 2016. Therefore, a GA in terms of GN 509 should be applied for with the DHSWS for the proposed project.

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13 APPENDIX A: DWS 2016 RISK MATRIX ASSESSMENT RESULTS


RISK MATRIX (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

NAME and REGISTRATION No of SACNASP Professional member: Mr Nhlakanipho Zondi Reg no. 118706

Risk to be scored for construction and operational phases of the project. MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

Unit	Phases	Activity	Aspect	Impact	Severity				Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating before Mitigation	Mitigations	Risk Rating After Mitigation
					Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph + Vegetation)	Biota													
HGM 1, Maundize River and Mvubukazi River	Construction	Construction of the Housing Infrastructure	Biodiversity Losses	Alteration of the wetland functionality due to the increased sediments deposits	0	1	1	0.5	0.625	1	2	3.625	2	1	5	3	11	39.875	L	Refer to Section 9.3	L
			Water Quality	Potential for increased sediments to enter the system through surface water dispersion. Potential for construction waste and hydrocarbons to enter the system	0	2	0.5	1	0.875	1	2	3.875	2	1	5	4	12	46.5	L	Refer to Section 9.3	L
			Alteration of flow regimes	Increased harden surfaces within the contributing catchment	2	0	1	0.5	0.875	1	2	3.875	2	2	0	2	6	23.25	L	Refer to Section 9.3	L
HGM 1, Maundize River and Mvubukazi River	Operation	Repairs and Maintenance	Water Quality	Potential for effluent generated to enter the system; Potential for domestic waste and hazardous substances to enter the wetland system	0.5	3	0	1	1.125	1	4	6.125	1	1	0	4	6	36.75	L	Refer to Section 9.3	L

Signature of Assessor:



Our reference: 10348

25 March 2023

LETTER OF UNDERTAKING

Environmental Assessment Practitioner (EAP)
Sinohydro Consultant PTY Ltd

SMERO/CALUZA HOUSING DEVELOPMENT: TRAFFIC ENGINEERING SERVICES

Dear Sir/Madam,

This is to confirm that Emaan Traffic Engineers (Pty) Ltd has been appointed to conduct the Traffic Impact Assessment for the above mentioned housing development.

We confirm that we will undertake the work to conduct the Traffic Impact Assessment. We also confirm that we have the necessary professional registration with the Engineering Council of South Africa and experience to conduct this work.

The Traffic Impact Assessment will be conducted as soon as the town planning and engineering layouts are at a more advanced stage of finalisation.

Yours faithfully,



Faisal Barakzai (PrEng)
Director
Emaan Traffic Engineers (Pty) Ltd

ENGINEERING PRELIMINARY FEASIBILITY REPORT

FOR PROPOSED

SMERO/CALUZA HUMAN SETTLEMENT PROJECT

JUNE 2018

Rev 1

Prepared for:



**Verern Builders
& Developers**

19 Madeleine Road
Ballito
4399

Prepared by:



**PANGAEA
CONSULTING**

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Our ref:6/189/2
Enquiries: Sanjay Sathnarayan
Contact: 083 792 8333 – 031 267 2185



08 June 2018

The Director
Verern Builders & Developers
19 Madeleine Road,
Ballito,
4399

civil engineering
project management
property development
building economists

Att: Ms N Nanthala

**ENGINEERING PRE-FEASIBILITY REPORT FOR PROPOSED SMERO/CALUZA
HUMAN SETTLEMENT PROJECT**

Reference is made to our appointment and scope of works to undertake the engineering services discipline for the implementation of the Smero/Caluza Human Settlement Project in Edendale, Pietermaritzburg.

Attached is our report, which includes the following disciplines of our engineering assessment:

Roads
Stormwater
Sanitation
Water
Electricity
Solid Waste Management
Floodlines

Should you have any queried please do not hesitate to contact the writer.

Yours faithfully

A handwritten signature in black ink, appearing to read "Sanjay Sathnarayan", is written over a horizontal line.

Sanjay Sathnarayan
Pr 200070067 Tech Eng. Civil Eng. Pr CPM



LEVEL 1 B-BBEE ENTERPRISE

taking ordinary to extraordinary

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SMERO/CALUZA HUMAN SETTLEMENT PROJECT

PRE-FEASIBILITY REPORT FOR THE PROVISION OF ENGINEERING SERVICES TO APPROXIMATELY 2 000 RESIDENTIAL DEWLLING UNITS

1. INTRODUCTION

This report entails the preliminary feasibility study of the project from an engineering perspective. The study will focus on provision of new roads, storm water drainage, sanitation, potable water and electricity provision for 2 000 residential stands.

Verern Builders & Developers have been awarded the contract by Msunduzi Municipality to undertake this project via specialized contract no 11 of 15/16. Verern Builders & Developers appointed **Pangaea Consulting** to undertake the engineering scope of works of this project.

2. GENERAL

2.1 LOCATION

The site is located 21km south west of the Pietermaritzburg city center and is accessed via two different points as the site is split by an in accessible cliff edge.

Access to the upper portion of the site is via Moses Mabhida Road, right onto Caluza Road, left onto Sweetwaters main road, then left on an unnamed road leading to the project site at GPS co-ordinates 29°38'0.42"S, 30°17'30.80"E.

Access to the lower portion of the project site is gained from Moses Mabhida Road, onto Selby Msimang Rd, right onto Caluza Road, left onto Mbanjwa Rd to GPS co-ordinate point 29°38'32.55"S, 30°17'30.69"E closest to the site boundary.

2.2 Geotechnical Aspects

A desktop geotechnical investigation report was prepared by Geosure (Pty) LTD reference, 161-18.R01, dated 11 June 2018.

3. CIVIL ENGINEERING SERVICES – ROADS DESIGN PARAMETERS

The design of the bulk and internal services will be undertaken to the minimum standards of municipality, where applicable forms the basis of the design standards and procedures that would be applicable at the final design stage for the provision of services for Smero/Caluza Human Settlement Project. The recommended parameters contained in the following guidelines will be applied and adhered to as far as the layout, topography, soil conditions, etc, permit.

- 🌀 Guidelines for Human Settlement Planning and Design issues by the CSIR,
- 🌀 SANS 1200 series
- 🌀 UTG 17 Design of Urban Local Residential Streets

3.1 Roads

The roads design will be based on the guidelines of the above industry best practice guidelines and to municipal standards were available.

The road network shall comprise of the following hierarchy:

Taxi & Collector Streets
 Residential Streets
 Cul de sac
 Access Ways

3.1.1 Road Pavement Design Parameters

The following road pavement design parameters will be proposed at final design stage. These are based on typical traffic loading conditions found in townships based on TRH4 -1984&1996

Route Description	Road Category	Design Loading	Traffic	Pavement Materials Depth (mm)
Local residential roads & cul de sacs	C / D	0.1 x 10 ⁶ E80's		700
Taxi Routes (no busses)	C	0.3 – 1.0 x 10 ⁶ E80's		800
Bus Routes	B	3.0 x 10 ⁶ E80's		900

The geotechnical investigation of the road centerline profiles together with DCP's test results and the appropriate road loading applied will determine the eventual road pavement thickness and any subgrade treatment if required.

3.1.2 Road Geometric Design

The geometric design shall follow the standards of the guidelines articulated above and municipal minimum standards were appropriate.

3.2 Footpaths

Where vehicular access is not possible due to the topography constraints, footpaths will be proposed to afford residents access to their erven.

4. CIVIL ENGINEERING SERVICES – STORMWATER

The site is on steep terrain and drains into natural valley lines. The ultimate design will make use of these natural watercourses with the appropriate attenuation along the route before storm water enters the river water courses.

4.1 Internal Stormwater

The internal storm water management system shall be based on the following principles:

Stormwater will be directed along the road surfaces to either discharge through energy dissipaters directly into the valley lines or collected by side inlets at strategic and critical points and directed into sub surface spigot pipe system, min. 375mm diameter. These pipe systems will then discharge through headwall outlets with the appropriate erosion protection systems into the natural watercourses.

Surface runoff from the roads will be contained by the road crossfall and the kerbs. Road crossfalls where possible will fall towards the cut side of the roads in order to accommodate discharging of underground pipes onto the road surface through the kerb. Where this is not possible then kerbs shall be accommodated on both sides of the roads.

Stormwater drainage from proposed sites will be discharged on to the road kerb via a piped system from the house roofs and the excess water from the paved and unpaved areas of the property. Where the property is below the road then midblock drains with S&D servitudes shall drain this properties to the road system.

4.2 Attenuation

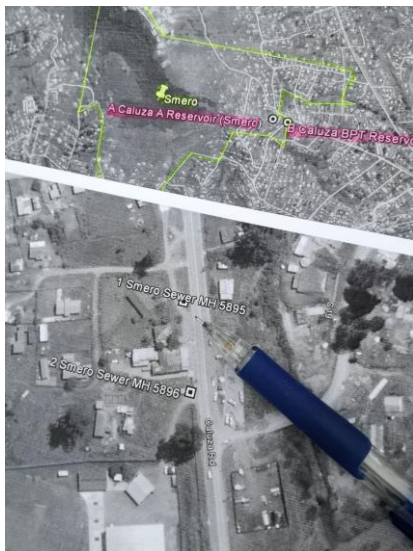
Appropriately situated attenuation facilities will be positioned to delay the additional runoff generated between the post and pre development values from the project area. Due to the nature of the development and the site sizes to maximize densities, thereby reducing costs and containing the development cost within the available subsidy, on site attenuation might not be possible, and larger attenuation dams will need to be investigated to appropriately address this item.

5. CIVIL ENGINEERING SERVICES – SANITATION

Preliminary discussion has been held with the Municipal Water and Sanitation Managers in this regard. The sewer will be treated at the Darville Treatments and we understand there is capacity at the treatment work to accommodate this project as its being accommodated in the overall master planning being undertaken by the municipality.

The bulk outfall routes to serve this entire project is approximately 4.8km of new mains. The connections are at two points, one in Caluza Road structure code 39140 and the other at Georgetown 8 Street structure code 38897. We have confirmed that these facilities are in existence and are functional.

The provision of water borne sanitation is the preferred option and it will allow other areas not previously connected to the system to now be accommodated as the mains now become accessible. Although the outfall might be lengthy it will service other areas not on water borne sanitation.



5.1 Internal Sewers

The internal sewer reticulation shall be designed to industry best practice guidelines. All reticulation shall be through underground piped systems connected to concrete manholes. All lines shall be installed in servitudes and shall gravitate to the outfall lines.

The internal reticulation shall comprise of:

160 dia min. uPVC collection pipes from all units

House connection points at each site

1 000mm concrete manholes at all changes in grade and direction not more than 100m apart.

Should the cost to reticulate this site proves to be prohibitive, then on site sanitation solutions will be investigated at the feasibility stage of the project.

The estimated discharge is 3.709ml/d.

Confirmation of availability of bulk services is attached.

6. CIVIL ENGINEERING SERVICES – WATER SUPPLY

An existing network of reticulation exists on site that is feeding the existing houses. Houses are metered and the mains are marked on site.



In preliminary discussion with the Municipal Water and Sanitation Department Managers an indication was given that potable water supply is available for the project. Extension of the bulk reticulation will be necessary to bring the supply closer to the project extents.



6.1 Internal Water Supply

The internal water supply will be fed of the existing bulk supply lines via the appropriate sized mPVC and HDPE pipe network. Application will be made to the municipality for a metered connection for every site and the housing contractor will undertake the house connection after the meter. All water mains will be laid in the road and footpath servitudes.

The design will be submitted to the Municipality for perusal and approval to the relevant official for approval, before works commences on site.

The estimated demand is 2.77ml/d.

Confirmation of availability of bulk services is attached.

7. ELECTRICAL SUPPLY

Electrical supply is designed and installed by the Eskom for the bulk and street reticulation. Confirmation of availability of bulk services is attached.

8. SOILD WASTE MANAGEMENT

Waste Management Services department is responsible for removal of domestic refuse from the development as per normal practice across the City. In this regard timeous notification to the line department will be required for them to budget for the development to be included in their route.

No burning or burying of solid waste will be allowed to take place on the site in accordance with Municipal by-laws.

9. FLOODLINES

The development is proposed on the ridgelines of the site. All valley lines will be identified by their relevant fold lines and the necessary buffer will be overlaid. These areas will be further highlighted in the environmental planning report that talks to the Environmental Impact Study to be undertaken. Where valley bottom need to be interfered with an environmental authorization will be sought in this regard.

No housing will be planned within the floodlines of natural valleys lines.

Msunduzi Municipality

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Enq: G. S. Majodwana

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15 June 2018

Pangaea Consulting
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Attention: Mr. S. Sathnarayan

Dear Sir,

SMERO/CALUZA HOUSING PROJECT
AVAILABILITY OF BULK POTABLE WATER AND SEWERAGE SERVICES

Your letter dated 04 May 2018 and email dated 11 June 2018 has reference.

The Department has no objection to the above mentioned development subject to bulk water and sanitation infrastructure that is required for this project being timeously funded. We understand that the service will be required in 3 years' time hence the budget must be timeously included in the Municipality's business plan & project pipeline for funding from the Municipal Infrastructure Grant. This Department together with the Human Settlements Unit shall undertake this process.

The tie-in points on your plan no. 6/189/102 obtained from our GIS Department shall be treated as approximate and must be confirmed on site, in terms of position and size.

Please contact this Department should further information be required.

Yours faithfully

sm a p l
for **SENIOR MANAGER [WATER & SANITATION]**

INFRASTRUCTURE SERVICES

Telephone/uCingo: 033 392 2132
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Enq: T.T.Makhanya

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22 August 2019

Pangaea Consulting
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Attention: Mr. S. Sathnarayan

Dear Sir,

SMERO/CALUZA HOUSING PROJECT
AVAILABILITY OF BULK SEWERAGE SERVICES TO SERVE THE PROPOSED HOSUNG DEVELOPMENT

Your letter dated 04 May 2018 and our meeting of 28 June 2019 has reference.

Sewerage

The proposed Smero/Caluza Housing Development to accommodate 2000 households (1400 BNG & 600 Gap Market Housing). The existing sewer reticulation gravitates towards two outfall lines, one in Caluza Road and the other towards Waterworks Road, Wadley Stadium.

The Department is currently busy with the design for the extension of the bulks in the vicinity of Wadley Stadium. This upgrade will be available for the project to discharge into, at your planned implementation roll out envisaged to be in 3yrs time. The outfall leading to Caluza Road will need to be extended to reach the project as this is not a planned project for the City.

We confirm that MIG Funding will be applied timeously for the extension of this bulk main with an approximate length of 5.1km (extension of a portion of the line from Wadley Stadium and Caluza Roads to reach the project) at an estimated cost (based on provisional planning) of R 17 million.

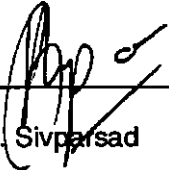
The Msunduzi Municipality, Water and Sanitation Department therefore has no objection to the development with the Housing Department and confirms that the MIG funding application will be undertaken timeously to match the project rollout programme such that implementation date will be met.

Water

It is envisaged that the project would require a 10MI reservoir and such can be confirmed by the consultant during the detail planning stage. The additional bulks pipelines and the reservoir is estimated to be R 60 million and an application for funding from MIG will be submitted in accordance to the deliverables of the programme.

The Msunduzi Municipality, Water and Sanitation Department therefore has no objection to the development and confirms that an application will be made jointly by Human Settlements and the Water and Sanitation Department to the appropriate grant fund for this infrastructure.

Please contact this Department should further information be required in this regard.



Mr B. Sivpalsad

Senior Manager: Water & Sanitation

Our ref:6/189/2
Your ref:

Enquiries: S Sathnarayan
Contact: 031 267 2185
Cell: 083 792 8333
Email: sanjay@pangaeahe.co.za

08 June 2018

ESKOM
Distribution Unit

Att: Ms Hlongwa

Dear Madam,

CALUZA/SMERO HOUSING DEVELOPMENTS
CONFIRMATION OF BULK SERVICES TO SERVE THE PROPOSED PROJECTS

The Msunduzi Municipality has appointed Verern Builders as implementing agents for the delivery of approximately 2000 units in Caluza/Smero comprising 1400 BNG and 600 GAP housing opportunities in Edendale.

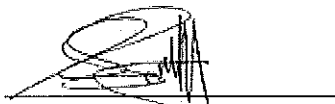
Pangaea Consulting are engaged by Verern Builders to undertake the civil engineering component of this project.

Please could you confirm that the bulk services of electricity are available in the vicinity of the project as indicated on our general layout plan 6/189/100, or bulk services can be provided in the future when the project reaches implementation stage.

Your assistance in this regard is most appreciated.

Should you have any queries, please do not hesitate to contact our office.

Yours faithfully



S Sathnarayan (Pr Tech Civil Eng.)
for Pangaea Consulting
encl

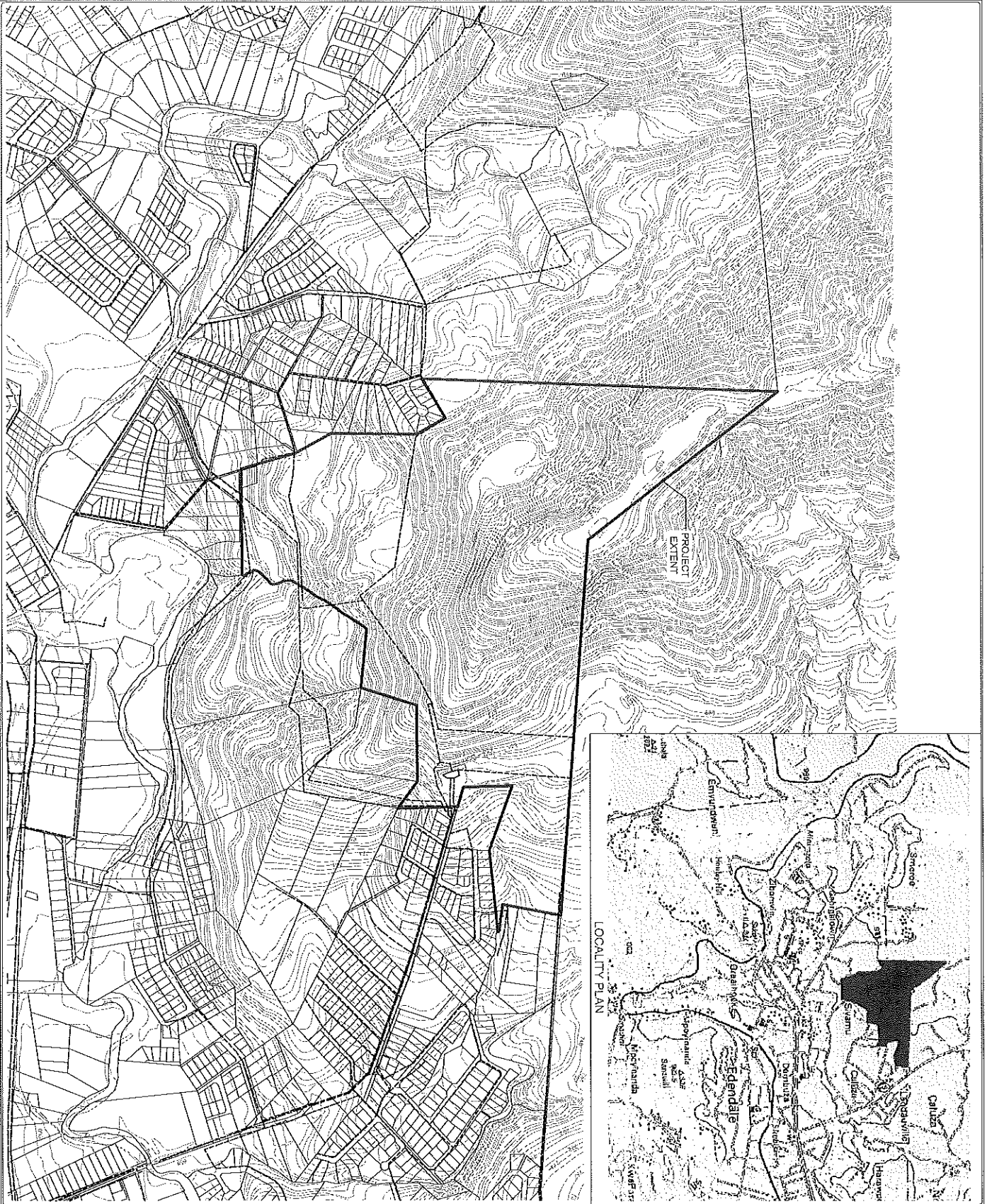


civil engineering
project management
property development
building economists



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LEVEL 1 B-BBEE ENTERPRISE
taking ordinary to extraordinary



LEGEND

▬ EXISTING WATER REGULATION

▬ EXISTING SEWER REGULATION

Revision	Issued	Date	Description	Drawn by

NOTE:

1. The proposed works shown in this plan are subject to the approval of the relevant authorities and the landowner. It is the responsibility of the client to ensure that the necessary permissions are obtained for the proposed works. The client shall be responsible for ensuring that the proposed works are carried out in accordance with the relevant regulations and standards. The client shall also be responsible for ensuring that the proposed works do not cause any damage to the environment or the surrounding infrastructure. The client shall also be responsible for ensuring that the proposed works are carried out in a safe and sound manner.

CLIENT DETAILS

PRINCEALPHAS
M S U N U Z I

PROJECT TITLE

CALLEZ / SIYANI

DRAWING TITLE

PROJECT EXTENT & EXISTING SERVICES

SCALE

1 : 5000

DATE

10/08/2018

CHECKED

S.S. PRINCEALPHAS

DESIGNED

V.G.S. DAVENBY

DRAWN BY

V.G.S.

PANGAEA CONSULTING

Private Skills 15, Widdow Street, Widdow Street, Widdow Street, Widdow Street

Phone No: 031 891 100

6/1891/00

Scale: 1 : 5000

Pangaea Consulting
Suite 12 Westville Centre
52 Norfolk Terrace
Westville
3629

Date: 26.06.2018
Enquiries: Ms S Hlongwane
Tel +2733 395 3679
Our Ref: **SH02-2018/2606**
Your Ref: 6/189/2

Dear Sir/ Madam

CALUZA / SMERO HOUSING DEVELOPMENTS : CONFIRMATION OF BULK SERVICES TO SERVE THE PROPOSED PROJECTS.

Application received 09/06/2018, regarding the above, refers.

We confirm that an investigation has been carried out with regard to the site in question as well as encroachment into Eskom Servitudes, in respect of the development as set out above. Note that Eskom has no objection to the development however we take no responsibility for damage to equipment or injuries / loss of lives to persons.

Note: There is an existing Eskom overhead-cable network in the vicinity of the proposed development and the closest networks to the development in question are: Dambuza NB:DI and Edendale NB:EP.

Eskom cannot guarantee the availability of supply in 36 months' time due to network changes and other development in the area. We can never reserve capacity for a customer and supply is granted on a first come first serve basis depending on the availability and the capacity.

We can however share the current status of the network(s) without considering this supply. Any further assessment will require the customer application or an Electrification NPR request. Thus a formal application is required and proper evaluation will be done in due cause.

Note that RDP – house units going into households with existing supply will not be granted a second point of supply as per National Energy Regulator of South Africa NERSA.

Make sure that work is carried out cautiously when working in and around Eskom infrastructure. If there is need to relocate any of our services notes that cost will be to the developer.

A developer requiring any of the following:

A new supply, an increase of supply or line deviation / relocation, from Eskom, should make application to Eskom via the Eskom toll free number 0860037566. These applications will be processed in terms of Eskom's standard customer connection tariffs, conditions and policies, in effect at that time. The costs of which will be for the developer's account.

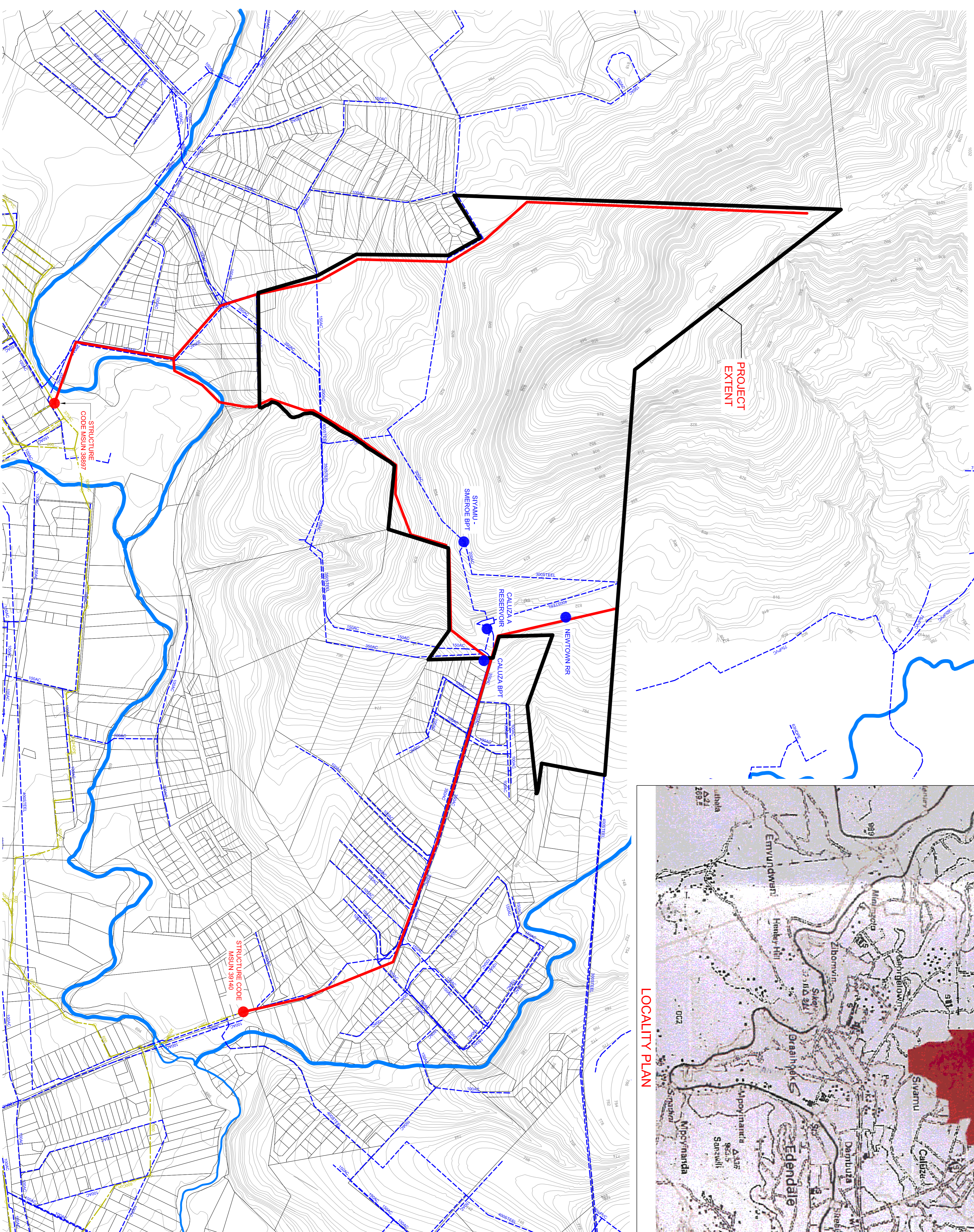
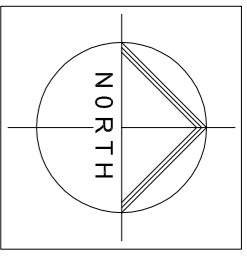
This reply is only in respect of existing power lines, 11kV to 132kV presently under the control of Eskom Distribution, KZN operating unit.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Simangele Hlongwane', with a horizontal line extending to the right.

Simangele Hlongwane
Senior Survey Technician

PLAN INDICATING EXISTING WATER AND SEWER NETWORK AND PROPOSED SEWER OUTFALL MAINS



LOCALITY PLAN

- LEGEND:**
- = EXISTING WATER RETICULATION
 - = EXISTING SEWER RETICULATION
 - = PROPOSED SEWER CONNECTION
 - = EXISTING RIVER
 - = EXISTING RESERVOIR/PUMPSTATION
 - = PROPOSED SEWER CONNECTION POINT


Reference Drawing Title	Dwg. No.

Revision	Date	Description

NOTE:
 Only underground services affected by new construction work are shown. Care must be taken during excavations for road foundations, trenches etc., to avoid damage to underground services such as sewers, drains, cables, water mains and connections. Wherever possible these must be located before work proceeds.

Contract No

Client Details


CITY OF CHOICE
 PIETERMARITZBURG
 M S U N D U Z I

Project Title
 CALUZA / SMERO

Drawing Title
 EXISTING SERVICES
 AND PROPOSED BULK SEWER LAYOUT

Scales	Date
1 : 5000	11/06/2018

Designed	Drawn by	Checked
V.G	V.G	PR 200070067 PR TECH ENG


PANGAËA CONSULTING

Postal: P O Box 2293 Pietermaritzburg, 3600
 Physical: Suite 12, Westville Centre, 52 Nordik Terrace, Westville 3629
 Email: info@pangaëa.co.za
 Phone No: 031 267 2185 Fax No: 031 267 0292

Drawing No.	6/189/102	Sheet 1 of 1 Sheets
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SMERO/CALUZA HOUSING PROJECT

Stormwater Management Report

15 March 2023



Ref: 6/189/4/2

Prepared for:



Human Settlements Department

Prepared by:



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On behalf of Verern Builders (Pty) Ltd

STORMWATER MANAGEMENT STRATEGY FOR SMERO/CALUZA HOUSING PROJECT

1. INTRODUCTION

Stormwater management is the term used to describe a group of techniques whose common aim is the mitigation of undesirable effects produced by the quantity and quality of urban development runoff. In any development of this nature, it is necessary to control stormwater and when controls are put in place then it is essential to manage the stormwater.

2. TERMS OF REFERENCE

PANGAEA CONSULTING has been appointed by Verern Builders (Pty) Ltd to plan and design the civil engineering infrastructure for this project from SUPLUMA packaging through to implementation. **PANGAEA CONSULTING** is thus required to assess the stormwater requirements for the proposed development.

The development will consist of various land uses, namely, single storey units, GAP housing, social/community facility, and mixed use (local retail) land uses. The universal consideration of Water Sensitive Urban Design/Water Sensitive Design (WSUD/WSD) strategies will be incorporated where possible in the design and implementation of this project. The roofs of the mixed-use sites will be drained and attenuated on site before being released to channels and piped systems in the internal road stormwater system. These systems will in turn discharge the runoff to the natural valley lines. The low-cost housing components, due to the small site sizes cannot accommodate onsite attenuation and here attenuation ponds will be utilised to delay the stormwater peak. The siting of these structures will be where possible be in open spaces, parks, play lots and outside the development edge and outside of the valley buffers. The GAP housing sites will attenuate on site, whilst the roads will be attenuated on the respective ponds.

The purpose of this report is to explain how stormwater runoff from the proposed development is to be disposed of and managed.

Further, this report will supplement the submission drawings and assist in the process of gaining planning approval for the development.

The following documents have been used as guidelines in the compilation of this report: -

Design Manual: The Neighbourhood Planning and Design Guideline, as published by the CSIR.

3. IMPACT OF NEW DEVELOPMENT ON STORMWATER RUN OFF

Any additional stormwater run-off generated because of the change in site coverage is to be attenuated or retarded to not exceed the estimated pre-development discharge rates. The pre- and post-development 50-year storm return periods are used to determine the volume of run-off to be retained (temporarily) on site, while discharge from the site will be limited to the 10-year pre-development return period.



4. PRE AND POST PEAK FLOW RUN- OFFS FROM THE DEVELOPMENTS

Detailed pre and post development run off has been calculated based on the designs at hand at this stage of the planning process. We tried to be as accurate as possible to try to compute the flows that could be generated when final and detailed designs are prepared, post SPLUMA approval.

These detailed calculations will then lead to confirming the quantification of the volume of water to be attenuated, which then will indicate the type of conduit to be utilised to convey this flow to the attenuation devices as well as pipe and catchpit spacing and sizing.

5. MITIGATION INITIATIVES FOR CONSEQUENCES OF THE PROPOSED DEVELOPMENT

The recommendations in the specialist's environmental studies highlight the importance of adequate attention to the following keys issues, amongst others:

- Erosion control measures must be put in place including monitoring and controlling the spread of erosion.
- Each household should be encouraged to acquire and utilise storage tanks to retain rainwater. This will also alleviate possible water shortages in the area.
- All stormwater discharge points need to be protected against erosion.
- Retention of vegetation where possible to avoid soil erosion and siltation of the wetland.
- Controlled use and or storage of materials, fuels and chemicals which could potentially be transported by stormwater off the site.
- During rainy days activities involving machinery and earth moving must be avoided especially on unstripped vegetation area.
- Adequately and safely dispose of runoff from developed areas without causing soil saturation or erosion. The importance of this is greater on the slopes showing grades exceeding 20%.
- Stormwater systems should be designed to function adequately with low maintenance in the long term, should cater for silting.

6. OBJECTIVES OF THE SMERO/CALUZA HOUSING PROJECT STORMWATER MANAGEMENT PLAN

- To protect life and property resulting from stormwater discharge/runoff.
- To prevent erosion.
- To conserve the flora and fauna of the natural valley lines.
- To protect and enhance the quality of water in the catchments from pollution and siltation.

7. DESIGN PHILOSOPHY FOR THE MANAGEMENT AND DISPOSAL OF STORMWATER

The following will be the guiding factors that would need to be accommodated at the detail design stage and at individual site development and building plan approval stages.

The stormwater systems comprise of the major and minor network system components. The major systems incorporate the natural waterways, attenuation ponds and wetlands. The road network will act as a stormwater diversion mechanism as roads run parallel to the contours and are cut into the slopes which in turn will divert flows and increase the runoff times.



The minor systems include the runoff from roofs, open spaces and roads and convey this to the major systems. The minor systems include property drainage systems, i.e., rainwater goods, onsite attenuation devices and runoff from roads, other paved areas, and attenuation devices within the road stormwater network.

- Individual sites and buildings must be so designed to prevent concentration of flows and incorporate mechanisms to delay the storm runoff.
- At the construction and operation stages, mechanisms to prevent erosion of soil must be incorporated into the site development plans.
- The indiscriminate removal of ground cover must be prevented and must be undertaken where necessary, just in time.
- Landscaping of sites where development is completed, to be undertaken as soon as possible.
- Stormwater control systems such as swales, berms, soil fences, attenuation ponds, erosion protection devices are to be constructed prior to commencement of construction activities.
- All road and platform embankments are to be top soiled and grassed as soon as is practically possible to prevent soil erosion.

8. CRITICALITY OF SITE-SPECIFIC CONDITIONS

The existing terrain of the development is steep with the average slope being 1 in 5 generally. This poses major challenges in controlling stormwater runoff to prevent erosion of the natural valley lines as development will result in increased runoff, and shorter time of concentration.

Major Systems:

The peak elevation of the site is located at the middle of the site resulting in numerous low points around the site.

Attenuation ponds, where possible, are positioned along the natural stream valley of the site outside the valley buffers.

The attenuation of the flows between the 1:50 year pre and post development runoff does assist in limiting the potential erosion in the valleys due to delayed peak flows.

Thus, the unhindered 1:10 year pre-development flows will pass through the attenuation device to the natural valley lines and the existing stormwater network, whilst the difference between the 1:50 pre and post development runoff will be delayed by restricting the outlet device size.

Road low points to be critically looked at to ensure that overtopping is prevented in the event the catchpits are blocked.

Minor Systems:

The proposed BNG Housing areas cannot provide for onsite attenuation due to the very small site sizes ranging from 180m² to 350m². In this instance these areas will be attenuated utilising ponds that are outside of the environmental corridors but leading to the natural valley paths.



The discharge from the properties will be led to the road kerb edge by piped systems from the roofs and by appropriately landscaping the property. Footpaths are to also be utilised as drainage channels where this is necessary. Midblock drainage systems shall also be utilised to safely remove stormwater off sites and to prevent flooding of adjacent properties.

All other properties to attenuate and promote infiltration as much as possible without jeopardising the integrity of the built structures. Damming water near foundation must be avoided, but utilising level parking spaces and flat roofs to attenuate must be promoted. The project being a low-cost housing development would not necessarily provide much open spaces, but whatever spaces is available, stormwater infiltration should be maximised.

9.CONCLUSION AND RECOMMENDATION FOR THE PROJECT

The runoff from the BNG housing areas will be discharged to the road kerb edge to be caught at the catchpits and thereafter piped to the attenuation ponds located along the natural stream valley outside the 100-year flood line as indicated on drawing no 6/189/30/100/P1. A typical section through one of these devices is also illustrated on the above drawing.

Minimum pipe sizes shall be 300mm in servitudes and 375mm in road reserves of spigot and socket type. Energy dissipaters will be designed to limit the energy at outlets to prevent scour.

All other properties are to attenuate stormwater onsite in appropriately sized devices and to discharge to the street stormwater systems.

Road Network Drainage

The road network will be attenuated in the attenuation ponds. Surface runoff from the roads will be contained by the road crossfall and the kerbs. Road crossfalls where possible will fall towards the cut side of the roads for the full road prism to be drained on one edge of the road into kerb inlets to the piped stormwater system. Where this is not possible then kerbs shall be accommodated on both sides of the roads, with the road built with a camber.



SMERO/ CALUZA HOUSING DEVELOPMENT

Rational Method 1:10 yr return

Catchment No's	Pre Development							Post Development							Attenuation			
	C	I (mm/hr)	A (ha)	Factor Ft	Q (m3/s)	Tc (min)	Volume (m3)	C	I (mm/hr)	A (ha)	Factor Ft	Q (m3/s)	Tc (min)	Volume (m3)	Attenuation required (m3)	Attenuation provided (m3)	Attenuation structure	Comments
1	0.350	115.000	2.578	0.600	0.173	15.000	155.653	0.544	115.000	2.578	0.600	0.269	15.000	241.767	86.114	210.000	A	Attenuation Pond
2	0.350	115.000	2.563	0.600	0.172	15.000	154.741	0.544	115.000	2.563	0.600	0.267	15.000	240.353	85.612	210.000	B	Attenuation Pond
3	0.350	115.000	9.693	0.600	0.650	15.000	585.233	0.618	115.000	9.693	0.600	1.149	15.000	1034.135	448.902	1028.000	C	Attenuation Pond
4	0.350	115.000	7.519	0.600	0.504	15.000	453.984	0.544	115.000	7.519	0.600	0.784	15.000	705.154	251.170	590.000	D	Attenuation Pond
5	0.350	115.000	6.571	0.600	0.441	15.000	396.730	0.544	115.000	6.571	0.600	0.685	15.000	616.224	219.494	516.000	E	Attenuation Pond
6	0.350	115.000	8.135	0.600	0.546	15.000	491.163	0.544	115.000	8.135	0.600	0.848	15.000	762.905	271.743	636.000	F	Attenuation Pond
7	0.350	115.000	5.063	0.600	0.340	15.000	305.673	0.628	115.000	5.063	0.600	0.609	15.000	548.306	242.633	554.000	G	Attenuation Pond
8	0.350	115.000	2.233	0.600	0.150	15.000	134.787	0.656	115.000	2.233	0.600	0.281	15.000	252.579	117.792	290.000	H	Attenuation Pond
9	0.350	115.000	1.293	0.600	0.087	15.000	78.083	0.656	115.000	1.293	0.600	0.163	15.000	146.326	68.243	163.000	I	Attenuation Pond
10	0.350	115.000	7.965	0.600	0.534	15.000	480.869	0.618	115.000	7.965	0.600	0.944	15.000	849.713	368.845	867.000	J	Attenuation Pond
11	0.350	115.000	6.765	0.600	0.454	15.000	408.437	0.618	115.000	6.765	0.600	0.802	15.000	721.728	313.291	719.000	K	Attenuation Pond
12	0.350	115.000	2.235	0.600	0.150	15.000	134.932	0.656	115.000	2.235	0.600	0.281	15.000	252.855	117.923	291.000		Attenuation Pond
13	0.350	115.000	6.996	0.600	0.469	15.000	422.384	0.656	115.000	6.996	0.600	0.879	15.000	791.527	369.143	867.000	L	Attenuation Pond
Total Attenuation Required and Provided :															2960.904	6941.000		

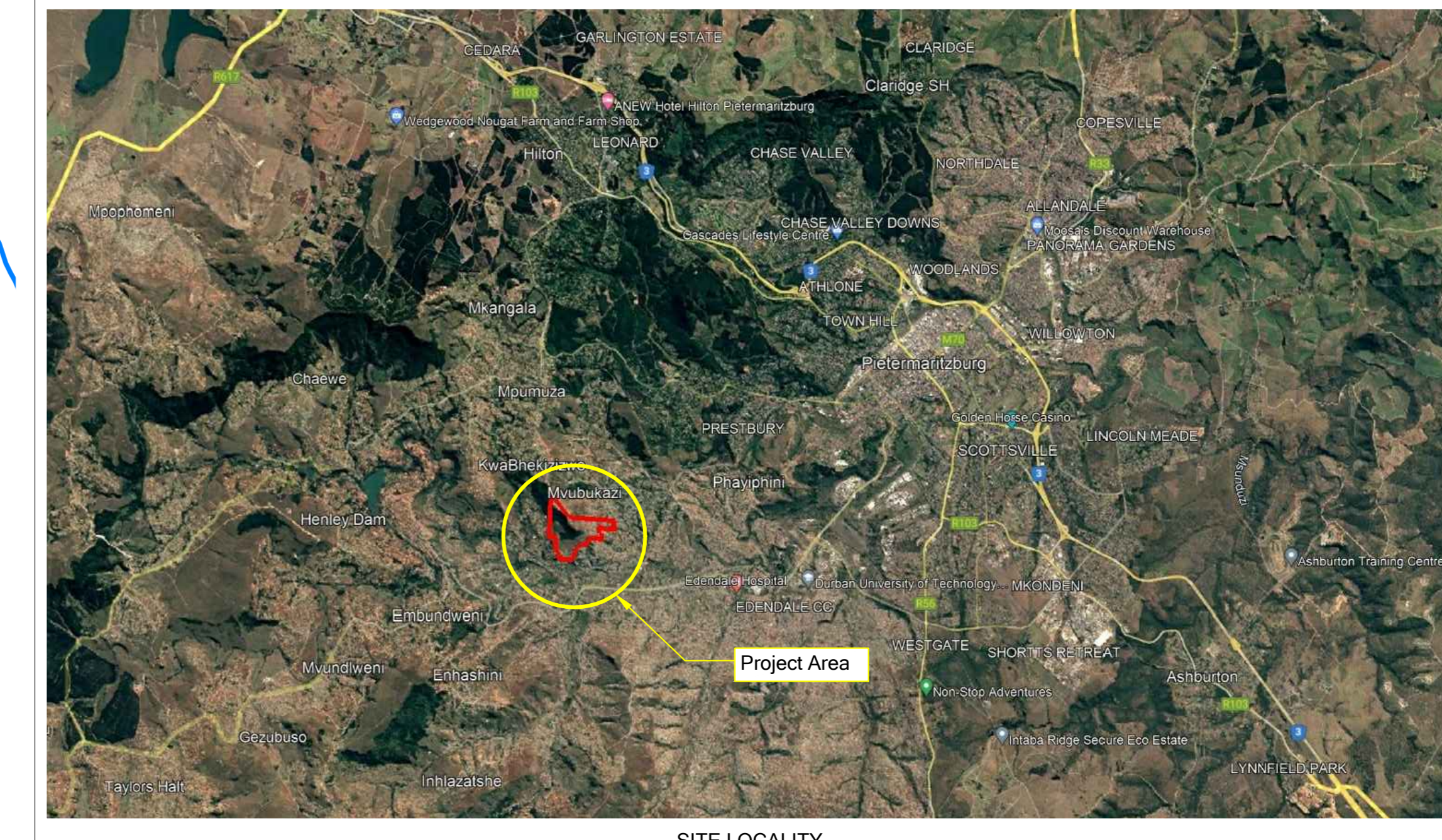
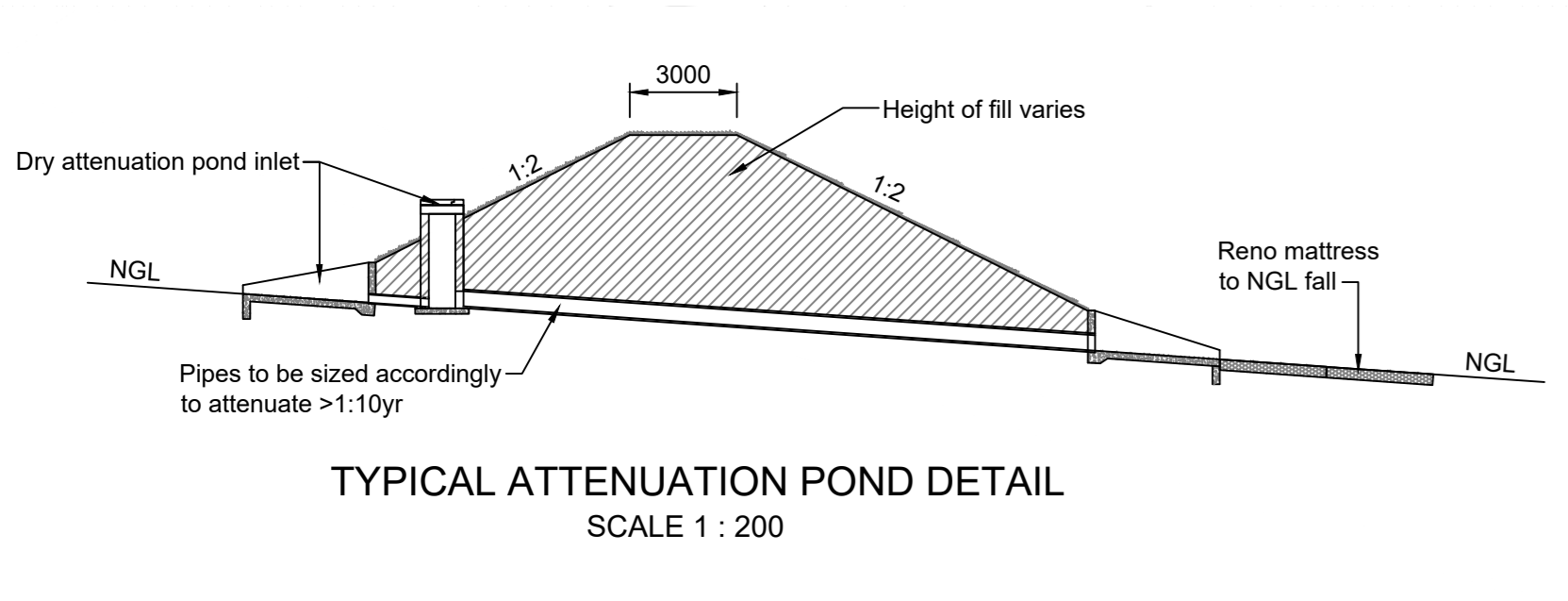
SMERO/ CALUZA HOUSING DEVELOPMENT

Rational Method 1:50 yr return

Catchment No's	Pre Development							Post Development							Attenuation			
	C	I (mm/hr)	A (ha)	Factor Ft	Q (m3/s)	Tc (min)	Volume (m3)	C	I (mm/hr)	A (ha)	Factor Ft	Q (m3/s)	Tc (min)	Volume (m3)	Attenuation required (m3)	Attenuation provided (m3)	Attenuation structure	Comments
1	0.350	189.750	2.578	0.830	0.395	15.000	355.277	0.544	189.750	2.578	0.830	0.613	15.000	551.832	196.555	210.000	A	Attenuation Pond
2	0.350	189.750	2.563	0.830	0.392	15.000	353.197	0.544	189.750	2.563	0.830	0.610	15.000	548.605	195.409	210.000	B	Attenuation Pond
3	0.350	189.750	9.693	0.830	1.484	15.000	1335.794	0.618	189.750	9.693	0.830	2.623	15.000	2360.413	1024.619	1028.000	C	Attenuation Pond
4	0.350	189.750	7.519	0.830	1.151	15.000	1036.218	0.544	189.750	7.519	0.830	1.788	15.000	1609.514	573.296	590.000	D	Attenuation Pond
5	0.350	189.750	6.571	0.830	1.006	15.000	905.537	0.544	189.750	6.571	0.830	1.563	15.000	1406.532	500.995	516.000	E	Attenuation Pond
6	0.350	189.750	8.135	0.830	1.246	15.000	1121.079	0.544	189.750	8.135	0.830	1.935	15.000	1741.332	620.253	636.000	F	Attenuation Pond
7	0.350	189.750	5.063	0.830	0.775	15.000	697.698	0.628	189.750	5.063	0.830	1.391	15.000	1251.508	553.811	554.000	G	Attenuation Pond
8	0.350	189.750	2.233	0.830	0.342	15.000	307.652	0.656	189.750	2.233	0.830	0.641	4.090	576.511	268.859	290.000	H	Attenuation Pond
9	0.350	189.750	1.293	0.830	0.198	15.000	178.224	0.656	189.750	1.293	0.830	0.371	3.967	333.988	155.764	163.000	I	Attenuation Pond
10	0.350	189.750	7.965	0.830	1.220	15.000	1097.583	0.618	189.750	7.965	0.830	2.155	5.520	1939.471	841.888	867.000	J	Attenuation Pond
11	0.350	189.750	6.765	0.830	1.036	15.000	932.257	0.618	189.750	6.765	0.830	1.830	5.335	1647.344	715.087	719.000	K	Attenuation Pond
12	0.350	189.750	2.235	0.830	0.342	15.000	307.982	0.656	189.750	2.235	0.830	0.641	4.913	577.141	269.159	291.000		Attenuation Pond
13	0.350	189.750	6.996	0.830	1.071	15.000	964.090	0.656	189.750	6.996	0.830	2.007	6.622	1806.659	842.569	867.000	L	Attenuation Pond
Total Attenuation Required and Provided :															6758.263	6941.000		

SINATHING HOUSING DEVELOPMENT									
Runoff Coefficient (C) - Calculation Summary									
PRE DEVELOPMENT (RURAL, > 900mm)			POST DEVELOPMENT (URBAN, > 900mm)						
Catchment No's	% of Site Undeveloped	C Factor	Catchment No's	% of Site	Streets/ Roofs	% of Site	Landscaped/ Grassed Areas	Resultant C Factor	
1	100.00	0.35	1	23.41	0.85	76.59	0.45	0.544	
2	100.00	0.35	2	23.41	0.85	76.59	0.45	0.544	
3	100.00	0.35	3	42.12	0.85	57.88	0.45	0.618	
4	100.00	0.35	4	23.41	0.85	76.59	0.45	0.544	
5	100.00	0.35	5	23.41	0.85	76.59	0.45	0.544	
6	100.00	0.35	6	23.41	0.85	76.59	0.45	0.544	
7	100.00	0.35	7	44.45	0.85	55.55	0.45	0.628	
8	100.00	0.35	8	51.47	0.85	48.53	0.45	0.656	
9	100.00	0.35	9	51.47	0.85	48.53	0.45	0.656	
10	100.00	0.35	10	42.12	0.85	57.88	0.45	0.618	
11	100.00	0.35	11	42.12	0.85	57.88	0.45	0.618	
12	100.00	0.35	12	51.47	0.85	48.53	0.45	0.656	
13	100.00	0.35	13	51.47	0.85	48.53	0.45	0.656	

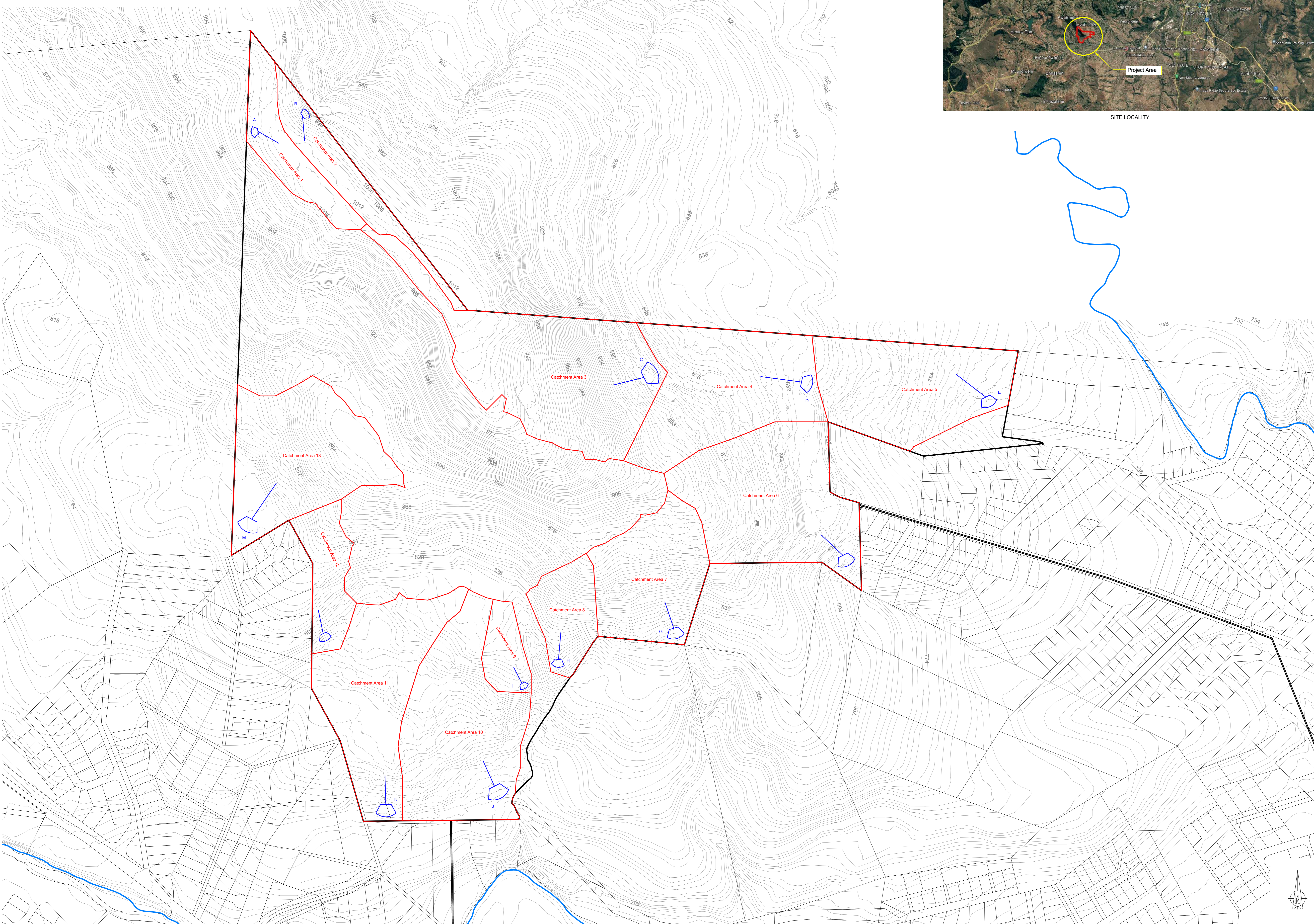




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Catchment Area	Attenuation		
	Required	Structure Number	Structure Capacity
1	196.555m ³	A	210m ³
2	195.409m ³	B	210m ³
3	1024.619m ³	C	1028m ³
4	573.296m ³	D	590m ³
5	500.995m ³	E	516m ³
6	620.253m ³	F	636m ³
7	553.811m ³	G	554m ³
8	288.859m ³	H	290m ³
9	155.764m ³	I	163m ³
10	841.886m ³	J	867
11	715.087m ³	K	719m ³
12	269.159m ³	L	291m ³
13	842.569m ³	M	867m ³

Note:
- To be read in conjunction with stormwater management report (Ref : 6/189/4/2)



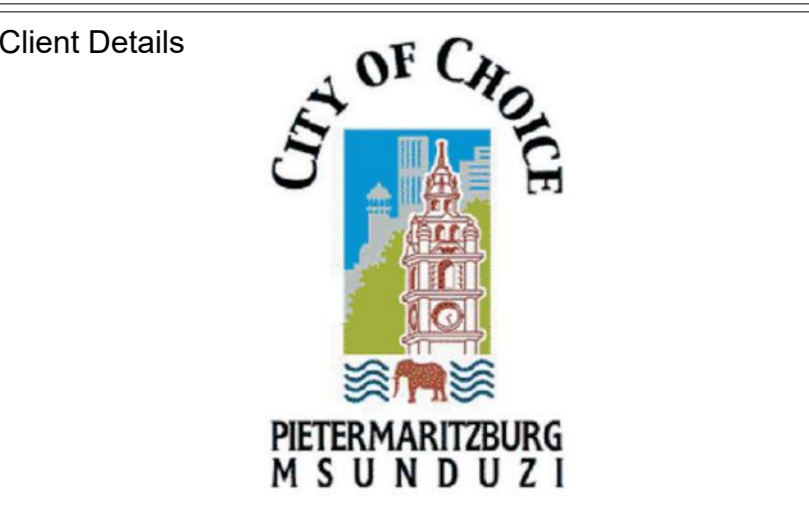
PRELIMINARY

Reference Drawing Title _____ Dwg. No. _____

Revision Date Description

NOTE:
Only underground services affected by new construction work are shown. Care must be taken during excavations for road foundations, trenches etc. to avoid damage to underground services such as sewers, drains, cables, water mains and connections. Wherever possible these must be located before work proceeds.

Contract No _____



Project Title
CALUA / SMERO HOUSING DEVELOPMENT

Drawing Title
STORMWATER ATTENUATION LAYOUT

Scales 1 : 2500 Date 30/04/2023

Designed V.G Drawn by V.G
Checked S.S PR 200070067 PR TECH ENG



Drawing No. 6/189/30/100/P1 Sheet of 1 Sheets

Msunduzi Municipality

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Eng: G. S. Majodwana

Tel: 033 3922 132

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15 June 2018

Pangaea Consulting
Suite 12, Westville Centre
52 Norfolk Terrace
WESTVILLE
3629

Attention: Mr. S. Sathnarayan

Dear Sir,

SMERICALUZA HOUSING PROJECT
AVAILABILITY OF BULK POTABLE WATER AND SEWERAGE SERVICES

Your letter dated 04 May 2018 and email dated 11 June 2018 has reference.

The Department has no objection to the above mentioned development subject to bulk water and sanitation infrastructure that is required for this project being timeously funded. We understand that the service will be required in 3 years' time hence the budget must be timeously included in the Municipality's business plan & project pipeline for funding from the Municipal Infrastructure Grant. This Department together with the Human Settlements Unit shall undertake this process.

The tie-in points on your plan no. 6/189/102 obtained from our GIS Department shall be treated as approximate and must be confirmed on site, in terms of position and size.

Please contact this Department should further information be required.

Yours faithfully

Sam ap L
for **SENIOR MANAGER (WATER & SANITATION)**

INFRASTRUCTURE SERVICES

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Enq: T.T.Makhanya

Tel. 033 392 2133

Email: Thamsanqa.Makhanya@msunduzi.gov.za

22 August 2019

Pangaea Consulting
Suite 12, Westville Centre
52 Norfolk Terrace
WESTVILLE
3629

Attention: Mr. S. Sathnarayan

Dear Sir,

**SMERO/CALUZA HOUSING PROJECT
AVAILABILITY OF BULK SEWERAGE SERVICES TO SERVE THE PROPOSED HOUSING DEVELOPMENT**

Your letter dated 04 May 2018 and our meeting of 28 June 2019 has reference.

Sewerage

The proposed Smero/Caluza Housing Development to accommodate 2000 households (1400 BNG & 600 Gap Market Housing). The existing sewer reticulation gravitates towards two outfall lines, one in Caluza Road and the other towards Waterworks Road, Wadley Stadium.

The Department is currently busy with the design for the extension of the bulks in the vicinity of Wadley Stadium. This upgrade will be available for the project to discharge into, at your planned implementation roll out envisaged to be in 3yrs time. The outfall leading to Caluza Road will need to be extended to reach the project as this is not a planned project for the City.

We confirm that MIG Funding will be applied timeously for the extension of this bulk main with an approximate length of 5.1km (extension of a portion of the line from Wadley Stadium and Caluza Roads to reach the project) at an estimated cost (based on provisional planning) of R 17 million.

The Msunduzi Municipality, Water and Sanitation Department therefore has no objection to the development with the Housing Department and confirms that the MIG funding application will be undertaken timeously to match the project rollout programme such that implementation date will be met.

Water

It is envisaged that the project would require a 10Ml reservoir and such can be confirmed by the consultant during the detail planning stage. The additional bulk pipelines and the reservoir is estimated to be R 60 million and an application for funding from MIG will be submitted in accordance to the deliverables of the programme.

The Msunduzi Municipality, Water and Sanitation Department therefore has no objection to the development and confirms that an application will be made jointly by Human Settlements and the Water and Sanitation Department to the appropriate grant fund for this infrastructure.

Please contact this Department should further information be required in this regard.



Mr B. Sivpheard
Senior Manager, Water & Sanitation

Our ref: 6/189/2
Your ref:

Enquiries: S Sathnarayan
Contact: 031 267 2185
Cell: 083 792 8333
Email: sathjy@pangaea.co.za

08 June 2018

ESKOM
Distribution Unit

Att: Ms Hlongwa

Dear Madam,

**CALUZA/SMERO HOUSING DEVELOPMENTS
CONFIRMATION OF BULK SERVICES TO SERVE THE PROPOSED PROJECTS**

The Msunduzi Municipality has appointed Verern Builders as implementing agents for the delivery of approximately 2000 units in Caluza/Smero comprising 1400 BNG and 600 GAP housing opportunities in Edendale.

Pangaea Consulting are engaged by Verern Builders to undertake the civil engineering component of this project.

Please could you confirm that the bulk services of electricity are available in the vicinity of the project as indicated on our general layout plan 6/189/300, or bulk services can be provided in the future when the project reaches implementation stage.

Your assistance in this regard is most appreciated.

Should you have any queries, please do not hesitate to contact our office.

Yours faithfully


S Sathnarayan (Pr Tech Civil Eng.)
for Pangaea Consulting
end

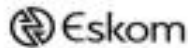


civil engineering
project management
property development
building construction



LEVEL 1 B-BBEE ENTERPRISE
taking ordinary to extraordinary

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3629

Date: 26.06.2018
Enquiries: Ms S Hlongwane
Tel +2733 395 3679
Our Ref: **SH02-2018/2506**
Your Ref: 6/189/2

Dear Sir/ Madam

CALUZA / SMERO HOUSING DEVELOPMENTS : CONFIRMATION OF BULK SERVICES TO SERVE THE PROPOSED PROJECTS.

Application received 09/06/2018, regarding the above, refers.

We confirm that an investigation has been carried out with regard to the site in question as well as encroachment into Eskom Servitudes, in respect of the development as set out above. Note that Eskom has no objection to the development however we take no responsibility for damage to equipment or injuries / loss of lives to persons.

Note: There is an existing Eskom overhead-cable network in the vicinity of the proposed development and the closest networks to the development in question are: Dembuza NB:DI and Edendale NB:EP.

Eskom cannot guarantee the availability of supply in 36 months' time due to network changes and other development in the area. We can never reserve capacity for a customer and supply is granted on a first come first serve basis depending on the availability and the capacity.

We can however share the current status of the network(s) without considering this supply. Any further assessment will require the customer application or an Electrification NPR request. Thus a formal application is required and proper evaluation will be done in due cause.

Note that RDP – house units going into households with existing supply will not be granted a second point of supply as per National Energy Regulator of South Africa NERSA.

Make sure that work is carried out cautiously when working in and around Eskom infrastructure. If there is need to relocate any of our services notes that cost will be to the developer.

A developer requiring any of the following:

A new supply, an increase of supply or line deviation / relocation, from Eskom, should make application to Eskom via the Eskom toll free number 0800037566. These applications will be processed in terms of Eskom's standard customer connection tariffs, conditions and policies, in effect at that time. The costs of which will be for the developer's account.

This reply is only in respect of existing power lines, 11kV to 132kV presently under the control of Eskom Distribution, KZN operating unit.

