



**RAND WEST CITY
LOCAL MUNICIPALITY**



PELZVALE WASTE WATER TREATMENT WORKS RAND WEST CITY LOCAL MUNICIPALITY DRAFT SECTION 24G REPORT

February 2026

Prepared by:

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Environmental Assessment Practitioner

GENERAL INFORMATION

Report name:	Draft Section 24G Report for the Pelzvale Waste Water Treatment Works (WWTW), Rand West City Local Municipality.
Client:	Rand West City Local Municipality
Project Manager/ Engineer:	Aphane Consulting (Pty) Ltd
Report Compiled by:	Yonanda Martin CV attached as Appendix I
Date of Report:	17 November 2025 7 January 2026 4 February 2026 Draft Report – Revision 01
Ref No:	GAUT 002/24-25/I0016

DECLARATION OF INDEPENDENCE

I, Yonanda Martin, appointed environmental assessment practitioner responsible for compiling the Draft Scoping Report for the Pelzvale WWTW, declare that I: -

- act as an independent environmental consultant, my conclusions are formed independently and without influence from external parties;
- I will perform the work relating to this scoping report in an objective manner, even if the results and findings are not favourable to the applicant;
- have no financial interest in Aphane Consulting (Pty) Ltd or any of its subsidiaries;
- do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed;
- undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document;
- based on information provided to me by the project proponent, and in addition to information obtained during the course of this study and the site visit, will present the results and conclusion within the associated document to the best of my professional judgment;
- will include all comments and inputs from stakeholders and interested and affected parties as part of the Scoping Report; and
- will address the comments and inputs received from stakeholders and interested and affected parties to the best of my abilities.

Signed:

A handwritten signature in black ink, appearing to read 'Yonanda Martin', is written over a large, light grey diagonal watermark that spans the page.

Date: 2026/01/06

ABBREVIATIONS AND ACCORNYMS

ADWF	Average Dry Weather Flow
BAR	Basic Assessment Report
BNR	Biological Nutrient Removal
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and the Environment Previously known as DEA
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMI	Environmental Management Inspectorate
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GA	General Authorisation
GDARDE	Gauteng Department of Agriculture, Rural Development and Environment Previously known as GDARD.
GDARDE C- Plan	Gauteng Department of Agriculture and Rural Development Conservation Plan (Version 4 - 2024)
GIS	Geographical Information System
GPEMF	Gauteng Province Environmental Management Framework
GSDF	Gauteng Spatial Development Framework
I&AP	Interested and Affected Party
JHB	Johannesburg
LC	Least Concern
LT	Least Threatened
MLSS	Mixed Liquor Suspended Solids
MUCT	Modified University of Cape Town
NEMA	National Environmental Management Act, Act No. 107 of 1998
NEMAQA	National Environmental Management: Air Quality Act 39 of 2004
NEMBA	National Environmental Management Biodiversity Act 10 of 2004
NEMPA	National Environmental Management Protected Areas Act 57 of 2003
NEMWA	National Environmental Management: Waste Act 59 of 2008
NFEPA	National Freshwater Ecosystem Priority Areas
OH&S	Occupational Health & Safety

PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
RAS / s-Recycle	Return Activated Sludge
RWCLM	Rand West City Local Municipality
SANBI	South African National Biodiversity Institute
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SR	Scoping Report
SST	Secondary Sedimentation Tank
UCT	University of Cape Town
VSD	Variable Speed Drive
VU	Vulnerable
WAS	Excess Sludge
WRDM	West Rand District Municipality
WULA	Water Use License Application
WWTW	Waste Water Treatment Works

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1. INTRODUCTION

Green Tree Environmental Consulting was appointed by Aphane Consulting (Pty) Ltd to conduct the Environmental Impact Assessment (EIA) Process for the new Pelzvale Waste Water Treatment Works (WWTW), located between the towns of Randfontein and Westonaria. Rand West City Local Municipality, refer to Figure 1: Locality.

The EIA Process started, and a reference number was obtained from the Gauteng Department of Agriculture, Rural Development and the Environment (GDARDE) on 20 February 2025, GAUT 002/24-25/I0016. Pre-application Public Participation commenced on 5 March 2025, and the Draft Scoping Report was circulated to all Registered Interested and Affected Parties (I&APs), the various State Departments and other parties identified during the public participation process. All comments received was included as part of the Comments & Responses Report and included as an Annexure to the Draft Scoping Report. The Application was completed and submitted to the Applicant for signature, unfortunately, before the Application and the Draft Scoping Report could be submitted to GDARDE for approval, the site location and the project layout was changed. This was mainly due to the findings of the Geotechnical Engineer and the recommendations made by them. This meant that the specialist had to revise their specialist studies and the Draft Scoping Report had to be revised to include the new site layout. During this revision process, the Applicant started with site establishment and clearance of the vegetation for the purpose of stockpiling and constructing a road (June 2025). The EAP was not informed that the construction commenced and on 23 June 2025 a site inspection was conducted during which the EAP noticed that site clearance took place, and a site camp was established. The GDARDE: Section 24G Unit was informed of the site clearance on 30 June 2025 and the Section 24G process started.

In terms of Section 24(G) read together with sections 24(F) of the National Environmental Management Act 107 of 1998, the **Rand West City Local Municipality** is considering applying for authorisation in terms of Sections 24(G) and 24(F) of the National Environmental Management Act 107 of 1998; for the unlawful commencement (site clearance) of the Pelzvale Waste Water Treatment Works (WWTW) and construction of the access road. The application together with this draft report will be submitted to the Gauteng Department of Agriculture, Rural Development and the Environment (GDARDE).

1.1 Content of the Section 24G Report

The table below summarises the content of the Section 24G Report:

Table 2: Content of the S24G Report

Content	Section in Report
A. Project Introduction	Section 1
i. Details and expertise of the EAP, including a CV	Section 1.2
ii. Details of the Applicant	Section 1.3
iii. Motivation for the need and desirability of the development	Section 1.4
B. Location of the activity:	
i. Surveyor General code	Section 2.1
ii. Physical address and farm	Section 2.1
iii. Co-ordinates	Section 2.1
C. A plan which locates the proposed activity or activities applied for at an appropriate scale.	Section 2 Figures 1 – 3 Aerial View 1 - 2
D. Description of the Scope of the proposed activity:	
i. Listed Activities triggered	Section 4
ii. Description of the activities to be undertaken as well associated infrastructure	Section 3
E. Description of the legislative context	Section 4
F. Description of the process followed to reach the proposed activity, site and location of the development footprint within the site	Section 5
i. Details of alternatives considered	Section 5
G. Possible Impacts and Mitigation Measures	Section 6 Section 9 Refer to the draft EMPr
H. Details of the public participation process	Section 7
I. Specialist studies	Section 8
J. Environmental Impact Assessment	Section 10
i. Methodology used in identifying and ranking the environmental impacts and risks for the activity and alternatives	Section 10
ii. Impact Assessment Matrix	Section 10
K. Undertaking an oath or affirmation by the EAP in relation to:	
i. The correctness of the information provided in the	Page iii

	report	
ii.	The inclusion of comments and inputs from stakeholders and interested and affected parties	Page iii
iii.	Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties	Page iii

1.2 Details of the EAP

Table 3: Details of the Environmental Assessment Practitioner (EAP)

Environmental Assessment Practitioner:	Yonanda Martin CV attached as Appendix H
Company Information:	Green Tree Environmental Consulting 7 Dublin Street Rangeview Ext 2 Krugersdorp Gauteng 082 409 0405 yonanda@gtec.net.za
Qualifications:	MSc. Ecological Remediation
Professional Registration:	South African Council for Natural Scientific Professions (SACNASP): 400204/09 EAPASA – 2019/1307

1.3 Detail of the Applicant

Table 4: Details of the Applicant and Project Manager

Applicant:	Rand West City Local Municipality Corner Sutherland and Pollock Street P.O Box 218 Randfontein 1760
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	011 278 3000
Project Manager/ Engineer:	Aphane Consulting (Pty) Ltd No 60 2nd Ave Alberton North Johannesburg 1458 011 907 6700

1.4 Need and Desirability of the Project

The West Rand City Local Municipality is quickly expanding with multiple applications for new residential areas. Unfortunately, the infrastructure can't accommodate the fast-growing area and will therefore have to be upgraded as soon as is possible in order to cater for the growth. This includes the construction of new WWTW, the upgrade of existing WWTW and the upgrade or construction of associated infrastructure such as the bulk water pipelines and outfall sewer lines. A lot of the new developments within the Municipality is located towards the south of Randfontein since there is space for expansion. This has motivated the construction of a WWTW that will cater for the specific area.

The construction of the Pelzvale WWTW and associated infrastructure will benefit the local community by providing decent services, especially to the communities where the services don't necessarily function effectively and will allow for further expansion of the area. During the construction period there will be several job opportunities but also opportunities to learn, especially for the local labourers. The purchase of material and hiring of equipment will support the economy and will hopefully boost the local economy.

2. PROJECT LOCATION

2.1 Location

The proposed project will entail the construction of a new waste water treatment works, an associated discharge pipeline and an outfall sewer line between the towns of Randfontein and Westonaria, Rand West City Local Municipality, West Rand District Municipality. The proposed project site is situated on the Remainder of Portion 1 and Portion 52 of the farm Gemspost 288 IQ, which is approximately 648ha in extent but only 28.8ha will be used for the actual footprint of the Pelzvale WWTW, refer to Figure 2: Locality and Aerial View 1: Locality. According to the GDARDE's Pollution Buffer Zone Guideline (2017), the recommended buffer zone of a waste water treatment facility is 800m. The proposed project site therefore includes the 800m buffer with the project footprint in the middle of the buffer.

Table 5: Property Information

Property	Remainder of Portion 1 of the Farm Gemspost 288 IQ
SG Code	T0IQ00000000028800001
Physical Address	3 rd Street Randfontein South Agricultural Holdings
Co-ordinates	26° 16' 30.73" S and 27° 40' 16.77" E
Property	Portion 52 of the Farm Gemspost 288 IQ
SG Code	T0IQ00000000028800052
Physical Address	Corner 3 rd Street and R28 Randfontein South Agricultural Holdings
Co-ordinates	26° 16' 09.67" S and 27° 39' 28.77" E
Property	Portion 6 of the Farm Middelvlei 255 IQ
SG Code	T0IQ00000000025500006
Physical Address	Randfontein South Agricultural Holdings
Co-ordinates	26° 15' 10.48" S and 27° 39' 00.93" E
Property	Portion 2 of the Farm Middelvlei 255 IQ
SG Code	T0IQ00000000025500002
Physical Address	Randfontein South Agricultural Holdings
Co-ordinates	26° 15' 18.63" S and 27° 38' 54.64" E

2.2 Receiving Environment

The proposed project is located between Randfontein and Westonaria and the environmental setting varies from urban (built-up) areas, mining and industrial areas, rural or agricultural areas and sections of natural vegetation.

The Pelzvale/ Randfontein South Agricultural Holdings are located directly north of the project site with mining activities located to the west and the small town of Westonaria located to the south of the project site. Other residential areas include Bekkersdal to the east of the project site.

The Middelvleispruit runs along the western boundary of the project property and the Wonderfonteinspruit runs in a north-east to south-western direction along the southern boundary of the project property. According to the Gauteng Department of Agriculture, Rural Development and Environment's (GDARDE) conservation plan or C-Plan, the Project site has no Ecological Support Areas (ESA) or Critical Biodiversity Areas (CBA). The ESA and CBA are mostly associated with the Middelvleispruit and Wonderfonteinspruit and is therefore mostly located to the west and the south of the project site.

Apart from the Middelvleispruit, ESA and CBA areas there are also a few wetlands as identified on the GDARDE C-Plan. Refer to Figure 3: GDARDE C-Plan Map and Aerial View 2: Sensitivity Map.

2.3 Vegetation

The vegetation type (veld type) of the study area and the study site is described by Mucina and Rutherford (2006) as Carletonville Dolomite Grassland. This vegetation type is characterised by slightly undulating plains with rocky chert ridges and species-rich grassland which forms a mosaic of patterns and species types. This is evident when standing on site, the study area slopes to the south and the east (towards the Modderfontein and Middelvlei Spruit), there are rocky outcrops located all over the study area and the grassland species richness is seen in all the grass species found on site, refer to Photographs 1 – 3: Site Photos.

The Carletonville Dolomite Grassland has a Least Threatened (LT) or Least Concern (LC) status and is not considered to be a threatened ecosystem. The veld type is however recognised by Mucina and Rutherford (2006) as vulnerable (VU) due to the small percentage of this veld type that is currently conserved.

2.4 Geology

According to Mucina and Rutherford (2006) the general geology of the Carletonville Dolomite Grassland is dolomite and chert of the Malmani Subgroup (Transvaal Supergroup) supporting mostly shallow Mispah and Glenrosa soil forms with deeper red to yellow apedal soils (Hutton and Clovelly

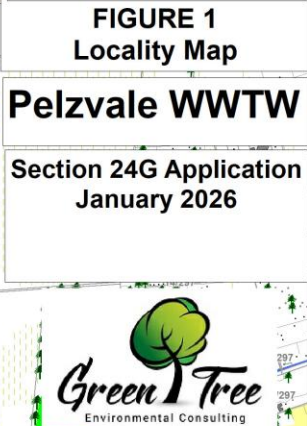
forms) which occur sporadically throughout the vegetation type. The general area is prone to sinkhole formation due to the underlaying dolomite.

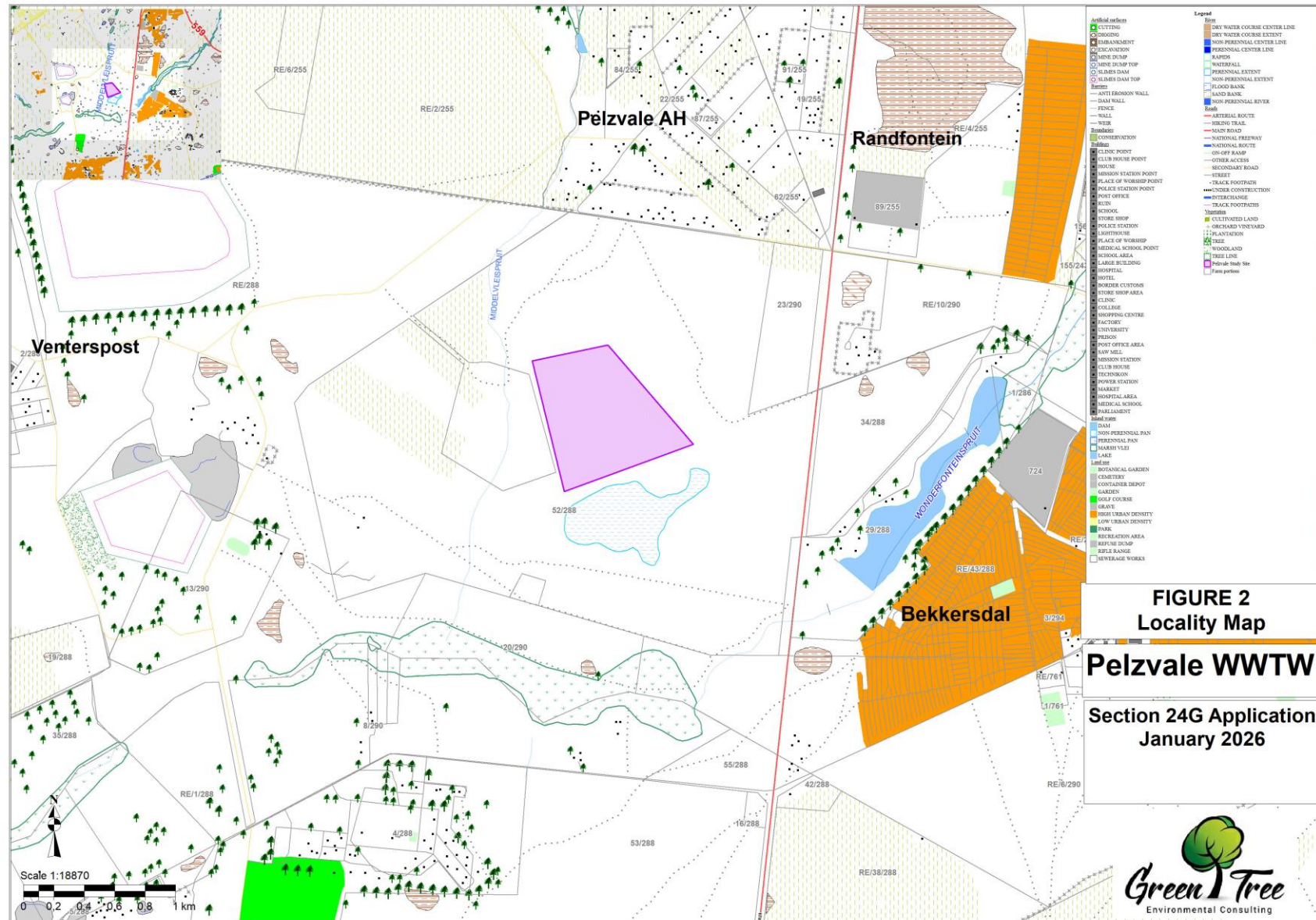
2.5 Surface Water

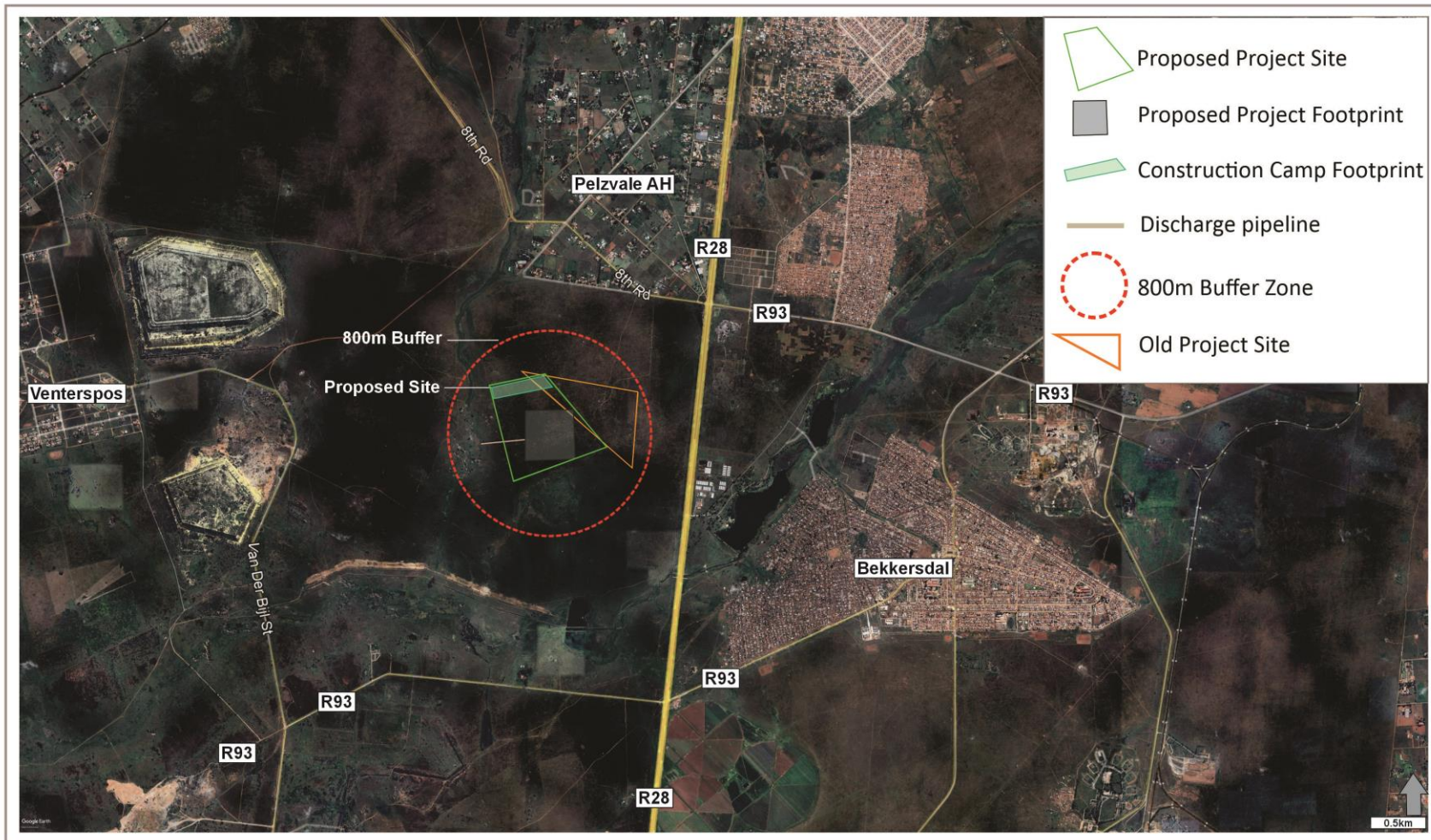
According to Flori Scientific Services (2020), there are no major perennial rivers in the study site. There is a small semi-perennial stream (Middelvelsprit) that flows along the western boundary of the 800m-radius area and the Wonderfonteinspruit flows east and south of the study site. The Middelvelsprit (and other smaller drainage lines in the area) are tributaries of the Wonderfonteinspruit. Although there are no major rivers or streams in the study area (which includes the 800m radius area) there are two wetland areas south of the proposed Pelzvale WWTW site area, but within the 800m-radius area.

Table 6: Drainage Area

Level	Category
Primary Drainage Area (PDA)	C
Quaternary Drainage Area (QDA)	C23D
Water Management Area (WMA) – Previous / Old	Upper Vaal (WMA 8)
Water Management Area (WMA) – New (as of Sept. 2016)	Vaal (WMA 5)
Sub-Water Management Area	Downstream Vaal Dam
Catchment Management Agency (CMA)	Vaal (CMA 5)
Wetland Vegetation Ecoregion	Dry Highveld Grassland (Group 5)
Fish FEPA	No
Fish FSA	No
Fish Corridor	No
Fish Migratory	No
Priority Quaternary Catchment	No
SWSA	Yes (Far West Karst Region)







Aerial View 1: Locality Plan

RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

January 2026

GDARDE C-Plan



02/01/2026

Gauteng_C-Plan_v4_wgs84

CBA1

CBA2

ESA1

ESA2

World Imagery

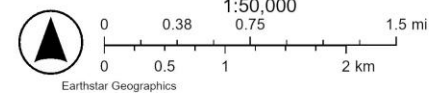
Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

9.6m Resolution Metadata



Aerial View 2: GDARDE Conservation Plan (C-Plan ver 4.0) – Map was generated from the GDARDE website



View 1: View from the Pelzvale WWTW site towards the west and the north.



View 2: View from the Pelzvale WWTW site towards the Pelzvale Agricultural Holdings (3rd Road), directly north of the site.



View 3: View from the Pelzvale WWTW site towards the mining area , directly west of the site.

Photograph 1: Site Photographs - before site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 4: View from the Pelzvale WWTW site towards the east and south.



View 5: View of one of the rocky outcrops on site.



View 6: View of the wetland area and the Eskom transmission lines located along the southern point of the study site.

Photograph 2: Site Photographs - before site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 7 and 8: View of the construction camp site and equipment on site.

View 9: View of the area that was cleared for the purpose of stockpiling material.



Photograph 3: Site Photographs - after site clearance commenced (23 June 2025)
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 10: View of the area that was cleared for the proposed Pelzvale WWTW - 23 June 2025.



View 11: View of the area that was cleared for the proposed Pelzvale WWTW - 5 November 2025.

Photograph 4: Site Photographs - after site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 12: View of the temporary road that was cleared in order for vehicles to access the site - 23 June 2025.



View 13: View of the temporary road that is now a properly constructed access road - 5 November 2025.

Photograph 5: Site Photographs - after site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 14a - c: View of the Middelvlei Spruit, erosion and sinkhole formation along the spruit.



View 15a - c: View of the Middelvlei Spruit, evidence of illegal activities (dumping, mining) along the spruit. These activities are not related to the Pelzvale WWTW but to illegal mining and dumping, the photos were taken before site clearance commenced in June 2025.

Photograph 6: Site Photographs - before site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025



View 16: View of a dung beetle found during the original site inspection.



View 17: View of a *Boophane disticha* found during the original site inspection.



View 18: Example of the rocky outcrops found within the study area.

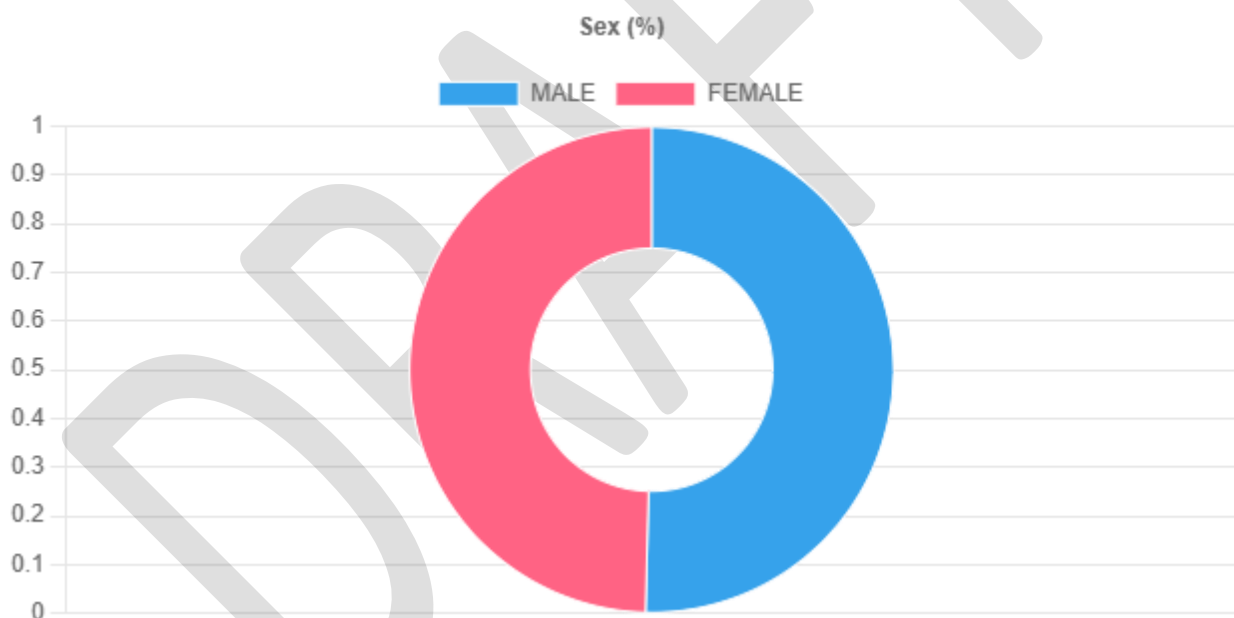
Photograph 7: Site Photographs - before site clearance commenced
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

November 2025

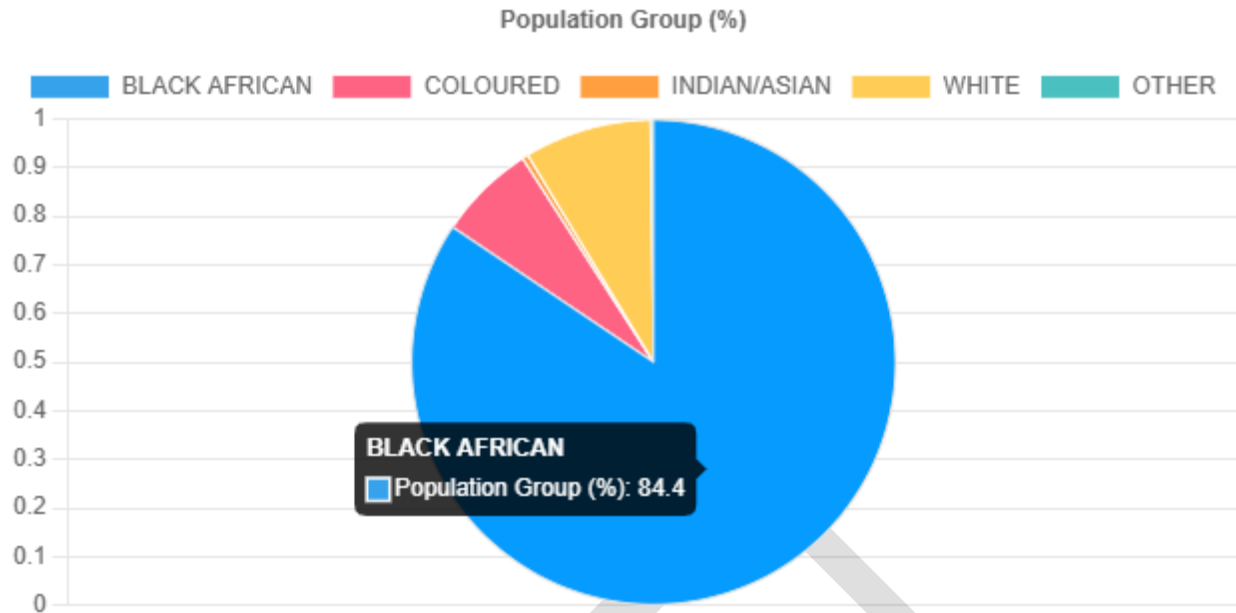
2.6 Socio-Economic Environment

The information provided in this section is based on the Census 2022 data (<http://www.statssa.gov.za/>) for the Rand West City Local Municipality.

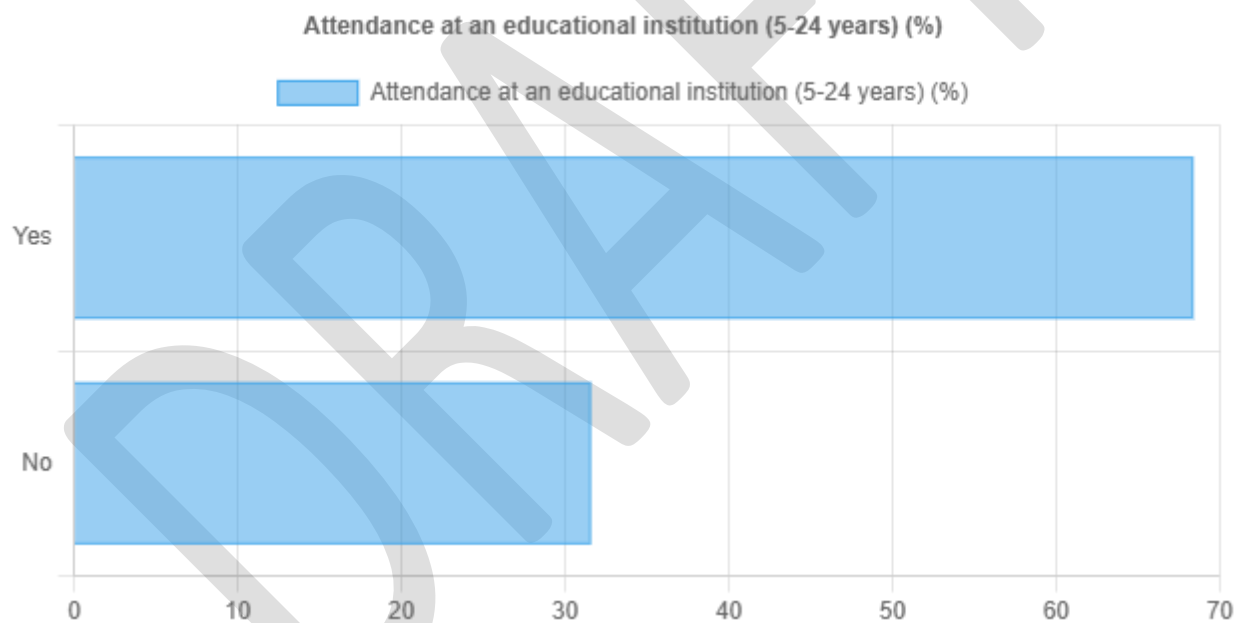
According to the Census Data (2022), RWCLM has a population of approximately 334 773. Most of the population is Black African, and according to the date the population is a 50/50 split between male and female. Approximately 68.4% of the population attended an educational institution (5-24 years) and 89.5% of the population has a formal dwelling. The population of Randfontein and Weston aria is reliant on the local municipality to provide water and a proper sewer system, there is only a handful of the population that either has a borehole or their own sewer system. Proper services provided by the municipality are therefore essential. The population data are comprised of the following and presented in the graphs below; Gender, Population Group, Education, Household Type, Water Source and Sewer System (Toilet Facilities). The graphs below is an extract from the Census Data (2022):



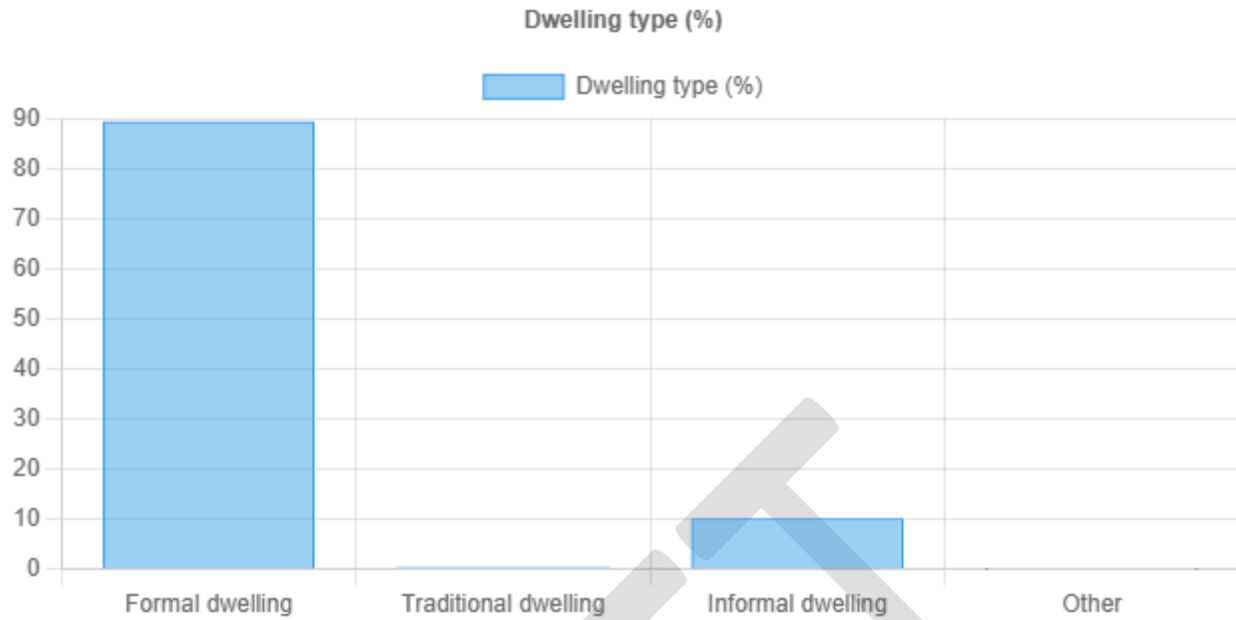
Graph 1: Gender combination for RWCLM



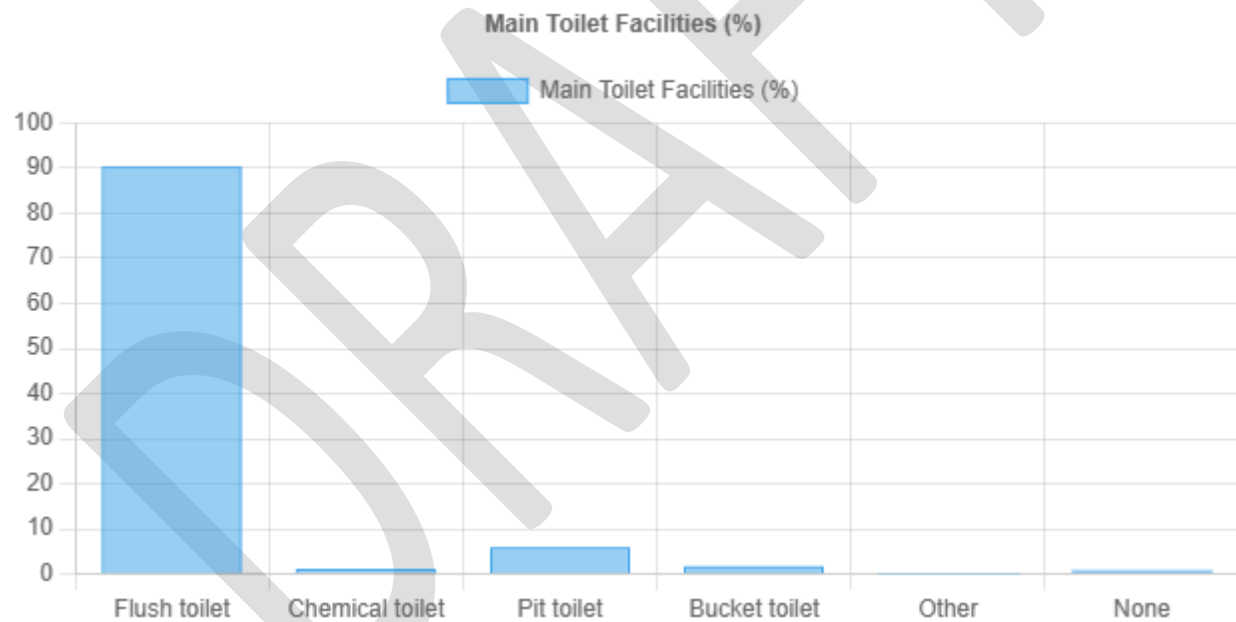
Graph 2: Population Groups for RWCLM



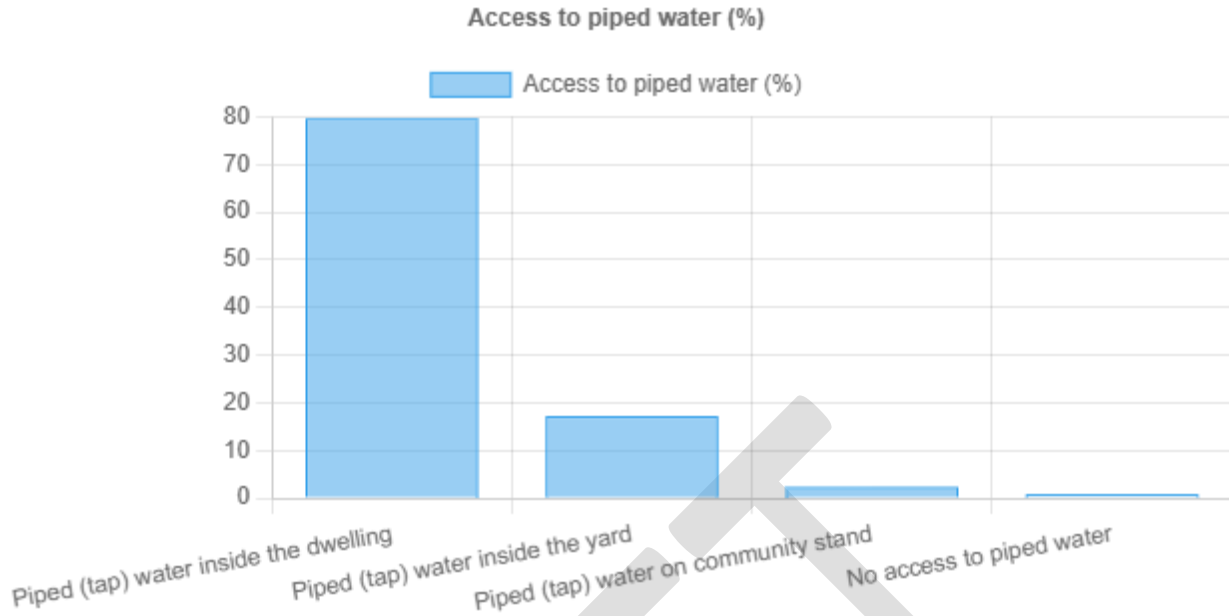
Graph 3: Level of Education for RWCLM



Graph 4: Dwelling type for households in RWCLM



Graph 5: Toilet/ Sewer System for RWCLM



Graph 6: Access to piped water for households in RWCLM

2.7 Future Development

Future development planned for the study area is mostly residential development. These developments include the following, refer to Aerial View 3: Land Use for the location of the proposed developments:

- Finsbury Agricultural Holdings
- Ridgeview
- Toekomsrus Extension 4
- Bundu Inn Development
- Mohlakeng Extension 13, 14 and 15
- Montrose Phase 1 and 2
- Dan Tloome Phase 1, 2, 3 and 4



Aerial View 3: Proposed Future Developments

RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

January 2026

3. PROJECT DESCRIPTION

The Pelzvale WWTW will have a final capacity of 60ML and will be constructed in phases, the first phase will accommodate for 20ML and after the WWTW will be expanded by 20ML as the demand in the area increases.

The WWTW infrastructure will include the following components:

- Screening and De-gritting
- Primary Settling Tanks
- Balancing Tank
- Flow Division Structure
- BNR Activated Sludge Configuration/ Reactors (3x 20ML)
- 2 Clarifiers (Clarification)
- Chlorine Contact Tank (Disinfection)
- Maturation Dam
- Outfall sewer line for the discharge
- Administrative Building with ablution facilities
- Access road and internal roads
- Organic matter/ fertiliser storage area
- Fencing and security guards
- Bulk electricity supply
- Storm water management system

The information below was provided by the Project Engineers, refer to the schematic illustration below, Figure 4: Schematic Illustration and Aerial View 4: Proposed Layout Plan, and the Design Report (Appendix B).

3.1 Screening at the Head of the Works and De-gritting

A three-channel inlet is proposed. The head of works needs to be constructed for the final capacity of 60 ML/day. During the initial operating phase two 20 ML/day ADWF channels will be utilized while the third will serve as a standby unit. The three interconnected channels will house:

- i. Three parallel screening stations with coarse and fine mechanical screening units, screenings transfer units and screenings washers discharging dewatered screenings into skips.
- ii. An overflow by-pass around the mechanical screening section will be equipped with manual coarse hand screens, discharging into a common channel upstream of the vortex degritters.
- iii. Three parallel vortex degritters, each designed for 20 ML/day ADWF and associated with peak flows.

The head of work entails a complicated arrangement of several process units that will take considerable time to finalize. It will require an estimated area of 110 m by 25 m.

The objective of the screens is to remove from the influent wastewater materials any objects that would damage equipment or would interfere with the satisfactory operations of downstream unit processes. The 10 mm tapered front raked coarse screens will be located at the inlet to the wastewater treatment works, upstream of the grit removal system.

The wastewater is first screened via a static bar screen, followed by three mechanical, front-raked bar screens. The screenings will be discharged to a conveyor belt and deposited to a screenings bin. The return flow from the screenings handling area will then enter the mainstream wastewater channel.

The vortex de-gritters provide sufficient retention time and a suitable hydrodynamic environment for the separation of inorganic grit and detritus particles (debris/litter/waste). The accumulated grit is pumped from the bottom hoppers to a dedicated grit classifier. The grit classifier further separates and dewateres the detritus and grit, which are discharged to a separate bin. The return flow from the grit classifier enters the mainstream wastewater channel.

After de-gritting the flow will be screened again tapered front raked fine screens. The flow is then divided and metered into three Parshall flow flumes, which records the total influent flow.

The Head of Works must be able to screen initial minimum hourly flows as well as expected Peak Wet Weather Flow (PWWF) for the design capacity of the Works. Flows exceeding PWWF will be diverted to the Stormwater overflow dam.

3.2 Primary Settling Tanks

The objective of the primary settling tanks (PST) is to remove readily settled suspended solids and scum from the screened and de-gritted wastewater and to reduce the organic load on the downstream biological treatment process units.

- i. Three separate 33 m diameter primary settlers are required for each of the 20 ML/day modules. The primary settlers will be conventional units and will not be equipped for volatile fatty acid production as required for enhanced biological nutrient removal.
- ii. Primary sludge extraction will be controlled to achieve the required concentration and will be pumped directly to the digesters.

3.3 Balancing Tank

The wastewater flow and quality will fluctuate substantially during the day. During the early morning hours, the quality of the wastewater is fairly diluted, while it will be more concentrated during daytime hours. The Balancing Tank will provide sufficient retention time to balance the diurnal pattern of wastewater flow and load. Due to the lack of inflow data, a 6-hour retention time was used to calculate the required size of the Balancing Tank. The Balancing Tank will have four separate compartments which will allow periodic cleaning of the tanks. The first compartment will be constructed during Phase 1 and the second during Phase 2. Flow in excess of Peak Dry Weather Flow (PDWF) will be diverted

to the stormwater overflow dam, via overflow weirs after the measuring flumes and overflow weirs in the Balancing Tank. The Balancing Tank will be mixed with platform mounted, vertical spindle mixers to keep suspended solids in suspension.

3.4 BNR Activated Sludge Configuration

The BNR process ultimately will consist of three 20ML/d reactors. The expected temperature for winter is 13°C and for summer 23°C. The intended Mixed Liquor Suspended Solids (MLSS) for winter is 4500 mg/l and 3500 mg/l for summer. The plant is able to operate in “3 Stage Phoredox, UCT, Modified UCT (MUCT) and Johannesburg (JHB)” process mode.

Each reactor will consist of the following:

3.5.1 The Pre-Anoxic Zone

The pre-anoxic zone of each reactor receives the return activated sludge (RAS or s-Recycle) from the Secondary Settling Tank (SST's), when operated in the MUCT and JHB process configurations.

3.5.2 The Anaerobic Zones

The anaerobic zone receives the following streams:

- Raw sewage from the balancing tank,
- The return activated sludge (RAS or s-Recycle) from the SST's, when operated in the 3 Stage Phoredox process configuration. The recycling rate may vary between 0.75 x ADWF and 1.5 x ADWF, and
- The r-Recycle flow from the anoxic zone, when operated in the conventional UCT process configuration. This r-Recycle is abstracted at the end of the anoxic zone. For the modified UCT process, the r-Recycle is abstracted from end of the pre-anoxic zone. The recycling rate is 1 x ADWF.

3.5.3 The Anoxic Zones

The main anoxic zone receives the following streams:

- Mixed liquor from the anaerobic zone when operated all modes except Modified UCT
- The return activated sludge (RAS or s-Recycle) from the SST's, when operated in the conventional UCT process configuration. The recycle rate may vary between 0.75 x ADWF and 1.5 x ADWF.
- The a-recycle flow from the aerobic zone, when operated in the conventional 3 Stage Phoredox, UCT, MUCT and JHB, process configurations. This recycle is abstracted from the end of the aerobic zones and the flow rate can be adjusted in accordance with the nitrate concentration in the effluent up to a maximum of 6 x ADWF with three axial flow pumps operational (3 duty, 1 standby).

The a-Recycle rate will be adjustable by running a different number of pumps. Flow will be extracted from the aerobic zone into a suitably sized canal fitted with a flow measuring flume and separate discharge points depending on the treatment process selection.

Allowance will be made to abstract mixed liquor from the anoxic zone (for the r-Recycle stream) at two different locations within the zone according to the process configuration chosen by means of two axial flow pumps (duty and stand), fitted with a variable speed drive (VSD). The recycle rate from the anoxic zone (i.e. r-Recycle can be adjusted in accordance with the phosphate concentration in the effluent stream. The process has been designed to operate at an expected optimum with the r-Recycle in the order of 1 to 1.5 x ADWF, which can be changed by adjusting the speed of the pump.

The selection of the internal recycles will be manual and all flows will be measured by either utilising flumes in open canals or discharge over weirs.

3.5.4 The Aerobic Zone and Aeration Requirements

The aerobic zone receives flow from the main anoxic zone. The aeration capacity are based on oxygen transfer rates under standard conditions and adjusted for site conditions. A drop between the un-aerated and aerated zones is required to prevent back mixing.

Excess sludge (WAS) will be wasted from both the end of the aerobic zone of the BNR and from the Sludge Return Flow stream.

3.5.5 Surface Aeration

Air will be introduced into the mixed liquor by means of a series of staged surface aerators (bubble aeration can also be investigated).

Low dissolved oxygen concentrations have been noted more than any other cause for the production of MLSS with poor settling characteristics into what is known as bulking sludge, which defines a condition in the activated sludge clarifier that can cause high effluent suspended solids and poor treatment performance.

The mechanical aeration equipment has therefore been sized to maintain a Dissolved Oxygen (DO) concentration of 2 mg/l in the aeration basin as higher values will constitute a wastage of energy.

The aerators will be equipped with timers which will switch the units on and off based on the DO levels in the reactor. In addition, an adjustable tilting weir will be provided at the outlet to control the immersion and therefore the power drawn by the aerators. The weir will be equipped with an actuator that receives a signal from one or more DO meters indicating the required oxygen demand.

3.5 Clarification

Two 33 m diameter clarifiers will be required per 20 ML/day reactor. Sludge return to the activated sludge reactor will be facilitated with the aid of a variable speed self-priming pump coupled directly to the clarifier sludge outlet, discharging into the inlet of the AS reactor.

The clarifiers will have a 4m side wall depth to separate the return activated sludge (RAS) from the effluent (the third module will be constructed during Phase 2). An upwards velocity of 0.7 m/h will be maintained peaking at 0.8 m/h. Flux loading in summer can be expected to be 50 kg TS/m²/day and 65kg/m²/day in winter. The tanks will be designed with sloping floors and sludge will be scraped towards a central sludge collecting hopper with a logarithmic spiral type scraper assembly suspended from peripherally driven bridge. Sludge will be withdrawn to the sludge pump station.

Treated effluent will flow over V-notch weirs into a peripheral launder. The effluent from the clarifier is collected in a common effluent channel. At the end of the channel, the flow is measured in a venturi flume. The typical return activated sludge concentration will be 0.6 to 1.5% peaking at 2.0 to 3.0%

3.6 Disinfection

Gas chlorination is proposed. Although a single chlorine contact tank was called for, two similar parallel units are proposed with adequate capacity to treat the ultimate 60 ML/day (i.e. two 30 60 ML/day units). This configuration will allow for the cleaning of one unit while the other remains in service. The chlorination facility will consist of two main elements:

- ✓ A Chlorination building of 20 m by 10 m will house chlorine tanks as well as the pumps and dosing equipment.
- ✓ Two chlorine contact tanks with a 2.5 m water depth, each a footprint of 9 m x 35 m.

The effluent from the secondary clarifiers will be collected in a common sump and then ultimately distributed into a chlorine contact tank. The chlorine dosing facility will have the flexibility of dosing between 4 and 8 mg/l at the inlet weir. The contact tanks provide 15 minutes contact time at PWWF. An auto analyzer will be installed after the chlorine contact tanks. Sloping floors will be provided on the floor of the tank to allow for pumping out the contents of the tank.

3.7 Anaerobic Digesters

Anaerobic digestion is an energy effective process to stabilize sludge extracted from the PST's as well as waste sludge from the activated sludge reactor. High-rate anaerobic digesters are quite complex and require mixing, boilers, heating, methane gas collection and storage, methane conditioning, etc. High-rate anaerobic digesters also have the option to add combined heat and power systems. This equipment would, however, add significant complexity to the system but could have the capacity to generate in the order of 500 kW electrical power if the 60 ML/day plant is fully loaded.

For Pelzvale it was opted to use low-rate anaerobic digesters. One of the disadvantages of the low-rate digesters is that the required capacity is about double, so one 6 000 kL digester is required per 20 ML/day module. In order to treat the sludge from three 20 ML/day modules, three anaerobic digesters are required with a diameter of 20 m and an effective depth of 20 m. It is proposed that these digesters are equipped with mixing pumps to improve performance.

3.8 Sludge Drying

The process of sludge drying will encompass the mechanical dewatering by means of a belt press and solar drying to effectively reduce moisture content. Initially, the belt press removes excess water from sludge via mechanical dewatering, producing a semi-solid cake with about 18-20% solids content. This cake will then be transported into a greenhouse designed for solar drying where it's evenly distributed across floors or trays for optimal sunlight exposure and air circulation; regular turning prevents matting and ensures uniform evaporation of moisture as water vapor over several weeks—typically three to four—depending on weather conditions.

The dewatering building is sized to accommodate a dewatering capacity for the ultimate 60 ML/day although dewatering belt presses will be installed to handle sludge from each of the modules as they are phased in. The proposed dewatering building will have a footprint of 25 m x 25 m. A dewatered transfer system will discharge sludge into skip located outside the building, on a concrete paved area of 100 m x 100 m which will allow for the skips as well as an area to store sludge when required.

In addition to the belt filter dewatering facility, sludge drying beds sized to handle sludge for one 20 ML/day module are proposed as a backup facility. The area required for the proposed drying beds is 103 m by 120 m.

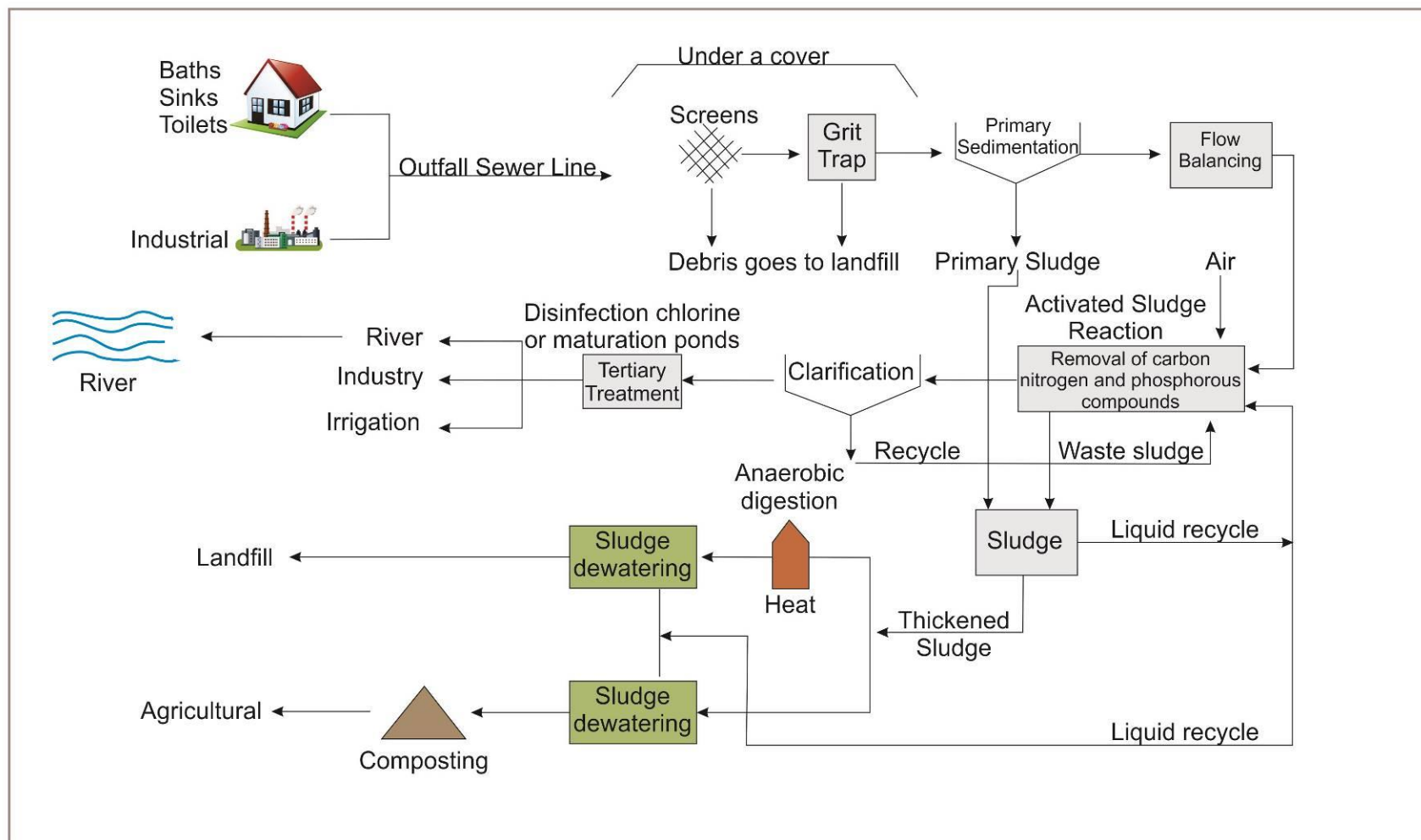
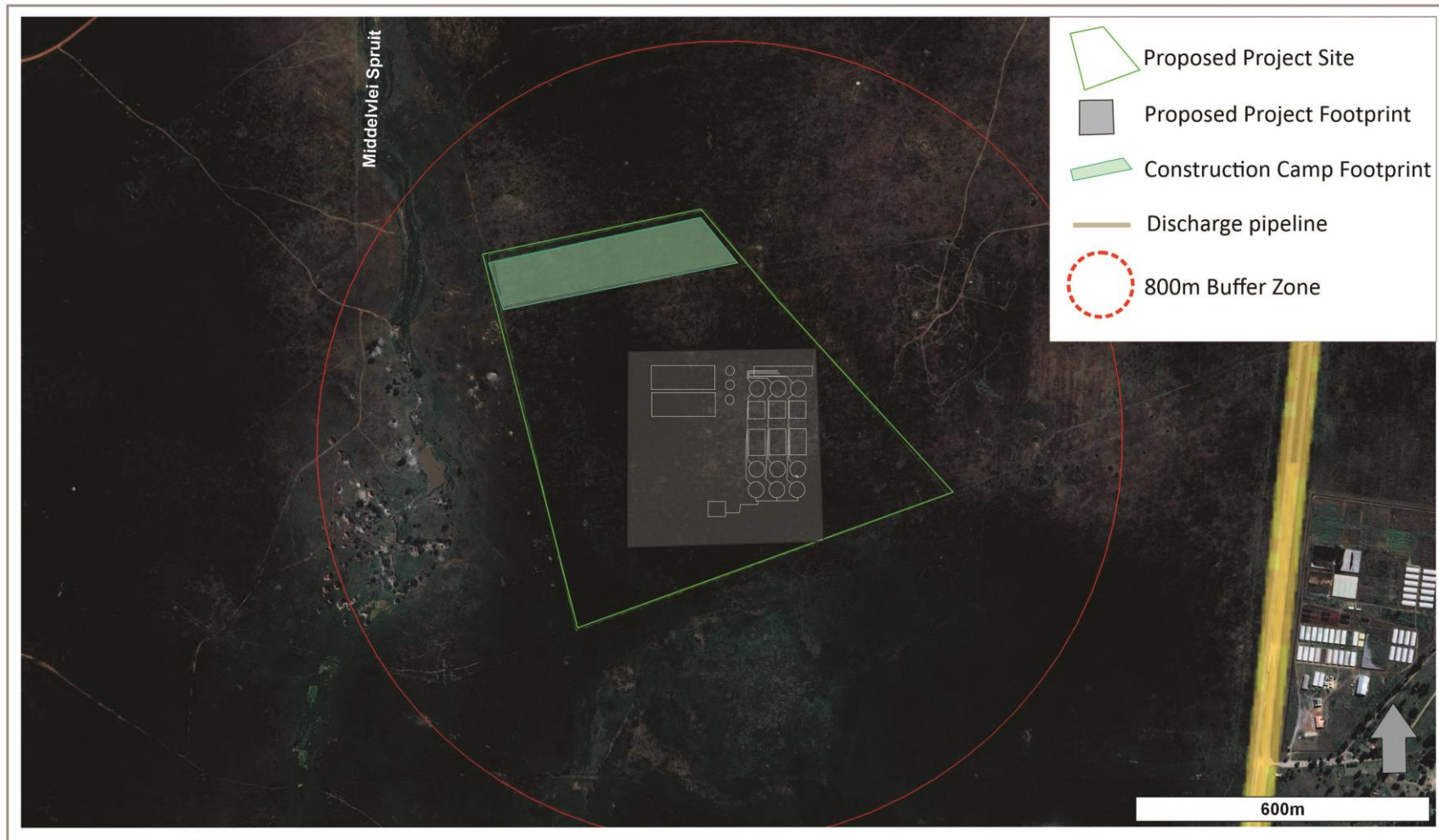


Figure 4: Schematic presentation of the process
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

March 2020



Aerial View 4: Proposed Layout Plan
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW
December 2025

4. LEGISLATION

4.1 The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

The Constitution of South Africa (No.108 of 1996) is an essential part of legislation that provides a framework for environmental management in South Africa. The Bill of Rights (Section 24) in the Constitution of South Africa (No.108 of 1996) states that everyone has the right to a non-threatening environment and requires reasonable measures to be implemented to protect the environment. Section 24(b) (i) encourages prevention of pollution and ecological degradation and Section 24(b)(iii) promotes ecologically sustainable development. These principles are embraced in NEMA and processes and procedures are identified within NEMA to ensure the protection of the environment.

The Constitutional mandate of all Local Municipalities, is described in Chapter 7, and specifically Section 152(1)(d) of the Constitution which requires of Local Government to promote a safe and healthy environment, this would include:

- Air pollution
- Building regulations
- Electricity and gas reticulation
- Local tourism
- Municipal planning
- Municipal health services
- Municipal public transport
- Pontoons, ferries, jetties, piers and harbours, excluding the regulation of international and national shipping and matters related thereto
- Storm-water management systems in built-up areas
- **Water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems**

4.2 The Municipal Systems ACT, 2002 (ACT 32 of 2002)

Municipal Systems Act (Act 32 of 2002) Chapter 2, Section 4, states that a "...municipality, within the municipality's financial and administrative capacity and having regard to practical considerations, has the duty to -

- Exercise the municipality's executive and legislative authority and use the resources of the municipality in the best interests of the local community;
- Provide, without favour or prejudice, democratic and accountable government;
- Encourage the involvement of the local community;
- Strive to ensure that municipal services are provided to the local community in a financially and environmentally sustainable manner;
- Consult the local community about- the level, quality, range and impact of municipal services provided by the municipality, either directly or through another service provider; and the available options for service delivery;

- Give members of the local community equitable access to the municipal services to which they are entitled;
- Promote and undertake development in the municipality;
- Promote gender equity in the exercise of the municipality's executive and legislative authority;
- Promote a safe and healthy environment in the municipality; and
- Contribute, together with other organs of state, to the progressive realisation of the fundamental rights contained in **Sections 24, 25, 26, 27 and 29** of the Constitution." (from the Municipal Systems Act, Chapter 4, own emphasis)

4.3 National Environmental Management Act

The National Environmental Management Act (Act 107 of 1998) sets out the principles of Integrated Environmental Management (IEM), which should be applied to ensure sustainable development. The IEM procedure aims to ensure that the environmental consequences of development proposals are understood and adequately considered during all stages of the project cycle, and that negative aspects are resolved or mitigated and positive aspects enhanced. NEMA aims to promote sustainable development, with wide-ranging implications for national, provincial, and local government. Included amongst the key principles is that all development must be environmentally, economically and socially sustainable and that environmental management must place people and their needs at the forefront, and equitably serve their physical, developmental, psychological, cultural and social interest.

As per the National Environmental Management Act 107 of 1998 (NEMA), Environmental Impact Assessment Regulations 2014, as amended, the proposed Pelzvale WWTW and associated infrastructure will trigger activities listed in Listing Notice 1 (GN R327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324). The process that was followed in order to receive an Environmental Authorisation was a Scoping/ Environmental Impact Assessment Process, as per the Regulations. This process was however halted and the Section 24G process followed instead.

Table 7: Activities triggered according to the NEMA Listing Notices

Government Notice	Listing Notice & Activity	Description of Activity	Section 24G
GN. R 327, 7 April 2017	Listing Notice 1 Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or 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.	Although construction started by clearing of vegetation, establishing a site camp and construction of the access road, this Activity wasn't triggered. The alignment of the pipeline must still be confirmed.
GN. R 327, 7 April 2017	Listing Notice 1 Activity 10	The development and related operation or infrastructure exceeding 1 000metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – i. With an internal diameter of 0,36 meters or more; or ii. With a peak throughput of 120 liters per second or more; Excluding where – a. Such infrastructure is for the bulk transportation of	Although construction started by clearing of vegetation, establishing a site camp and construction of the access road, this Activity wasn't triggered. The alignment of the pipeline must still be confirmed.

		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.	
GN. R 327, 7 April 2017	Listing Notice 1 Activity 12	The development of— i. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or 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 d) from the edge of a watercourse; — excluding— aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;	Construction started by clearing of vegetation, establishing a site camp and construction of the access road, the clearance of vegetation has encroached into the watercourse buffer.

		cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; dd) where such development occurs within an urban area; ee) where such development occurs within existing roads, road reserves or railway line reserves; or ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
GN. R 327, 7 April 2017	Listing Notice 1 Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will	Construction started by clearing of vegetation, establishing a site camp and construction of the access road, the clearance of vegetation has encroached into the watercourse buffer.

		not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	
GN. R 325, 7 April 2017	Listing Notice 2 Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— - the undertaking of a linear activity; or - maintenance purposes undertaken in accordance with a maintenance management plan.	This activity was triggered since the construction included the removal of vegetation for both the site establishment and construction of the access road. In addition to the removal of the vegetation, none of the plant species, as listed in the specialist report, was removed before the Applicant started with site clearance. These include the following species: - African potato (<i>Hypoxis hemerocallidea</i>) - Century plant (<i>Boophone disticha</i>)
GN. R 325, 7 April 2017	Listing Notice 2 Activity 25	The development and related operations of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15 000 cubic metres or more.	This Activity was triggered since construction started by clearing of vegetation, establishing a site camp and construction of the access road.
GN. R 324, 7 April 2017	Listing Notice 3 Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. <u>Gauteng</u> Within any critically endangered or endangered	This activity was triggered since the construction included the removal of vegetation within an area that is classified as a CBA. In addition to the removal of the vegetation, none of the plant species, as listed in the specialist report, was removed before the Applicant started with site clearance. These include the following species:

		ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	• African potato (<i>Hypoxis hemerocallidea</i>) • Century plant (<i>Boophone disticha</i>)
GN. R 324, 7 April 2017	Listing Notice 3 Activity 14	The development of— iii. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres; or iv. 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;	Construction started by clearing of vegetation, establishing a site camp and construction of the access road, the clearance of vegetation has encroached into the watercourse buffer.

		<u>Gauteng</u> i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus Areas; iii. Gauteng Protected Area Expansion Priority Areas; iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority; vii. Sites or areas identified in terms of an international convention; viii. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA; ix. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or	
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		x. Sites zoned for conservation use or public open space or equivalent zoning.	
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4.4 National Water Act (Act 36 of 1998)

According to the National Water Act (Act 36 of 1998) there are different types of water uses (*Section 21 of the Act*):

- a. taking water from a water resource;
- b. storing water;
- c. **impeding or diverting the flow of water in a watercourse;**
- d. engaging in a stream flow reduction activity contemplated in section 36;
- e. engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1); with specific reference to irrigation of any land with waste or water containing waste generated through any industrial activity or by a water work.
- f. **discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;**
- g. disposing of waste in a manner which may detrimentally impact on a water resource;
- h. disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i. **altering the bed, banks, course or characteristics of a watercourse;**
- j. removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k. using water for recreational purposes.

If any of the above-mentioned water uses are applicable to a project, it will require a Water Use License from the Department of Water and Sanitation (DWS). The proposed project will require a Water Use License (WUL) since the project will dispose of water which has gone through an industrial cycle.

The clearance of the vegetation encroached into the buffer area of the watercourse and therefore Activity c and i are triggered. The water use license process has not yet commenced but DWS was informed of the activities on site.

4.5 Bylaws/ Policies

The following Bylaws/ Policies and Guidelines were also taken into consideration:

- Rand West City Local Municipality 2023/24 - Draft Integrated Development Plan.
- West Rand District Municipality Wetland Report, 2017.
- West Rand District Municipality Air Quality Management Plan, 2010.
- West Rand District Rural Development Plan, 2016.

4.6 Other Policies/ Guidelines

The following Policies and Guidelines were also taken into consideration:

- Gauteng Pollution Buffer Zones Guideline, March 2017
According to the guideline the best-case buffer of 800m and worst-case buffer of 500m must be maintained for Sewage treatment works.
- Gauteng Conservation Plan (C-Plan), Version 4

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5. PROJECT ALTERNATIVES

According to NEMA (Act 107 of 1998), Environmental Impact Assessment Regulations 2014, as amended on 7 April 2017, the proposed project must include or consider alternatives, whether the alternatives are different locations, methodologies used, technology or even a different land use.

During the Scoping Phase the following alternatives were considered:

- Site location on the proposed properties;
- Alternative access routes to the proposed site;
- Alternative uses for the sludge.

5.1 Site Location

The proposed property used for the location of the Pelzvale WWTW was bought by the Rand West City Local Municipality from one of the local mining companies. The property is one of a few properties available for the use of the Municipality and when considering the need for a new WWTW within that area the proposed property was ideal since it is located downstream of the developing area. Although the property is almost 648ha in extent there were a few issues that had to be taken into consideration in order to get the best possible site for the WWTW footprint on the proposed property. The following issues restricted the placement of the WWTW, refer to Aerial View 5: Site Selection:

- According to the GDARDE C-Plan there is a watercourse (pan) located on the southern section of the farm Gemspost;
- The Wonderfontein Spruit runs along the southern boundary of the farm Gemspost;
- There is an Eskom Transmission Line that runs in a north-east, south-west direction across the southern section of the farm Gemspost;
- The Middelvlei Spruit traverse the western section of the farm Gemspost;
- The R28, main road between Randfontein and Westonaria, forms the eastern boundary of the farm Gemspost;
- The property directly north of the farm Gemspost is agricultural smallholdings (residential) and according to the GDARDE Pollution Buffer Guideline (2017), the best-case buffer of 800m and worst-case buffer of 500m must be used.

Based on the above-mentioned issues the following measurements were used in order to get a section on the property (farm Gemspost) that would comply with the various Guidelines and Policies.

- The Pelzvale WWTW footprint must be located outside the buffer zone of the watercourse, which in this case was identified as a pan;
- The Pelzvale WWTW footprint must be located further than 500m from the Wonderfontein and Middelvlei Spruit;
- The Eskom Transmission Line had a servitude of 80m that was taken into consideration;

- It was decided to use the best-case buffer of 800m from the nearest residential area which was the Pelzvale/ Randfontein South Agricultural Holdings.

Taken that into consideration a triangular site was identified in which the proposed Pelzvale WWTW footprint could be placed. This area identified was the original site (old site) that was used by the specialist for the various specialist studies and for the purpose of the draft Scoping Report. The site identified was investigated by the Geotechnical Engineer and it was found that the area to the south-west of the site will be more stable and therefore the site location changed slightly. Refer to Aerial View 1: Locality Plan for the new site location.

This, however, meant that all the specialist studies had to be updated to accommodate the changes, this process.

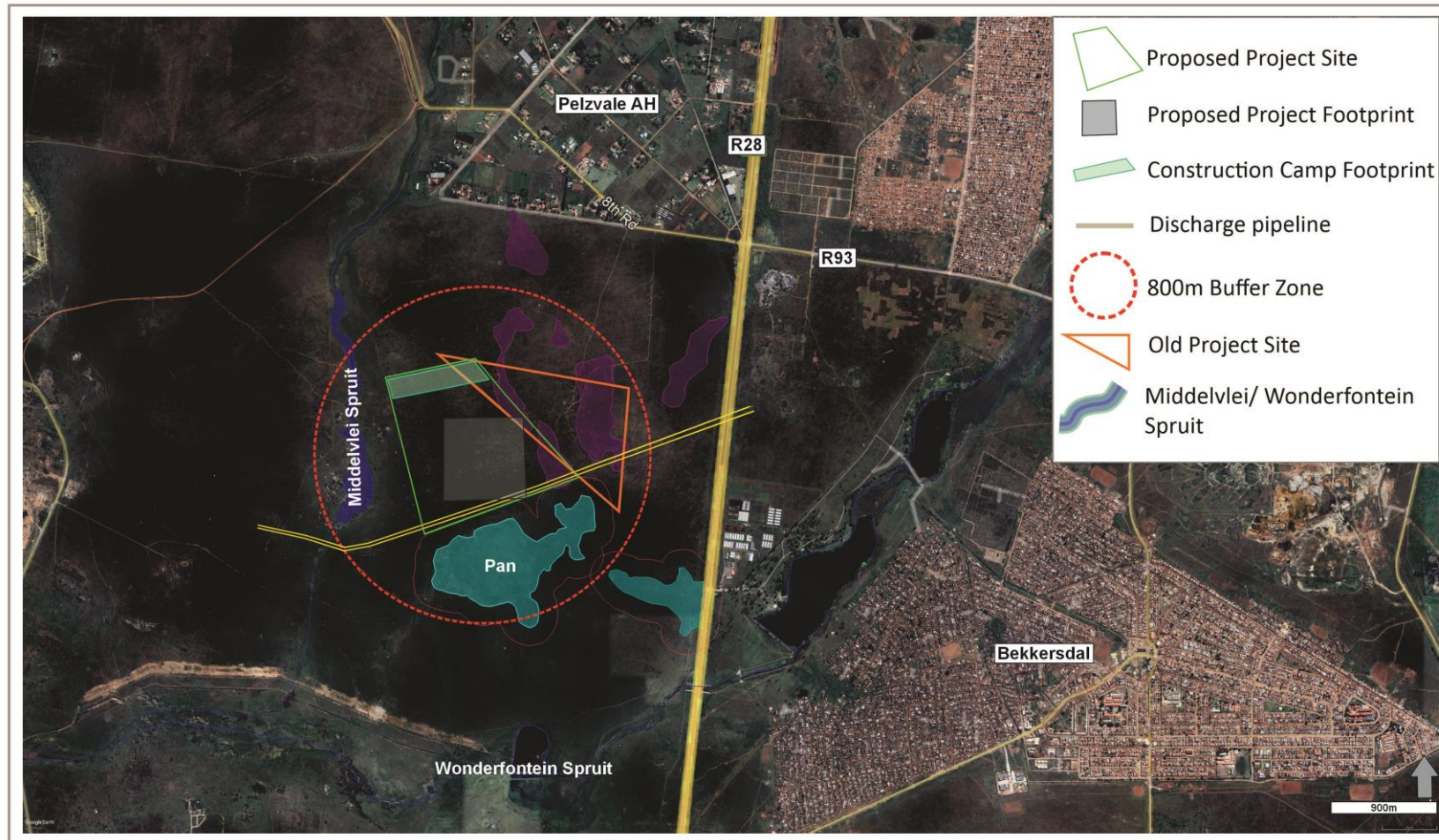
5.2 Access Road

The main access road would be via Third Road (3rd Rd), which turns out of the R28. From 3rd Rd two access roads were proposed for the entrance to the Pelzvale WWTW:

- The first alternative for the access road is approximately at kilometer 0.48, on 3rd Road. This alternative was chosen since there is an existing track that is used by vehicles to access the property or to get access to the Middelvlei Spruit. This alternative will however have to cross one of the 'surface water flow' areas that were identified by the aquatic specialist.
- The second alternative for the access road is approximately at kilometer 0.94, on 3rd Road. This alternative was chosen since it is located between the two 'surface water flow' areas as identified by the aquatic specialist. This road has already been constructed and was one of the activities that triggered the Section 24G process.

Although there were two possibilities for access, Road Alternative 2 has already been constructed and will be the main access from 3rd Road. Road Alternative 1 is still in use as a temporary access road while the contractor completes Road Alternative 2.

3rd Rd is currently a gravel road which is not maintained properly and has a few bigger holes in which water collect during the rainy season. Both 3rd Rd and the proposed access road will be tarred in order for trucks and other vehicles to access the site but also because it will be lower maintenance if the roads are tarred.



Aerial View 5: Site Selection
RAND WEST CITY LOCAL MUNICIPALITY- PELZVALE WWTW

December 2025

5.3 Alternative Uses for Sludge

Traditionally the municipal WWTW has a dry bed that is used to sun dry the sludge that is produced during the waste water treatment process. The sludge is normally used as fertilizer for either 'grass factories' or agricultural activities. The first alternative for the use of the sludge for the Pelzvale WWTW would be as a fertilizer for the local farming community.

The second alternative, is a new concept where the biomass (sludge) is heated in partial or total absence of oxygen in order to make charcoal, this product is known as biochar and the process is mainly pyrolysis. Research has shown that the projects are successful but mainly on a small to medium scale where they are used from VIP-type latrines at rural schools (Hofmeyer, 2018). This process of changing sludge into biochar is still a new concept and there are a few pilot studies in South Africa but it is mainly on a smaller scale. This alternative might not be a solution to recycle and reuse the sludge at the Pelzvale WWTW but could be considered as a small project at the WWTW that could also produce an income for the local community. The biochar can either be used as a source of energy for the WWTW or can be sold to the locals as a source of energy. This alternative must however still be investigated and, as stated above, it is small quantities of sludge that will be used and therefore will not fully replace the traditional way of dealing with the sludge.



Photo 1: Sewage Sludge Charcoal (<https://wasterecyclingplant.com/sewage-sludge-treatment-plant/>)

5.4 No-Go Alternative

The no-go alternative would mean that there will be no development of a WWTW for that specific area, the project will therefore not go ahead. Should this alternative be considered it could lead to service delivery problems for the Local Municipality since the existing WWTW in the area will not be able to accommodate the extra load from the proposed new developments. There is also not sufficient infrastructure (bulk outfall sewer lines) in the area to accommodate the sewerage from the new developments to existing treatment works. The new WWTW forms part of the requirements the Municipality will have to fulfil as a basic need.

6. POSSIBLE IMPACTS AND MITIGATION MEASURES

6.1 Activities causing potential impacts

The following activities are activities that could cause potential impacts, during the construction and operational phase, if not managed properly or if no mitigation measure is implemented. There will be no impacts during the planning phase of the project since this phase will include the preparation of documentation and appointment of the contractors. The activities listed below will be applicable to all alternatives considered:

- Removal of vegetation for the purpose of site clearance/ site preparation.
- Establishment of the site camp/ offices, including the access and material laydown area.
- Access roads and movement of machinery/heavy vehicles/equipment on site.
- Pathways created by workers/ vehicles/ machinery.
- Creating conditions for alien invasive species to propagate (disturbance of soil).
- Hydrocarbon spills/ leakages.
- Washing of equipment/ machinery.
- Mixing/ batching of concrete (cement).
- Poor waste management and littering.
- Stockpiling of soil and material.
- Poor management of water (storm water & potable water).
- Poor management of ablution facilities.
- Random events such as fire.
- Poaching or removal of fauna species.
- Poor management of the rehabilitation process.
- Poor management of the WWTW facility.
- Spillages during operational phase from the plant as well as honey suckers (sewage transport vehicles).
- Incorrect treatment/ operation – odour.
- Flooding or overflow – poor management of storm water.
- Poor management of the environment surrounding the WWTW.

6.2 Potential Impacts

The following impacts are potential impacts that could occur during the construction phase of the project. These impacts are applicable to all the alternatives considered for the Project.

Negative Impacts

1. Loss of habitat, loss of natural vegetation, fragmentation of vegetation/ habitat and the invasion of alien invasive plant species.

Clearance of the vegetation will take place which will result in the loss of natural vegetation but also the possibility of fragmentation of habitat. The proposed WWTW falls outside the areas classified as CBA and ESA, but the discharge pipeline will run through an ecological support area towards the Middelvlei Spruit. The loss in habitat could also lead to the displacement of the faunal community or too, direct mortalities and disturbance due to noise, dust and vibration of vehicles.

Clearance of vegetation and the disturbance of topsoil will lead to the invasion of weeds and alien invasive plant species.

Possible mitigation measures:

- ✓ Should plant species of medicinal value or threatened species be found, the species should be relocated.
- ✓ Site clearance should be done in phases and not all the vegetation at once.
- ✓ Alien invasive species removal must be part of the weekly site clean-up.
- ✓ Fencing of the construction area to avoid accidental death of fauna species on site.

Cumulative impacts:

- ✓ No cumulative impacts are expected due to the clearance of vegetation, loss in habitat and fragmentation.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected due to the clearance of vegetation, loss in habitat and fragmentation.

2. Risk of livestock due to construction activities and hazards associated with it.

During the construction period a section of the grazing fields will be cleared for construction purposes. Various activities such as the movement of plant/ machinery, excavation of trenches, generation of waste and storage of hazardous substance will take place during this period. If the area is not properly fenced there is a possibility that the cattle currently grazing on the properties could be harmed.

Possible mitigation measures:

- ✓ Fencing of the construction area to avoid accidental death of cattle.
- ✓ Closing excavated areas as soon as possible.
- ✓ Storage of hazardous substances in a bunded area or in a secured lockable container.
- ✓ Discussion with the owners of the cattle before construction commences to inform them of the activities that will take place on site.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

3. Encroachment by humans into the remaining natural grassland areas, with associated impacts such as poaching, litter as well as the introduction of pests, diseases and feral species.

With the increase in the construction activities there is a possibility that the activities could encroach into the surrounding natural landscape if the activities on site are not properly contained and managed.

Possible mitigation measures:

- ✓ Fencing of the construction area.
- ✓ Proper waste management on site, within the fenced area.
- ✓ Toolbox talks on possible pests, diseases associated with feral species.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

4. Encroachment by humans into the watercourse areas (wetlands located south of the site; Middelvlei Spruit and Wonderfontein Spruit), with associated impacts such as litter, spills as well as introduction of alien invasive species.

Construction activities will take place within a small section of the Middelvlei Spruit and the associated buffer area when the discharge pipeline is constructed. This could result in encroachment into the watercourse as a result of litter, hydrocarbon spills, movement of the plant/ machinery in unauthorized areas and the invasion of alien invasive species due to the disturbance of topsoil and the removal of vegetation.

Possible mitigation measures:

- ✓ Demarcating the construction area.
- ✓ Proper waste management on site, within the fenced area.
- ✓ Removal of alien invasive plant species.
- ✓ Maintenance of plant/ machinery.
- ✓ Educating the drivers of the plant/ machinery on where they are allowed to drive

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

5. Erosion due to clearance of vegetation, compaction of soil, poor management of stockpiling areas and poor management of rehabilitation process.

During the construction period the vegetation will be removed exposing the soil to erosion during the rainy season. Stockpiling of topsoil could also result in soil being washed away if not properly covered or protected. If construction within the watercourse are not properly managed and the area of construction isn't rehabilitated as soon as possible it could result in erosion along the watercourse.

Possible mitigation measures:

- ✓ Soil stockpiles must be protected or covered to avoid soil from washing away.
- ✓ Rehabilitation must be done as soon as possible.
- ✓ Vegetation must be removed in phases to avoid unnecessary exposure of soil.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ Irreplaceable loss of resources is expected if the topsoil is not properly stockpiled and protected during the construction period.

6. Pollution/contamination of soil, surface water and groundwater due to leakages or spillages of hydrocarbons, cement and other hazardous substances.

During the construction period various hazardous materials/ substances such as hydrocarbons (oils and fuel), cement and paint will be used. If the use of these hazardous materials/ substances is not properly managed it could lead to contamination/ pollution of soil, groundwater and surface water.

Possible mitigation measures:

- ✓ All hazardous material/ substances must be stored in a lockable and bunded area.
- ✓ Drip trays must be provided for all plant/ machinery on site.
- ✓ Mixing or batching must be done in a mixing basin.
- ✓ Spill kits must be available on site for hydrocarbon spills.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ Irreplaceable loss of resources is expected if the soil, groundwater and surface water is contaminated due to leakages or spills on site.

7. Littering/ Waste Management

During construction there is a possibility that workers on site might litter. If the waste is not managed on site it could lead to illegal dumping.

Possible mitigation measures:

- ✓ Provide enough bins on site.
- ✓ Remove all general waste on a weekly basis.
- ✓ Separate the construction waste and rubble. Re-use rubble as part of the filling.
- ✓ Provide skips for the construction waste such as cement bags.
- ✓ Provide waste bins for hazardous waste.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

8. Dust

This is due to construction related activities such as site clearance, excavation, movement of soil and material, and the movement of plant/ machinery on site.

Possible mitigation measures:

- ✓ A suitable dust suppression method must be used to suppress the dust during construction.
- ✓ Water restrictions and the dolomitic environment must be considered.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

9. Noise

Noise caused by construction related activities such as the hooting sound of plant/ machinery when reversing on site or the movement of material.

Possible mitigation measures:

- ✓ Work within suitable working hours (07:00 – 17:00 during week and 07:00 – 13:00 on Saturday, no work on Sunday and public holidays).
- ✓ Inform the community/ neighboring landowners if there will be excessive noise during construction.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

10. Visual impact.

During the construction phase there could be a visual impact due to the site camp and the construction activities on site. If the site is not properly managed, it will become an eyesore for the local community. The facility will also bring a change in the landscape which will result in a change of the current views from the neighboring properties.

Possible mitigation measures:

- ✓ Construction sites must be properly fenced and if possible, a shade net must be used as part of the fencing, this will screen the site from the neighboring properties.
- ✓ Maintenance and management of the construction site must be done on a regular basis, this will include the removal of waste, picking up litter, proper stockpiling of material and soil, and removal of alien invasive plant species.
- ✓ A vegetation screen (trees and shrubs) should be planted around the facility to screen the views from neighboring properties towards the facility.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

11. Socio-Economic

During the construction period there might be an influx of people seeking work and gathering around the construction site. This could become a safety risk and cause a nuisance to the people staying on the neighboring properties.

Possible mitigation measures:

- ✓ The contractor must ensure that the people of the community are part of the construction phase and work opportunities are provided.
- ✓ Fence and secure the site by installing a proper fence and providing guards for the evenings.
- ✓ No accommodation on site.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

12. Traffic

Disruption of traffic due to plant/ machinery using the local roads to access the site. The construction of the access road could also lead to traffic congestion along the local roads.

Possible mitigation measures:

- ✓ Appoint workers that can regulate the traffic.
- ✓ Inform the neighboring landowners if there will be disruption to traffic, especially of trucks transporting abnormal structures will enter the site.
- ✓ Make sure that the roads are safe, maintained and in good condition.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

The following impacts are potential impacts that could occur during the operational phase of the project. These impacts are applicable to all the alternatives considered for the Project.

1. Pollution/contamination of soil, surface water and groundwater.

Spillage of sewage; sludge or any other spillage caused by poor management of the facility could result in the contamination/ pollution of the soil, groundwater and surface water. If the WWTW is, however, properly managed and well maintained the risk of this happening should be low.

Possible mitigation measures:

- ✓ Appoint staff members that have experience in managing WWTW.
- ✓ Make sure that a maintenance plan is followed, and that proper maintenance takes place.
- ✓ Method statements for cleaning spills must be available to all employees.
- ✓ All equipment for cleaning a spill must be readily available.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ Irreplaceable loss of resources is expected if there is a spillage during the operational phase of the project.
2. Reduction in biodiversity and aquatic biota due to spillage of sewage; sludge or any other spillage caused by poor management of the facility.

Possible mitigation measures:

- ✓ Appoint staff members that have experience in managing WWTW.
- ✓ Make sure that a maintenance plan is followed, and that proper maintenance takes place.
- ✓ Method statements for cleaning spills must be available to all employees.
- ✓ All equipment for cleaning a spill must be readily available.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ Irreplaceable loss of resources is expected if there is a spillage during the operational phase of the project.
3. Pollution/contamination caused by littering or dumping of waste generated during the screening and de-gritting process.

Possible mitigation measures:

- ✓ A skip or proper bins must be provided for the waste that is collected at the screening and de-gritting phase.
- ✓ Waste must be disposed of in the correct manner.

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

4. Odour caused by poor management of the facility.

Possible mitigation measures:

- ✓ Appoint staff members that have experience in managing WWTW.
- ✓ Make sure that a maintenance plan is followed, and that proper maintenance takes place.
- ✓ Plant a vegetation screen (combination of trees and bushes).

Cumulative impacts:

- ✓ No cumulative impacts are expected.

Irreplaceable loss of resources:

- ✓ No irreplaceable loss of resources is expected.

Positive Impacts

- b) Implementation or construction of a facility that will accommodate the current and future demand of the area.
- c) Upgrade of existing outfall sewer lines.
- d) Less spills or overflowing sewer systems.
- e) Possible job opportunities (short-term and long-term opportunities) for local residents.
- f) Training opportunities for local residents.

No-Go Option Impacts

With the proposed development that is planned for Randfontein and surrounding areas, the current system will not be able to cope with the influx and will therefore not function optimally. There is already a problem with overflowing sewer pipelines along the R28 between Randfontein and Westonaria. Although these pipeline are being replaced and upgraded it will also require the upgrade or construction of new waste water treatment works in order to treat the waste water. The following conditions will continue if the entire bulk sewer infrastructure and treatment facilities are not upgraded, or new facilities constructed to deal with the demand:

- pollution/contamination of soil, surface water and ground water.
- bad odour.
- health risks.

7. PUBLIC PARTICIPATION

7.1 Public Participation Process for the Section 24G Process

Public participation was done following the process, in terms of Regulation 8 of the Regulations relating to the procedure to be followed and criteria to be considered when determining an appropriate fine in terms of section 24G published in the Government Gazette on 20 July 2017, Gazette No 40994, No. R. 698 ("Section 24G Fine Regulations").

During the pre-application public participation process the following were done:

- Placing statutory advertising on and around site on 7 January 2026, refer to Appendix C for photographic record.
- Emailing notifications to Interested and Affected Parties (I&APs) on 7 January 2026. This included potential I&APs as well as the I&APs that registered during the Scoping Phase of the project.
- Advertising in a local newspaper on 7 January 2026 – Randfontein Herald.
- Notice period for I&APs to register and review the Draft Application and the Draft Section 24G Report is 20 days (7 – 31 January 2026).

Table 8: List of Site Notices/ Adverts

Site Notice	Location (GPS Co-ordinates)	
Site Notice 1	English Notice	At the construction camp site
Site Notice 2	English Notice	Along the newly constructed road
Site Notice 3	English Notice	Along 3 rd Road

- Circulation of the Draft Application and the Draft Section 24G Report to the Councillors, State Departments such as WRDM and DWS, Conservancies and South African Heritage Resource Agency (SAHRA) on 7 January 2026.

7.2 Concerns/ comments received from Interested and Affected Parties

The site notices, newspaper advertisements notices to neighboring property owners and the draft application and report were all submitted to Interested and Affected Parties on the 7 January 2026 for registration and comments. The main concerns received from the community are as follow:

- The commencement of the project without the required authorisations
- I&APs were not informed of the project before construction started
- Additional information was requested

The comments and responses are included under Appendix C which will be submitted with the Section 24G Report and Application to the Department.

8. SPECIALIST STUDIES

In terms of Government Notice R.960 (05 July 2019) and NEMA EIA Regulations, the submission of a Screening Report, generated from the Department of Forestry, Fisheries and the Environment's (DFFE) website, was compulsory for the submission of the Scoping/EIA application for the Pelzvale WWTW Project and is therefore included as part of the Section 24G Application. According to the DFFE's Screening Tool and the Gauteng Department of Agriculture and Rural Development's (GDARDE) Conservation Plan the following sensitivities were identified on site:

- Agricultural potential – areas of both medium and high sensitivity was identified;
- Biodiversity – animal and plant species had a medium sensitivity;
- Aquatic – the project is located within 500m of a watercourse and was identified as a very high sensitive area;
- There might be archaeological artifacts and it was recommended that a paleontological study be undertaken;

The results of the screening tool indicated that the following specialist studies must be considered as part of the impact assessment for the proposed Pelzvale WWTW. The table below provides a list of the specialist studies identified by the DFFE Screening Tool Report (Appendix E) and indicates whether the studies were undertaken or not and a motivation or confirmation of the studies being included or not.

Table 9: DFFE Screening Tool Site Sensitivity and Specialist Studies

Study identified in the DFFE Screening Tool and Sensitivity	Study included as part of EIA?	Motivation
Agricultural Impact Assessment Sensitivity: Medium - High Feature(s): Moderate to high land capability.	No	The entire site is underlain with dolomite and not suitable for intensive agricultural activities. The site is used as a communal grazing area and only a small section of the property will be used for the treatment facility, the majority will still be open for grazing purposes.
Animal Species Assessment Sensitivity: Medium Feature(s): Presence of sensitive animal species	Yes	The biodiversity assessment is included in Appendix F. No significant animal species were found during the site inspection.

i.e., Mammalia - <i>Hydricotis maculicollis</i> (Spotted-necked Otter), <i>Crocidura maquassiensis</i> (Makwassie musk shrew) Invertebrate – <i>Clonia uvarovi</i>		
Aquatic Biodiversity Impact Assessment Sensitivity: Low	Yes	The biodiversity assessment was included as part of the aquatic assessment is included in Appendix F. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Archaeological and Cultural Heritage Impact Assessment Sensitivity: Low	Yes	A Cultural Heritage assessment included in Appendix F and was completed as per the requirements of the National Heritage Resources Act.
Civil Aviation Assessment Sensitivity: Medium Feature(s): Between 8 and 15 km of other civil aviation aerodrome	No	No major or other types of civil aviation aerodromes were found in proximity of the project site. The Johannesburg Light Plane Club is located at the Baragwanath Airfield, within 8km of the study site. The South African Civil Aviation Agency will be consulted during the public participation process.
Defence Theme Sensitivity: Low	No	The identification of the site as low sensitivity considering defence is agreed to by the EAP. The South African National Defence Force (SANDF) will be consulted as part of the Public Participation Process.
Palaeontological Impact Assessment	Yes	A Palaeontological screening assessment must still be completed.

Sensitivity: Very High Feature(s): The project area may comprise features that have a very high paleontological sensitivity		
Plant species Assessment Sensitivity: Medium Feature(s): <i>Khadia beswickii</i>	Yes	An ecological assessment is included as part of the Aquatic Assessment in Appendix F. Two plants were identified that must be relocated before construction starts. - African potato (<i>Hypoxis hemerocallidea</i>) - Century plant (<i>Boophone disticha</i>)
Terrestrial Biodiversity Impact Assessment Sensitivity: Low and Very High along the southern boundary of the site. Feature(s): The project area comprises of an Ecological Support Area	Yes	An ecological assessment is included as part of the Aquatic Assessment in Appendix F.
Geotechnical Assessment Sensitivity: Not indicated	Yes	The detailed Geotechnical Assessment was conducted and the site location and layout was changed due to the results of the investigation, refer to Appendix F. A Dolomitic Investigation was undertaken and included as part of the specialist studies in Appendix F. Design Hazard Class 4: Subsurface conditions characterised as largely reflecting a medium inherent susceptibility of sinkholes and subsidence formation with respect to ingress of water – Inherent Hazard

		Class 4// The inherent susceptibility with respect to groundwater level drawdown is considered to be low to medium – Inherent Hazard Class //1/4
Health Impact Assessment Sensitivity: Not indicated	No	A Health Impact Assessment will be completed if required and after comments are received from the Department.
Hydrology Assessment Sensitivity: Not indicated	Yes	A Hydrology / Surface Water Specialist was appointed. The investigation is still underway.
Odour Assessment Sensitivity: Not indicated	Yes	The draft specialist study is included as part of Appendix F. This study will be revised to include the changes in the layout.
Groundwater Assessment Sensitivity: Not indicated	Yes	A specialist was appointed, and the study is still underway.
Socio-Economic Assessment Sensitivity: Not indicated	No	Social-Economic studies were done as part of the Municipalities requirements and to fund the project. No additional specialist studies will be completed.

Screening Report Map



2 January 2026

Legend

Site Area

National Jurisdiction Area

EIA Application Site

EIA Application Development Footprint

Cadastre

Erven

Farm Portion

Farm

Agri Holding

Public Place

Aquatic Biodiversity Combined Sensitivity

Sensitivity category:

Very High

Low

0 1.75 3.5
km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Figure 3: DEA Screening Tool – Aquatic Sensitivity

Screening Report Map - Animal Species

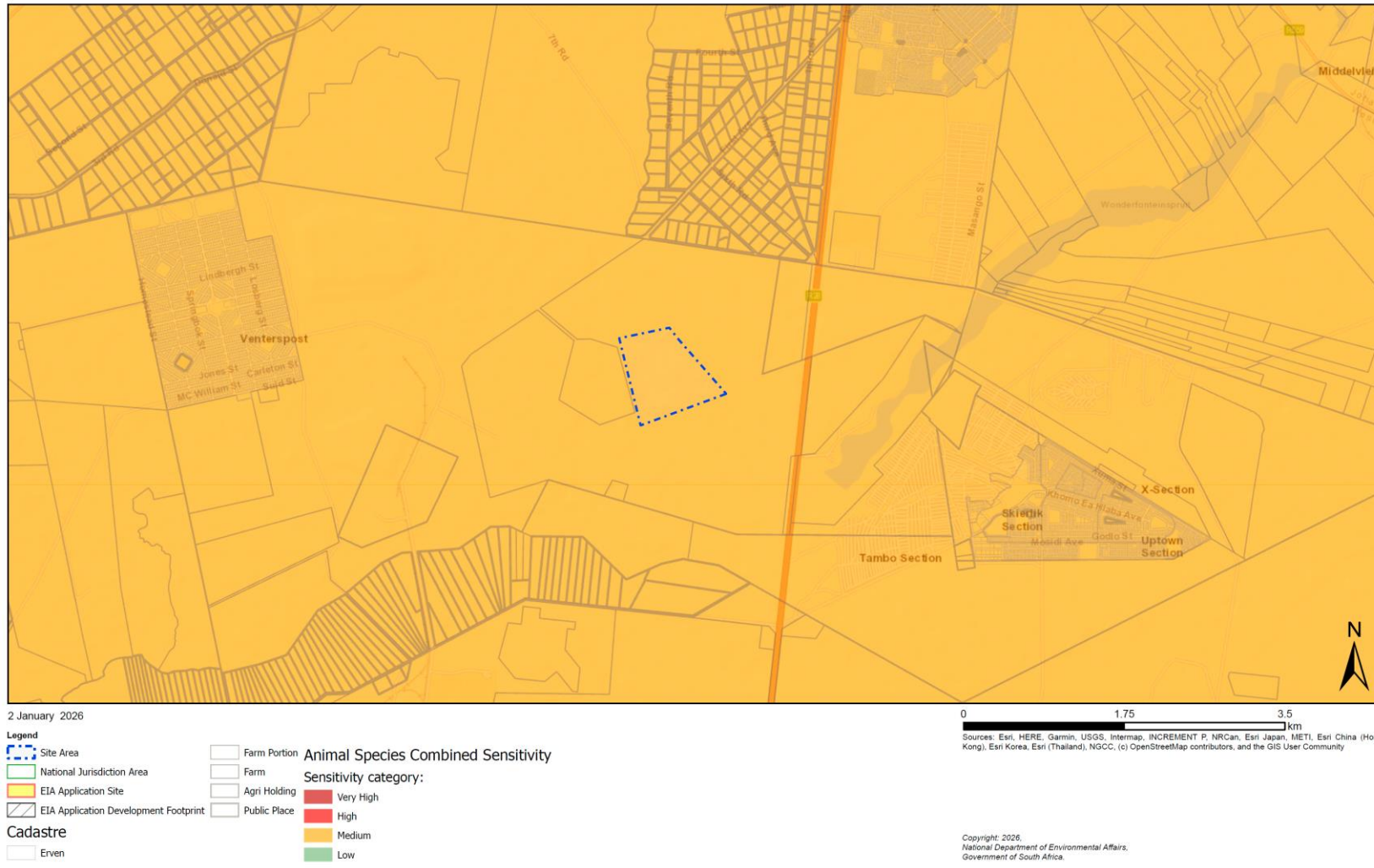


Figure 4: DEA Screening Tool – Animal Species Sensitivity

Screening Report Map - Archaeological

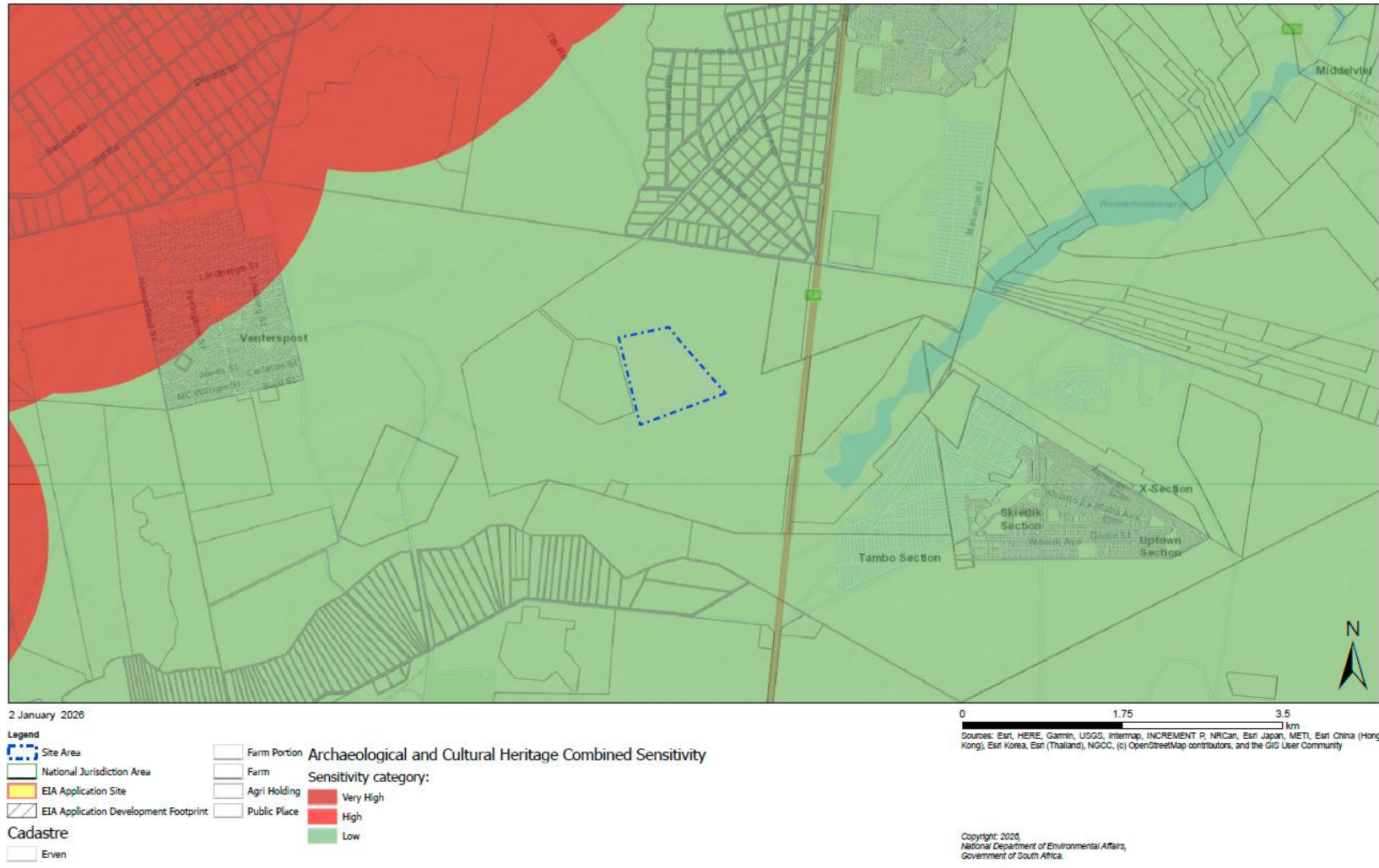


Figure 5: DEA Screening Tool - Archaeological Sensitivity

Screening Report Map - Paleontological

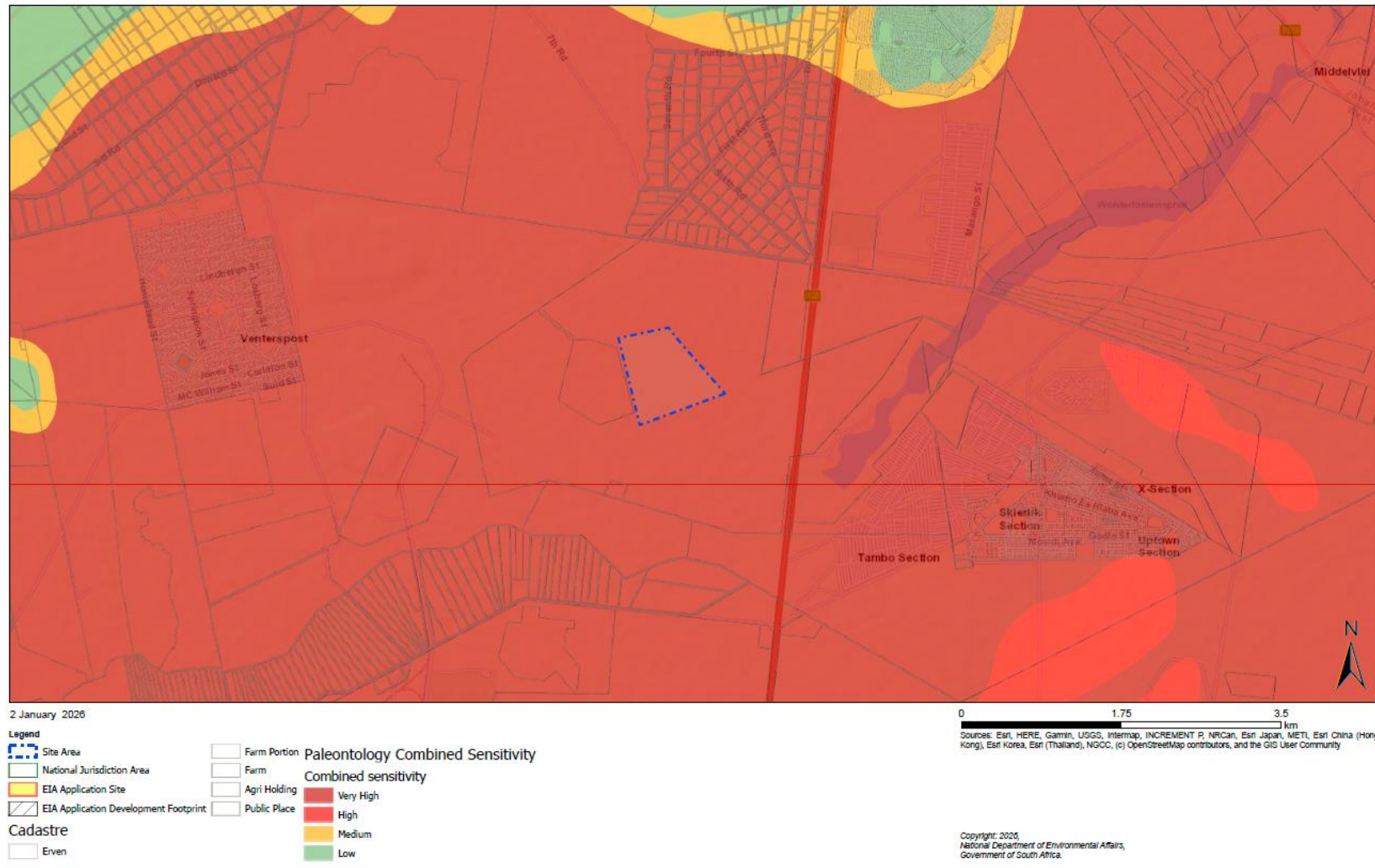


Figure 6: DEA Screening Tool - Paleontological Sensitivity

Screening Report Map - Plant Species

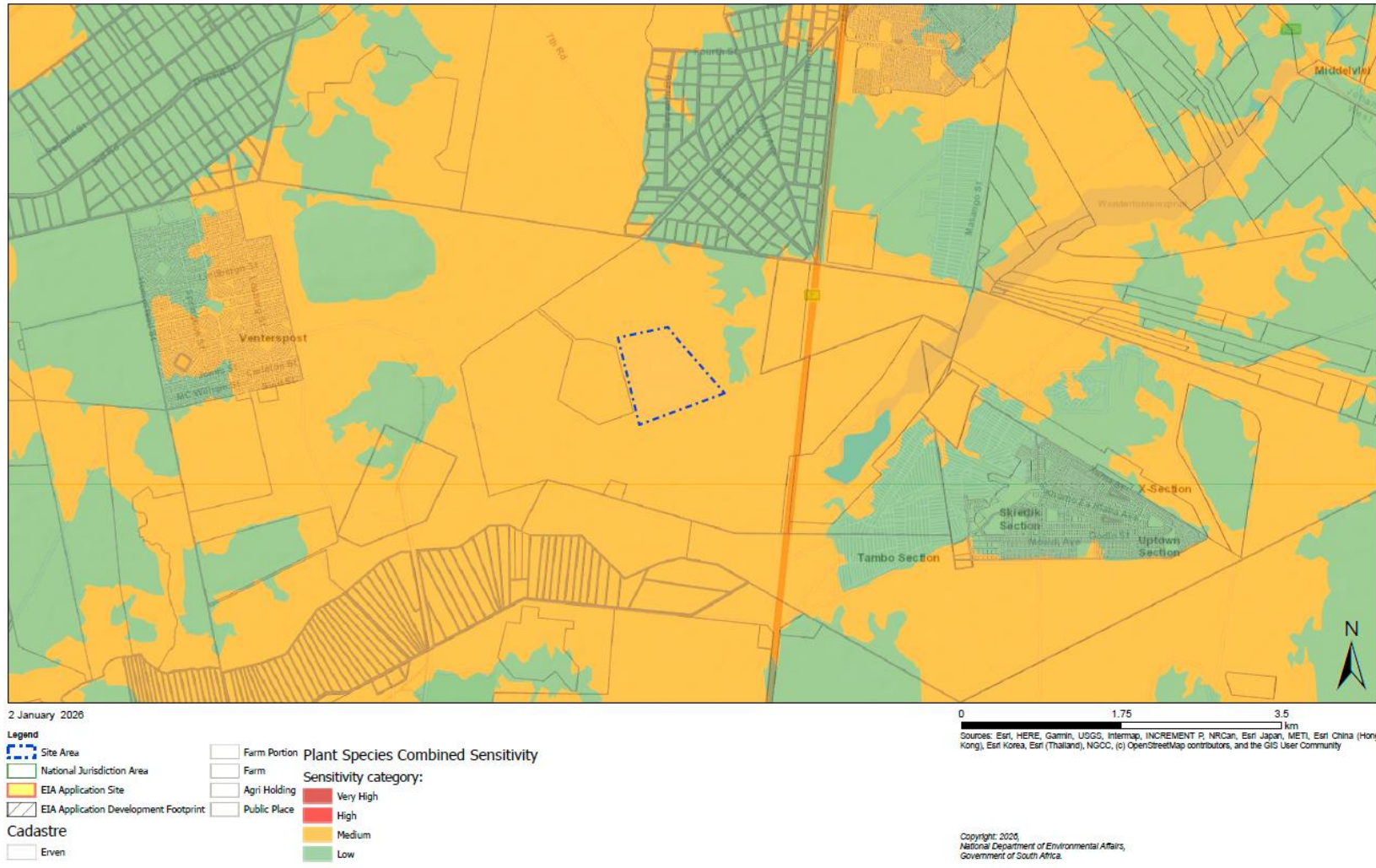
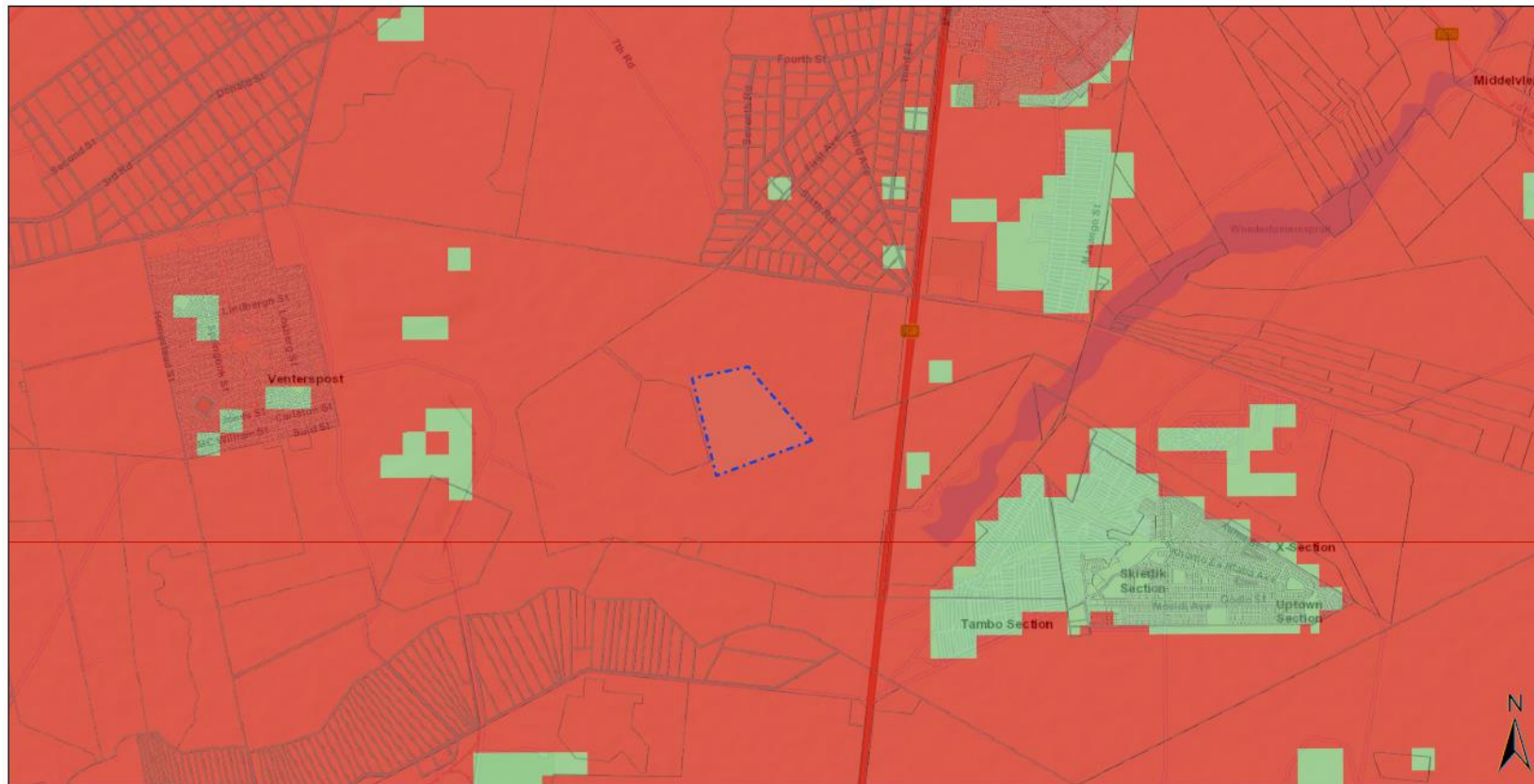


Figure 7: DEEA Screening Tool – Plant Species Sensitivity

Screening Report Map - Terrestrial Biodiversity



2 January 2026

Legend

Site Area

National Jurisdiction Area

EIA Application Site

EIA Application Development Footprint

Cadastre

Erven

Farm Portion

Farm

Agri Holding

Public Place

Terrestrial Biodiversity Combined Sensitivity

Sensitivity category:

Very High

Low

0 1.75 3.5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Figure 8: DEA Screening Tool – Terrestrial Biodiversity Sensitivity

Based on the above-mentioned and the potential impacts discussed under Section 6, the following specialist studies were undertaken or are in process:

- **Aquatic Assessment:** The specialist identified the various watercourses and addressed the impacts the WWTW could have on the biodiversity (fauna & flora) of the area during construction when the site is cleared but also during operational procedures.

According to the specialist (Flori Scientific Services, 2021) there are no major perennial rivers in the study site. There is, however, a small semi-perennial stream (Middelvelspruit) that flows along the western boundary of the study site, and the Wonderfonteinspruit flows east and south of the study site. Although there are no major rivers or streams in the study area there are two wetland areas south and south-east of the proposed Pelzvale WWTW site area.

- **Biodiversity Assessment:** The specialist addressed the impacts the WWTW could have on the biodiversity (fauna & flora) of the area during construction when the site is cleared but also during operational procedures.

The specialist (Flori Scientific Services, 2021) indicated that there are areas of high and medium sensitivity but most of the project footprint will be located on the medium sensitive area. The highly sensitive area is associated with the various watercourses. No significant animal species were identified but two plant species were identified that must be relocated before construction starts (*Boophone disticha*, *Hypoxis hemerocallidea*).

- **Heritage & Paleontological Impact Assessment:** According to the specialist (Leonie Marais, 2021) there are no significant heritage resources on site. The specialist addressed the possible impact on heritage resources during the construction period and the possibility of finding heritages resources / burial sites during excavation. According to Dr Durand (2025) the underlying geology in the study area is dominated by dolomite and chert of the Malmani Subgroup but obscured by soil and vegetation. It is therefore impossible to predict where Plio-Pleistocene cave infills, or significant stromatolite formations may occur in the dolomite of the Malmani Subgroup and therefore development should be undertaken with caution.

The heritage as well as the paleontological assessment were revised and are included as Appendix F.

- **Geo-technical Investigation:** specifically, to determine the dolomite hazardous level of the area and to establish what type of design principle should be considered for the WWTW. The overall site is underlain by dolomite and chert of the Chuniespoort Group, which is susceptible to the development of sinkholes and dolines. According to the specialist the overall study site is classified as D4 dolomite area designation with subordinate D3 zones, in accordance with SANS 1936:2012. Inherent Hazard Class for the site is predominantly IHC 7 which implies a high risk for the development of sinkholes of small (2m), medium (2m – 5m) and large (5m – 15m) sinkholes; a low risk for the development of very large diameter (>15m) sinkholes and a high risk of subsidence. Subordinate zones of IHC 4 was encountered and this implies a medium risk for the development of sinkholes of small (2m), medium (2m – 5m) and large (5m

– 15m) sinkholes; a low risk for the development of very large diameter (>15m) sinkholes and a medium risk of subsidence. Precautionary measures, with respect to the ingress of water and lowering of the groundwater level, should be implemented during the development of the land.

- Air Quality/ Odour: specifically referring to odour and the nuisance it might become for residents staying near the WWTW, referring to Pelzvale and Randfontein South Agricultural Small Holdings. According to the specialist the odour from the WWTW will be at its worst for receptors located within 400m of the project site, this is therefore also the reason why the 800m buffer, as suggested by GDARDE was used. There are no receptors located within the 400m or the 800m buffer and it was recommended that no development occurs within this area. The intensity of the odour can also change depending on the weather conditions. Mitigation measures are, however, available and can reduce the odour from the WWTW. The air quality and odour study was based on the old layout, and the specialist are in the process of updating the report according to the new layout. This is still underway and the revised specialist study will be available by 24 February 2026. This report will be submitted to GDARDE once it is received.
- Groundwater and Hydrological Assessment: a specialist was appointed to undertake groundwater and hydrological assessment. This is specifically aimed at the potential impact the WWTW could have on the neighboring farmers, since most of the neighboring properties use borehole water. The draft report is included as part of Appendix F, the revised report will be available by 24 February 2026 and will be submitted to GDARDE.
- Storm Water Management: The storm water management plan forms part of the hydrological assessment.

All specialist studies will comply with Appendix 6 of the National Environmental Management Act 107 of 1998 (NEMA), Environmental Impact Assessment Regulations 2014, as amended on 7 April 2017.

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 Environmental Impact Assessment Methodology

The potential impacts of the proposed project will be assessed in terms of the following environmental assessment methodology¹, as specified in the NEMA EIA Regulations 2014, amended 7 April 2017:

Nature of the impact

The nature of an impact refers to a description of the inherent features, characteristics and/or qualities of the impact. Thus, each impact will be comprehensively detailed and contextualised prior to being assessed.

Scale/extent of the impact

Extent refers to the impact footprint or stated differently the spatial area over which the impact would manifest. Note that if a species were to be lost then the extent would be global because that species would be lost to the world.

Table 10: Listing of descriptors to the extent of an impact together with definitions that serve to assist in selecting the appropriate rating

Extent Description	Definitions	Rating
Site	The impact footprint remains within the cadastral boundary of the site/ project boundary	1
Local	The impact footprint extends beyond the cadastral boundary of the site/ project boundary, to include the immediately adjacent and surrounding areas	2
Regional	The impact footprint includes the greater surrounding area within which the project is located	3
National	The scale/ extent of the impact is applicable to the Republic of South Africa	4
Global	The scale / extent of the impact is global (or world-wide)	5

Duration of the impact

Duration is the period of time for which the impact would be manifest. Importantly the concept of reversibility is reflected in the duration scoring. In other words, the longer the impact endures the less likely is the reversibility of the impact.

Table 11: Listing of descriptors for the duration of an impact together with definitions that serve to assist in selecting the appropriate rating

¹ as developed by SE Solutions

Duration Description	Definitions	Rating
Construction Period Only	The impact endures for only as long as the Construction period of the proposed activity. This implies the impact is fully reversible. Like noise and dust	1
Short Term	The impact continues to manifest for a period of between 3 – 10 years. The impact is reversible.	2
Medium term	The impact continues to manifest for a period of 10-30 years. The impact is reversible with relevant and applicable mitigation and management actions	3
Long Term	The impact continues for a period in excess of 30 years. However, the impact is still reversible with relevant and applicable mitigation and management actions.	4
Permanent	The impact will continue indefinitely and is irreversible	5

Intensity or severity of the impact

The concept of intensity potential is an important point of departure. This provides the acknowledgement at the outset of the potential significance of the impact. For example, emissions of SO₂ have the potential to result in adverse human health effects, which is obviously a significant potential impact, and that potential must be acknowledged in the significance ratings. The importance of this intensity potential cannot be overemphasized. If the impact is adverse health effects, then even a limited extent and duration will still be significant. If the impact is loss of vegetation, then the impact will only become significant if the extent is regional and the duration irreversible (for example). Thus, in the latter example the degree to which the impact may cause irreplaceable loss of a resource is considered.

The second important part of intensity potential is that it provides a measure for comparing significance across different specialist assessments. What this means is that specialists will have to select a potential intensity rating from the tables below that best describes the nature of the impacts identified by the specialist. Note that the EAP has defined the intensity/ severity descriptors together with their appropriate ratings, specialists are required to select the appropriate rating only when ascribing significance to various impacts. This will allow for effective comparison of significance across specialist assessments to allow for an integrated assessment of the project.

Table 12: Listing of descriptors for the intensity/ severity of an impact together with definitions that serve to assist in selecting the appropriate rating

Descriptors: potential consequence (negative)	Rating	Score
Human health – morbidity/mortality. Loss of species	High	6
Reduced faunal/floral populations, loss of livelihoods, individual economic loss	Moderate – High	5
Reduction in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate	4
Nuisance	Moderate - Low	2
Negative change – with no other consequences	Low	1
Descriptors: potential consequence (positive)	Rating	Score
Net improvement in human welfare	Moderate – High	5
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate	4
Economic Development	Moderate - Low	2
Positive change – with no other consequences	Low	1

The probability (or likelihood) of the impact occurring

Likelihood is the likelihood of the impact intensity (consequence) manifesting so the 0.1, 0.2, 0.5, 0.75 and 1 serve to illustrate that if an impact is unlikely to manifest then its intensity/consequence score will be reduced and the resultant significance reduced. Although likelihood and probability may be considered interchangeable, the term likelihood is preferred as probability has a very specific mathematical and/ or statistical connotation. As such the expectation created by the term probability is that there will be an accurate empirically or mathematically defined expression of risk, which is not necessarily required.

Table 13: Listing of descriptors for the likelihood of the impact intensity/ severity manifesting together with definitions that serve to assist in selecting the appropriate rating.

Likelihood/ Probability Descriptors	Definitions	Rating
Improbable	The possibility of the impact occurring is negligible and only under exceptional circumstances.	1
Unlikely	The possibility of the impact occurring is low with a less than 20% chance of occurring. The impact has not occurred before.	2
Probable	The impact has a 20-50% chance of occurring. Only likely to happen once every three or more years	3
Likely	It is most likely that the impact will occur. A 51 – 75% chance	4

	of occurring.	
Highly Probable	It is most likely that the impact will occur. A 51 – 75% chance of occurring.	5
Definite	More than 75% chance of occurrence. The impact occurs regularly.	6

Impact significance before mitigation

Environmental impacts identified will be evaluated according to the above-mentioned criteria. The significance of impacts will be derived through a synthesis of ratings of all criteria in the following calculation:

(Extent + Duration + Potential Intensity) x Probability/Likelihood = Significance before Mitigation

The significance of a potential impact on decision-making is indicated through significance points. Significance points indicate the following:

Table 14: Listing of descriptors for the significance score of an impact.

Descriptors	Definitions	Rating
Low	Project can be authorised with a low risk of environmental degradation	<15
Moderate	The project can be authorised but with conditions and routine inspections	16-45
High	The project can be authorised but with strict conditions and high levels of compliance and enforcement in respect of the impact in question	46-70
Fatally Flawed	The project can't be authorised	>71
Positive Impact	Positive impact due to the implementation of the project.	

Impact significance after mitigation

In order to reduce the significance of negative impacts and increase the significance of positive impacts, mitigation measures will be identified and discussed for each impact. The degree to which the impact can be mitigated (if negative) or enhanced (if positive) will be a function of whether the mitigation changes the intensity/ severity and/or the likelihood of the impact. Thus, once the mitigation measure/s have been described, a new significance rating will be determined by following the same steps detailed above, however taking the mitigation and controls into account.

Ascribing significance to cumulative impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative

impact. For example, dust and air emissions cannot be assessed in isolation of the potential cumulative impact of increased emissions into the atmosphere. Similarly, if water quality is improved within the immediate surroundings of the proposed activities, this will most certainly have a broader effect/ cumulative impact on the greater water quality in the area. Once all the impacts have been assessed and significance ratings allocated, the EAP will assess the project on a holistic basis to determine the overall project impact on the receiving environment. This will be a function of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/ project.

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PELZVALE WWTW - DRAFT ENVIRONMENTAL IMPACT ASSESSMENT																	
Aspect and Description		Impact Rating (before mitigation)							Impact Rating (after mitigation)							Mitigation Measures	Risk of the impact and mitigation not being implemented
Aspect	Description	Nature of Impact (Positive/Negative)	Spatial Scope/ Extent	Duration	Severity	Consequence	Probability	Significance	Nature of Impact (Positive/Negative)	Spatial Scope/ Extent	Duration	Severity	Consequence	Probability	Significance		
FLORA - Damage or loss of habitat due to construction activities	Weeds and alien species will be introduced and seeds will spread due to disturbance	N	2	2	4	8	4	32	N	2	2	4	8	3	24	Implementation of an Alien Invasive and Weed Eradication Plan	High
	Vegetation will be removed in order to establish a site camp, access the site and excavate for the new treatment works.	N	2	2	4	8	6	48	N	1	2	4	7	4	28	A Rehabilitation Plan, as per the specialists' recommendations must be implemented after the excavated areas has been filled and the construction camp site has been removed.	High
	Destruction, further loss and fragmentation of the vegetation community classified as CBA or ESA.	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Construction activities in CBA or ESA must be kept to the minimum footprint and must be rehabilitated after construction.	Moderate
	Removal of Gauteng Red or Orange Listed Plants	N	2	2	4	8	6	48	N	2	2	4	8	2	16	Construction activities in CBA or ESA must be kept to the minimum footprint and must be rehabilitated after construction.	Moderate
	Dumping of waste outside the designated area.	N	2	2	4	8	4	32	N	2	2	4	8	3	24	Staff members/ contractors must be educated. Clear signs must be erected indicating where waste can be disposed. Bins must be provided for waste, and a skip must be provided for the construction waste.	Low
	Burning of vegetation on site.	N	2	2	4	8	4	32	N	2	2	4	8	1	8	No fires allowed on site. Staff members/ contractors must be educated.	Low
	Storing of construction material and soil stockpiles outside the designated areas	N	1	2	4	7	4	28	N	1	2	4	7	3	21	A designated area at the construction camp site must be identified for the stockpiling of material and soil	Moderate
FAUNA & AVIFAUNA - Loss of species	Removal of the plant species	N	1	2	4	7	6	42	N	1	2	4	7	4	28	A Rehabilitation Plan, as per the specialists' report, must be implemented after the excavated areas has been filled and the construction camp site has been removed.	High
	Injury / death to fauna and avifauna due to poaching	N	2	2	4	8	3	24	N	2	2	4	8	2	16	No poaching allowed on site. Staff members/ contractors must be educated.	Low

	Dumping of waste and construction material outside the designated area	N	2	2	3	7	4	28	N	2	2	2	6	2	12	Staff members/ contractors must be educated. Clear signs must be erected indicating where waste can be disposed. Bins must be provided for waste, and a skip must be provided for the construction waste.	Low
	Fires	N	2	2	4	8	3	24	N	2	2	4	8	2	16	No fires allowed on site. Staff members/ contractors must be educated.	Low
	Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and excavation.	N	2	1	4	7	3	21	N	2	1	8	11	2	22	The ECO must walk the site before construction starts to identify any breeding areas. A Rehabilitation Plan, as per the specialist reports, must be followed after the completion of the project.	
	Movement of construction vehicles in order to access the site but also while working on site.	N	2	1	4	7	3	21	N	2	1	4	7	2	14	Access roads must be clearly identified, and trucks must stick to the designated areas.	High
WATERCOURSE (WETLAND & STREAMS) - Damage or loss of watercourse due to construction of the pipeline and the treatment works.	Weeds and alien species will be introduced and seeds will spread due to disturbance.	N	2	2	4	8	4	32	N	2	2	4	8	3	24	Implementation of an Alien Invasive and Weed Eradication Plan	High
	Some of the vegetation within the watercourse and buffer area will be removed in order to excavate and install the pipeline.	N	1	2	4	7	6	42	N	1	2	4	7	2	14	A Rehabilitation Plan, as per the specialists' recommendations must be implemented after the excavated areas has been filled and the construction camp site has been removed.	High
	Staff members/ Contractors might create new pathways within the watercourse areas and buffer zones.	N	1	2	4	7	4	28	N	1	2	4	7	2	14	Staff members/ Contractors must be informed/ educated regarding environmental issues, pathways created due to construction activities must be rehabilitated.	Moderate
	Dumping of waste outside the designated area.	N	2	2	3	7	4	28	N	2	2	3	7	2	14	Staff members/ contractors must be educated. Clear signs must be erected indicating where waste can be disposed. Bins must be provided for waste, and a skip must be provided for the construction waste.	Low
	Burning of vegetation on site.	N	2	2	3	7	4	28	N	2	2	3	7	2	14	No fires allowed on site. Staff members/ contractors must be educated.	Low
	Construction vehicles driving through the watercourse and damaging vegetation.	N	1	2	4	7	6	42	N	1	2	4	7	2	14	Access roads must be clearly identified and trucks must stick to the designated areas.	High
	Dumping of construction material within the watercourse or buffer area	N	2	1	4	7	6	42	N	2	1	4	7	2	14	Staff members/ contractors must be educated. Clear signs must be erected indicating where waste can be disposed. Bins must be provided for waste and a skip must be provided for the construction waste.	Low

	Erosion and siltation will result in destruction of the remaining vegetation	N	1	2	4	7	6	42	N	1	2	4	7	2	14	Erosion measures must be in place, refer to the EMPr for details. The exposed soil must be vegetated as soon as possible.	Moderate
	Spillage/leak of hydrocarbon or other hazardous material	N	2	2	5	9	6	54	N	2	2	5	9	2	18	Trucks and machinery must be checked regularly to avoid any leaks. Hazardous material must be stored in a lockable container and on an impervious surface. Hydrocarbon must be stored within a bunded area.	Moderate
SURFACE WATER - Pollution or loss of surface water	Spillage of fuel / oil from construction vehicles or containers	N	2	2	4	8	6	48	N	2	2	4	8	2	16	Trucks and machinery must be checked regularly to avoid any leaks. Hazardous material must be stored in a lockable container and on an impervious surface. Hydrocarbons must be stored within a bunded area.	Moderate
	Spillage of chemicals	N	2	2	4	8	6	48	N	2	2	4	8	2	16	Chemicals must be stored in a lockable container and on an impervious surface.	Low
	Spillage of cement	N	2	2	4	8	6	48	N	2	2	4	8	4	32	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate
	Mixing of cement on soil surface	N	2	2	4	8	6	48	N	2	2	4	8	4	32	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate
	Maintenance or fixing of vehicles / machinery on site	N	2	2	4	8	4	32	N	2	2	4	8	2	16	No maintenance or fixing of vehicles on site. Should there be an emergency the maintenance and fixing of vehicles must be done on an impervious surface or with a drip tray.	Moderate
	Washing of vehicles / machinery on site	N	2	1	4	7	4	28	N	2	1	4	7	2	14	No washing of vehicles on site.	Moderate
	Siltation and Erosion	N	1	2	4	7	6	42	N	1	2	4	7	3	21	Erosion measures must be in place, refer to the EMPr for details. The exposed soil must be vegetated as soon as possible.	Moderate
	Washing up (bathing, hand washing an washing of dishes / containers or clothes)	N	1	1	4	6	6	36	N	1	1	4	6	1	6	All washing must be done in a designated area.	Low
	Excessive water usage	N	1	1	2	4	6	24	N	1	1	2	4	1	4	Staff members/ Contractors must be informed/ educated regarding environmental issues.	Moderate

SURFACE WATER - Pollution of surface water during the operational phase	Spillage of fuel / oil from operational vehicles on site - including the honeysuckers	N	1	3	4	8	6	48	N	1	3	4	8	2	16	Trucks and machinery must be checked regularly to avoid any leaks. Hazardous material must be stored in a lockable container and on an impervious surface. Hydrocarbons must be stored within a bunded area.	Moderate
	Spillage/ leakage of sewage and/or sludge	N	3	3	4	10	6	60	N	3	3	4	10	3	30	Chemicals must be stored in a lockable container and on an impervious surface.	Low
	Runoff (stormwater) flowing through the dirt areas and entering the cleanwater area.	N	3	3	4	10	6	60	N	3	3	4	10	3	30	The stormwater system must be designed and constructed as per the recommendations from the specialist. Maintenance must take place regularly to prevent blocking of the systems.	Low
	Presence of impermeable structures may increase overland flow and soil detachment.	N	2	2	4	8	6	48	N	2	2	4	8	2	16	No maintenance or fixing of vehicles on site. Should there be an emergency the maintenance and fixing of vehicles must be done on an impervious surface or with a drip tray.	Moderate
	For collection systems that combine stormwater and domestic effluent, abrupt changes during storm events may change the suspended solid concentration of influent into the WWTW and reduce the treatment efficiency.	N	2	1	4	7	6	42	N	2	1	4	7	2	14	No washing of vehicles on site.	Moderate
	Reduced levels of organic matter, coliform bacteria, heavy metals, and other pathogens can be expected in the discharge from the WWTW relative to the current raw sewage discharge to the Vaal River will improve environmental health, improve the freshwater ecosystem diversity and alleviate existing health hazard o humans.	P	3	3	4	10	6	60	N	3	3	4	10	6	60	Stringent measures need to be employed to avoid chlorine overdose, which may cause an ecological health risk. Similarly, underdosing poses a human health risk due to residual pathogen exposure.	Moderate
	Ongoing discharge from the treatment plant into the receiving watercourse may have an impact in the environment if the effluent quality is poor.	N	2	1	4	7	4	28	N	2	1	4	7	2	14	Ensure that the treated effluent conforms to general limits to wastewater discharge into a watercourse (NWA, 1999). Ensure routine maintenance of the treatment plant. Ensure there is annual monitoring of the receiving environment, and that the Middleveispruit remains within current conditions. If pollution is observed, the treatment plant needs to be investigated as well as the reason for the pollution impact occurring.	

	If improperly managed, the general waste, non-biodegradable solid waste and sludge, generated on site may end up in the surrounding water course.	N	2	1	4	7	4	28	N	2	1	4	7	2	14	A site environmental manager should be appointed to ensure that the generated sludge is tested to comply with acceptable limits outlined in the Sewage/Sludge State Quo Report (2021/22) (USAID Resilient Water Program and DWS, 2021). o If within limits, the sludge may be used as a fertiliser in the nearby farms or for soil improvement in the nearby mine closure activities. Hazardous waste must be stored separately, covered with containers and appropriately disposed of at a licensed disposal facility. All general solid waste shall be routinely disposed of at a licensed disposal facility. Solid influent shall be handled, stored, transported in a such a manner that does not cause environmental hazard or secondary pollution.	
	Blockages in the inlet pipe and outlet pipe failures during power cur events may result in sewage discharge into the nearby water course.	N	1	1	2	4	6	24	N	1	1	2	4	2	8	Staff members/ Contractors must be informed/ educated regarding environmental issues.	Moderate
GROUNDWATER - Pollution of the ground water system	Spillage of fuel / oil from construction vehicles or containers	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Trucks and machinery must be checked regularly to avoid any leaks. Hazardous material must be stored in a lockable container and on an impervious surface. Hydrocarbons must be stored within a bunded area.	Moderate
	Spillage of chemicals	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Chemicals must be stored in a lockable container and on an impervious surface.	Low
	Spillage of cement	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate
	Mixing of cement on soil surface	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate
	Maintenance or fixing of vehicles / machinery on site	N	2	2	4	8	6	48	N	2	2	4	8	2	16	No maintenance or fixing of vehicles on site. Should there be an emergency the maintenance and fixing of vehicles must be done on an impervious surface or with a drip tray.	Moderate

	Washing of vehicles / machinery on site	N	2	1	4	7	6	42	N	2	1	4	7	2	14	No washing of vehicle's on site.	Moderate
	Ablution facilities risk leakage	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Ablution facilities must be maintained and cleaned. No ablution facility within the watercourse or the buffer.	Moderate
	Washing up (bathing, hand washing an washing of dishes / containers)	N	1	1	4	6	4	24	N	1	1	4	6	2	12	All washing must be done in a designated area.	Low
	Spillage of sewage	N	3	3	4	10	6	60	N	3	3	4	10	3	30	Proper maintenance of the waste water system is essential.	Moderate
	Runoff (stormwater) flowing through the dirt areas and entering the cleanwater area.	N	3	3	4	10	6	60	N	3	3	4	10	3	30	The stormwater system must be designed and constructed as per the recommendations from the specialist. Maintenance must take place regularly to prevent blocking of the systems.	Low
GROUNDWATER - Pollution of the ground water during operational phase	Seepage from the WWTW ponds, drying areas and emergency ponds may introduce poor quality into the sub-surface area.	N	1	2	4	7	6	42	N	1	2	4	7	2	14	Overflow ponds should be lined with impermeable HDPE or geomembrane liners or compacted clay. Ensure that all ponds are operated to a suitable freeboard and are kept away of the 1:100-year flood events.	Moderate
SOIL - Pollution and Compaction	Removal of vegetation	N	2	2	5	9	6	54	N	2	2	5	9	2	18	A Rehabilitation Plan, as per the specialists' recommendations must be implemented after the excavated areas has been filled and the construction camp site has been removed.	High
	Spillage of fuel / oil from construction vehicles or containers	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Trucks and machinery must be checked regularly to avoid any leaks. Hazardous material must be stored in a lockable container and on an impervious surface. Hydrocarbons must be stored within a bunded area.	Moderate
	Spillage of chemicals	N	2	2	4	8	6	48	N	2	2	4	8	2	16	Chemicals must be stored in a lockable container and on an impervious surface.	Low
	Spillage of cement	N	2	2	4	8	6	48	N	2	2	4	8	3	24	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate
	Mixing of cement on soil surface	N	2	2	4	8	6	48	N	2	2	4	8	4	32	Cement must be mixed on an impervious surface such as a mixing tray, a wheelbarrow or a bunded area. Should cement trucks be used during construction trucks must be checked to avoid any cement spilling.	Moderate

	Maintenance or fixing of vehicles / machinery on site	N	2	2	4	8	6	48	N	2	2	4	8	2	16	No maintenance or fixing of vehicles on site. Should there be an emergency the maintenance and fixing of vehicles must be done on an impervious surface or with a drip tray.	Moderate
	Washing of vehicles / machinery on site	N	2	1	4	7	6	42	N	2	1	4	7	2	14	No washing of vehicles on site.	Moderate
	Erosion of soil	N	1	2	4	7	6	42	N	1	2	4	7	3	21	Erosion measures must be in place, refer to the EMPr for details. The exposed soil must be vegetated as soon as possible.	Moderate
	Unnecessary loss of soils due to site preparation	N	1	1	4	6	6	36	N	1	1	4	6	3	18	Soil must be stockpiled correctly and measured implemented to prevent soil from washing away during rainy seasons.	Moderate
	Compaction of the soil due to construction activities and movement of vehicles / machinery	N	1	1	4	6	6	36	N	1	1	4	6	3	18	Construction areas must be rehabilitated according to the recommendations made by the specialist	Moderate
	Washing away of soil from stockpiles	N	1	1	4	6	6	36	N	1	1	4	6	2	12	Soil must be stockpiled correctly and measured implemented to prevent soil from washing away during rainy seasons.	Moderate
SOIL - Pollution during the operational phase	Poor quality seepage into the soils from leaking sewer lines may impact the soil quality and result into poor quality seepage into the surrounding water resources.	N	1	2	5	8	4	32	N	1	2	5	8	2	16	Monitor water quality and conduct visual assessments at the inlet area and along the pipeline. Routine inspections of all sewer-related infrastructure (hydraulic monitoring) and maintenance to prevent leakages.	High
	In the event of a sinkhole developing below the treatment plant, any leaks will be introduced in the sub-surface soils and recharged to the shallow aquifer zone.	N	2	2	4	8	4	32	N	2	2	4	8	3	24	Avoid excessive groundwater abstraction from the dolomitic aquifers. Ensure regular maintenance of water pipes and sewage systems to avoid introducing water to the dolomite around the site.	Moderate
	There is a potential infrastructure failure due since the site is located on a dolomitic sinkhole area, which may result in watercourse pollution if the event of failure.	N	1	6	6	13	4	52	N	1	6	6	13	2	26	Prior construction, in-depth geotechnical investigation needs to be completed to identify a suitable laydown area and identify unstable areas which must be considered in the design, construction and operation of the WWTW. Establish groundwater monitoring boreholes to constitutently check seepage from the WWTW.	Moderate
AIR QUALITY - Polluting or decreasing the quality of the air	Fires on site	N	2	1	4	7	6	42	N	2	1	4	7	2	14	No fires allowed on site. Staff members/ contractors must be educated. A fire extinguisher must be available on site in order to extinguish a fire.	Low
	Emissions from construction vehicles	N	2	1	4	7	6	42	N	2	1	4	7	2	14	Construction vehicles must be maintained.	Moderate
	Waste flying through the air.	N	2	1	4	7	6	42	N	2	1	4	7	2	14	Waste must be contained in a bin that can close. During very windy conditions the skips must be covered to avoid waste from flying through the air.	Moderate

	Cement bags / particles flying through the air	N	2	1	4	7	6	42	N	2	1	4	7	2	14	A designated bin or container, that can close properly, must be provided for the cement bags.	Moderate
	Particulate matter and dust flying off moving vehicles	N	2	1	4	7	6	42	N	2	1	4	7	3	21	Construction vehicles must be covered when transporting soil or alternatively the top layer of soil must be watered.	Low
	Particulate matter may be lifted from the site and pose a health threat	N	2	1	4	7	6	42	N	2	1	4	7	2	14	Dust suppression must take place during very windy conditions or as per the instructions of the ECO/ OHS Officer.	Low
VISUAL IMPACT - Change in the sense of place or decreasing the aesthetic value	Site clearance / removal of vegetation	N	1	2	4	7	6	42	N	1	2	4	7	3	21	The site must be rehabilitated according to the recommendations by the specialist.	High
	Dust created during the construction activities	N	2	1	4	7	6	42	N	2	1	4	7	3	21	Dust suppression must take place during very windy conditions or as per the instructions of the ECO/ OHS Officer.	Low
	Waste on site	N	1	1	4	6	6	36	N	1	1	4	6	3	18	Bins must be provided for the waste on site. The bins must be able to close properly and enough bins must be provided.	Low
	Change in the landscape character	N	2	3	4	9	6	54	N	1	1	4	6	3	18	The area around the waste water treatment works must be rehabilitated. If possible, plant a vegetation screen along the fence/boundary in order to screen views towards the reservoirs, especially along the northern and the eastern boundary/ fence	Moderate
	Change in the sense of place of the area	N	2	3	4	9	6	54	N	1	1	4	6	3	18		Moderate
	Visibility of the waste water treatment works	N	2	3	4	9	6	54	N	2	3	4	9	4	36		Moderate
HEALTH - Spreading of diseases/ degradation in health	Using the field for ablution instead of toilets	N	1	1	4	6	6	36	N	1	1	4	6	3	18	Enough toilets must be provided. The toilets must be located in close proximity to the working area and at least two toilets must be provided at the site camp. Staff members/ contractors must be educated.	Low
	Dust created during construction	N	2	1	4	7	6	42	N	2	1	4	7	3	21	Dust suppression must take place during very windy conditions or as per the instructions of the ECO/ OHS Officer.	Low
	Dumping of waste on site	N	1	1	4	6	6	36	N	1	1	4	6	3	18	Bins must be provided for the waste on site. The bins must be able to close properly and enough bins must be provided.	Low
	Workers not using / wearing PPE	N	1	1	4	6	6	36	N	1	1	4	6	2	12	Staff members/ contractors must be educated regarding PPE. Daily checks must be done by the OHS Officer.	Low
	Burning of material / hazardous waste on site	N	2	1	4	7	6	42	N	2	1	4	7	2	14	No fires or burning of material on site. A fire extinguisher must be provided on site.	Low
	Spreading of diseases such as COVID-19	N	3	2	4	9	6	54	N	3	2	4	9	2	18	Staff members/ contractors must be educated regarding the spreading of diseases and the correct PPE and measures must be implemented to prevent spreading.	Low

	Inappropriate hygiene (not covering when coughing and sneezing, not washing hands)	N	3	1	4	8	6	48	N	3	1	4	8	3	24	Staff members/ contractors must be educated regarding the spreading of diseases.	Low
	Dehydration due to a lack of drinking water	N	1	1	4	6	6	36	N	1	1	4	6	2	12	Drinking water must be provided for workers. Staff members/ Contractor must also be informed/ educated regarding this issue.	Low
NOISE	Noise from construction related activities	N	2	1	3	6	6	36	N	2	1	3	6	4	24	Noise must be kept to a minimum and construction activities must be kept to the normal working hours.	Low
Odour	Odour from the waste water treatment works	N	2	3	4	9	6	54	N	2	3	4	9	2	18	Odour must be managed according to the mitigation measures that were suggested by the specialist. Maintenance of the waste water treatment works will be essential.	Low
TRAFFIC - disturbance to the flow of traffic	Increase in construction vehicles	N	2	1	2	5	6	30	N	2	1	2	5	2	10	Daily traffic hours must be taken into consideration when construction vehicles move from and to the site.	Moderate
	Traffic congestions due to the construction activities	N	2	1	2	5	6	30	N	2	1	2	5	2	10	Traffic must be regulated to avoid congestions, especially during the peak traffic hours.	Low
SAFETY & SECURITY	Theft of construction material and equipment	N	1	1	4	6	4	24	N	1	1	4	6	3	18	Security guards must be appointed to control or guard the construction camp site at night.	Low
	The site is unsafe for locals, especially kids playing on construction site or residents passing through the site	N	1	1	5	7	4	28	N	1	1	5	7	1	7	Strct measures must be implemented to demarcate the site, especially the deep excavations. The local community must be educated regarding the safety of the construction sites.	Low
	Home owner security at risk due to influx of workers into area	N	2	1	5	8	4	32	N	2	1	5	8	1	8	Contractors must control the influx of workers in the area. No staff members/ contractors are allowed to sleepover at the construction site.	Moderate
	Construction vehicles at risk of theft or vandalism	N	1	1	4	6	5	30	N	1	1	4	6	3	18	Construction vehicles must be locked in the evenings and a security must patrol the area.	Low
	Unfair treatment of staff member can lead to dispute or strikes	N	2	1	4	7	5	35	N	2	1	4	7	3	21	The project manager and contractor must ensure that workers are treated fairly, this includes payment of salaries, ablution facilities, lunch times and other privileges.	Moderate
	Using inappropriate working methods or equipment	N	1	1	5	7	5	35	N	1	1	5	7	3	21	Staff members/ Contractors must be educated on how to use specific equipment or material.	Low
	Workers not wearing the correct PPE	N	1	1	5	7	5	35	N	1	1	5	7	3	21	Staff members/ contractors must be educated regarding PPE. Daily checks must be done by the OHS Officer.	Low
SOCIO-ECONOMIC	Risk of ground subsidence affecting other public services or landowner activities	N	2	1	4	7	5	35	N	2	1	4	7	3	21	Storm water management on site must be done according to the engineers specification. Construction activities that	Low

	N	1	1	4	6	5	30		N	1	1	4	6	3	18	result in ground subsidence must be halted and the area rehabilitated as soon as possible.
Disruption arising during the construction activities	N	1	1	4	6	5	30		N	1	1	4	6	3	18	The project manager and contractor must ensure that workers are treated fairly, this includes payment of salaries, ablution facilities, lunch times and other privileges.

10. CONCLUSION AND RECOMMENDATIONS

The proposed Pelzvale WWTW is a necessity in order to unlock future development within the Rand West City Local Municipality. The proposed Pelzvale WWTW forms part of the Rand West City Local Municipality's future planning for the upgrade of the bulk water supply and the bulk outfall sewer line. These upgrades and construction of new services will unlock the area to the south of Randfontein and will give the opportunity for development. The proposed site selected for the Pelzvale WWTW is based on the availability of Municipal property, the distance from residential areas to the site, the geology (dolomite) of the area, the gradient of the area, the accessibility of the site and the sensitivity of the environment.

The proposed Pelzvale WWTW will have an impact on the environment during the construction phase and if not properly managed there will also be impacts during the operational phase of the project. Although the proposed project will have negative environmental impacts, the impacts can be mitigated and if managed correctly the severity of the impacts can be low to moderate. It is, however, essential that the mitigation and design measures, as per the specialist reports, are taken into consideration and implemented during the planning, construction and the operational phase of the project.

Unfortunately, construction of the proposed project started without the correct approvals and some of the environmental impacts can therefore not be mitigated as per the management measures suggested by the specialist. In particular, the site was cleared and vegetation removed without first removing the two Gauteng Orange Listed plant species (*Boophane disticha*, *Hypoxis hemerocallidea*). Other impacts such as dust and erosion were controlled by the contractor and during the site inspection there were no signs of damage. The site construction camp site was also well monitored during the clearance of vegetation and the construction of the road and there is no significant impact from the construction camp site, except for the removal of vegetation and therefore destruction of the habitat. It is essential that the recommendations as per the specialist studies, engineers and the draft Environmental Management Programme (EMPr) are properly implemented to avoid any further destruction of the habitat.

The following are recommended:

- The specialists are in the process of revising the specialist reports to include the new site location and layout. These must be distributed to all registered I&APs when received.
- The specialist studies that are underway must be completed and the recommendations from these studies must be included in the design, if applicable, as well as the draft EMPr.
- Should any further clearance be required, after the authorization is issued, proper care must be taken to remove the protected plant species before the construction commences. GDARDE Biodiversity must be informed of the removal and replanting of these species.

- Although no further construction may proceed it is recommended that the applicant maintain the current site to avoid further destruction of the habitat. This must include erosion control, waste management, control of alien invasive plant species, dust suppression and management of the construction camp site.
- The water use license must be applied for, and it is essential that DWS form part of the environmental process.
- All comments from I&APs must be considered, discussed and mitigation must be included as part of the EMPr.
- A second round of public participation must be followed to allow I&APs to comment on the revised specialist studies, the reports should be available by 24 February 2026.
- The impact assessment was based on the information available at the time that the report was written. It is recommended that the impact assessment be revised or updated when all of the specialist studies are available and updated. The worst-case scenario was, however, used for the purpose of compiling the impact assessment.
- The EMPr must be updated as soon as:
 - The management measures for the operational phase of the project are available.
 - All the specialist studies were updated.
 - Comments received from I&APs such as the DWS, WRDM, RWCLM and the Wonderfonteinspruit Forum.
 - The water use license is issued.

Although the project is a necessity for future development and forms part of the planned sewer upgrades, it is essential that the correct processes are followed to obtain the required licenses and authorisations. The impacts were assessed based on worst case scenario and the mitigation measures were recommended to reduce the proposed impacts. If the mitigations are implemented correctly and successfully and the project is properly managed and maintained, the environmental risk will be reduced and the project can proceed.

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- National Environmental Management Act (NEMA), 1998 (Act 107 of 1998)
- National Environmental Management: Biodiversity Act (NEM:BA), 2004 (Act 10 of 2004)
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Statistical Information was gathered using the following 3 websites:

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<https://census2011.adrianfrith.com/place/764>

<http://www.citypopulation.de/php/southafrica-admin.php?adm2id=GT482>

Pictures:

TLM Engineers. 16 March 2020. Example of a grit.

<http://www.telem.co.il/Telem/index.asp?DBID=1&LNGID=1>

Slideshare. 16 March 2020. Example of a Primary settling tank.

<https://pt.slideshare.net/NusratBashir3/waste-water-treatment-ppt?smtNoRedir=1>

Appendix A

Locality Map

Site Plan

Environmental Sensitivity Map

Appendix B

Facility Illustration/ Layout Plan
Preliminary Design Report

Appendix C

PUBLIC PARTICIPATION

Newspaper Advert

Site Notices

Letter to I&APs/ BID

I&AP Dataset

Appendix 1

Proof of site notice

Appendix 2

Written notices issued as required in terms of the regulations

Appendix 3

Proof of newspaper advertisements

Appendix 4

Communications to and from interested and affected parties

Appendix 5

Comments and Responses Report

Appendix 6

Copy of the register of I&APs

Appendix D

Water Use License(s) Authorisation –
This process has not started yet

SAHRA information – Draft report submitted

Appendix E

DFFE Screening Tool Report

Appendix F

SPECIALIST REPORT
Aquatic & Biodiversity Assessment
Heritage Impact Assessment
Paleontological Assessment
Odour Assessment
Dolomitic Investigation

Appendix G

- EMPr

Appendix H

OTHER

- CV