Final Environmental Management Programme for the proposed Grootvlei Sewer Pump Station, at Strubenvale in Springs,

Environmental Management Programme (EMPr)

Competent Authority Reference Number: GAUT: 002/19-20/E0196

COMPETENT AUTHORITY:
GDARD

APPLICANT:

City of Ekurhuleni

Project Number: PS-WS 36-2016

Prepared for:
Tangos Consultants (Pty) Ltd on Behalf of CoE

TANGO'S CONSULTANTS
A division of Tango's Group (PTY) Limited

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Prepared by

Vulcano Engineering and Environmental Consultants

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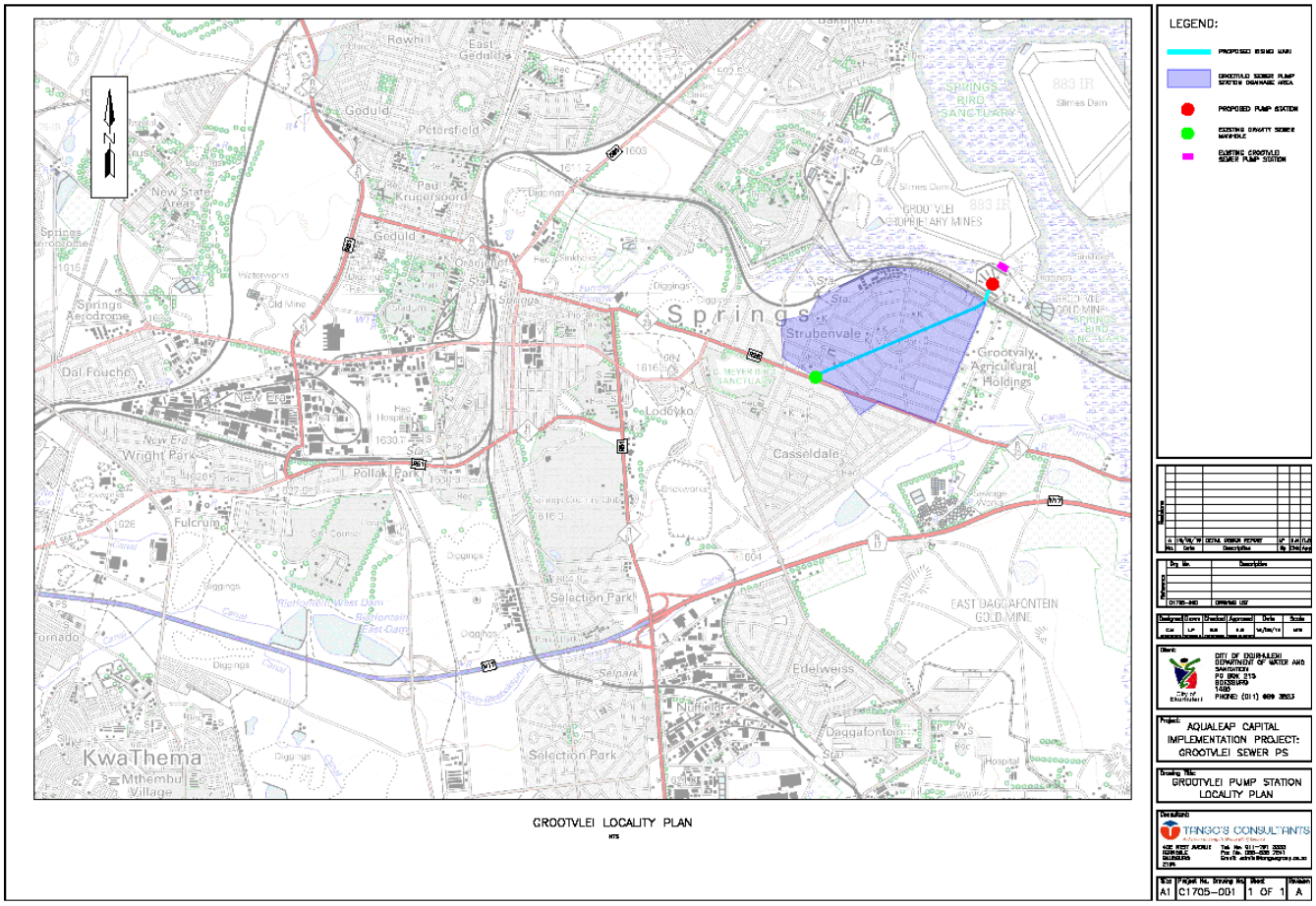
PROPOSED GROOTVLEI LOCALITY MAP



GROOTVLEI LOCALITY PLAN

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1. INTRODUCTION

City of Ekurhuleni Intends to construct a new Grootvlei Sewer Pump Station of Strubenvale suburb at adjacent area of in Springs, Gauteng.

This was a decision came after the results from Engineering, and Environmental Consultants condition assessment reports, which was indicating number of problems including the current point of pump station sitting on the edge of wetland, on the mine field, and every type of steel is corroded, structure was vandalizes, no power, everywhere is sewage water till to the entrance gate. It was the proposed to build a new pump station and to relocate from old pump station point to new area.

Proposed pump station will drain domestic sewage from the surrounding 1100 households of middle-income group in Strubenvale. The proposed development will be well sufficient and work properly engineer already take action on the identified sewer problems in the area. The pump station will be fed by an existing 225mm diameter sewer asbestos pipe. Sewer from pump station will be pumped out through rising main to be upgraded from 150mm to 250mm diameter pipe on a distance of 2km along Largo road on the road reserve in Strubenvale to connect at corner Ermelo Road and Largo Road.

The aim of the project is to come up with a concrete solution on Strubenvale sewer problem that is heavily impacting the surrounding environment, wetland, municipal budget, Strubenvale community they are now living on, like cost in their houses to control sewage overflow especially during summer, area become sewer wetland. Therefore, Engineers were mandated duties to come up with a concrete solution whether to refurbish or build a new pump station, and it was proposed that new Grootvlei sewer pump station required to be constructed and must relocate from the exiting old sewer pump station area, next to Acid Mine Drainage Treatment Plant-Eastern Basin

In terms of activity alternatives, these could not be considered as the minor problem is addressing a specific need and as such cannot be replaced by a different activity. Based on the above-mentioned reasons, both the site and activity alternatives were not considered for the proposed development. Geographically of the proposed area co-ordinate are 26^0 14’ 59.16”S, 28^0 29’ 12.79”. Refer to Locality Map, and Layout Plan attached. (Appendix 1 of Basic Assessment)

1.1. Scope of the Environmental Management Plan

This Environmental Management Plan (EMP), prescribes and directs the management of all environmental aspects, physical, natural and / or social, associated with and arising from construction work to be undertaken for the proposed construction of Grootvlei sewer pumps station, as well as relevant aspects of the on-going operational phase.

This EMP must be read as a whole and complete document and is numbered accordingly. For convenience of implementation, the EMP has been divided into sections, dealing generally with management, structure and accountability, technical issues and environmental specifications respectively.

1.2. Objectives of the EMP

The objectives of the Management Plan are to:

- Outline guidelines for construction and operational management for the sound management of environmental issues pertaining to the execution of all construction work associated with the project;
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment;
- Provide a standard for management of environmental issues pertaining to the execution of civil and other construction work with specific reference to issues raised through the environmental studies undertaken for the project; and
- Reduce the environmental impacts of civil and any other construction work through the proactive employment of sound and effective working practices.

1.3 Project Description

City of Ekurhuleni Intends to construct new Grootvlei sewer pump station of Strubenvale suburb closed to Acid Mine Drainage-Eastern Basin and away from existing old sewer pump station in Springs, Gauteng. The proposed project construction of Grootvlei sewer pump station and upgrading of sewer rising main pipeline entails the followings:

- Construct a new Grootvlei Sewer Pump Station house provided with ventilation.
- Construct a single rectangular wet well below the pump house at 7.5m X 4m X 9m Deep
- Installation of permanent hoist and monorail system in the pump house,
- Installation of two 12.5kW submersible pumps to operate in 1 duty and 1 standby mode

- Installation of a guardrail within wet well to easy access for pumps maintenance,
- Installation of a 2 isolate valves,
- Installation of a 2 swing check valves
- Installation of a pump suction valves, and air valves
- Construction of concrete valve chamber,
- Construction of 100mm diameter hot deep galvanized steel pipe from wet well to valve chamber;
- Installation of 2 flange adapters, and 2 magnetic flow metering and pressure gauge
- Installation of 50mm diameter uPVC pipe;
- Construction of pavement, Parking, Vacuum Truck, Equipment Store
- Installation of a 50kVA transformer;
- Installation of 1 MCC Box,
- Installation of Portable Emergency Generator

Vulcano Engineering & Environmental Consulting CC has been appointed by Tangos Consultants to conduct an Environmental Impact Assessment and compilation of Environmental Management Plan respectively, as per the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and EIA Regulation 2014 as amended in 2017.

The proposed project was found triggered with listed Activity in terms of the Government Notice R324, listing notice 3, as promulgated on the National Environmental Management Act,1998 (Act no.107 of 1998) and EIA Regulation 2014 as amended in 2017, confirmation already sent to GDARD and comments still pending.

1.4 General Accountability and Environmental Management

1.4.1 Environmental Control Officer (ECO)

It is the responsibility of the project manager to appoint a qualified independent Environmental Control Officer (ECO) for the proposed project activities in writing. The ECO will be responsible for communicating environmental issues associated with the site to the constructor, resident engineer and the applicant. Should any non-compliance with the EMP take place, the ECO must communicate this with the party responsible for the non-compliance as well as the contractor, resident engineer and the applicant. If the non-compliance continues after written request by the ECO to rectify the situation, the ECO must inform the local municipality / provincial environmental authority in writing. The ECO is also responsible for the explanation of environmental issues contained in this EMP to anyone working on site. Should any issues arise on the site of an environmental nature or concern, the ECO will be responsible for taking the appropriate action.

The duties of the ECO shall include the:

- Prior to commencement of work on site, the contractor shall be briefed by Engineer and ECO on obligations related environmental controls and methodologies in terms of EMP.
- Enforcement and implementation of the conditions stipulated in the Authorisation issued by GDARD and the WULA issued by DHSWS
- Monitoring and enforcement of the conditions of the local municipality's Environmental Policy, Procedures and relevant Standards, as applicable and revised from time to time;
- Implementation and enforcement of the conditions of this EMP and the Environmental Specifications included herein, throughout the construction phase of the project;
- Taking all actions necessary to ensure compliance with the above policies, procedures and standards, in line with the objectives set for this EMP.
- Inform the Engineer immediately where clearly defined and agreed "no-go" areas are violated or in danger of being violated.
- Take photographs(digital) of the site prior to, during and immediately after construction and rehabilitation as a visual reference.
- The ECO shall have access to the site and all activities occurring thereon, with due regard for all safety requirements. The ECO shall furthermore have unfettered authority to order restriction or control measures over any activity which is contradictory to the EMP and / or the Record of Decision, through the appropriate site management structures.

1.4.2 Resident Engineer (RE)

The RE will be required to:

- Be familiar with the contents of the EMP;
- Monitor the Contractor's compliance with the Environmental Specifications on a daily basis, through the Site Diary, and enforce compliance;
- Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports;
- Request for, review and approve any Method Statements prepared by the Contractor in consultation with the ECO;
- Designate and manage the working areas as per the approved construction site layout, including sensitive environments and 'no-go' areas;
- Advise on materials that may be used to designate working areas and materials to be used for the works as and when necessary;

- Issue site instructions giving effect to the ECO requirements where applicable;
- Communicate to the ECO, verbally and in writing, at least 10 working days in advance regarding any proposed actions which may have negative impacts on the environment, with specific reference to blasting;
- Undertake damage assessments where incidents, accidents and serious infringements have occurred on or a relevant distance off site or neighbouring properties;
- Review and approve all areas that have been rehabilitated by the Contractor;
- Review complaints received and issue instructions as necessary;
- Accompany the ECO during site inspections and/or inform the ECO in writing, of any infringements of the EMP and to issue instructions to the Contractor on the advice of the ECO;
- Implement Temporary Work Stoppages where serious environmental infringements and non-compliances have occurred;
- Maintain a record of complaints from the public and communicate these to the Contractor and the ECO; and
- Facilitate proactive communication between all role-players in the interests of effective environmental management.

1.4.3 Contractor

Role

With specific reference to the EMP, the role of the Contractor will be to:

- Implement, manage and maintain the construction elements of the EMP for the duration of his/her contract;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the construction EMP;
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties;
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site or during the provision of their services off site;
- Ensure that all sub-contractors and other workers appointed by the Contractor are complying with, and implementing the construction EMP during the duration of their specific contracts; and
- Provide appropriate resources – budgets, equipment, personnel and training –for the effective control and management of the environmental risks associated with the construction of the project.

Duties and responsibilities of the contractor

The Contractor shall have the following responsibilities:

- Be familiar with the contents of the EMP and the specifications contained herein;
- Comply with the Environmental Specifications contained in the EMP and subsequent revisions;
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities;
- Prepare Method Statements, programme of activities and drawings/plans for submission to the RE (and ECO); when requested;
- Undertake daily site inspections to monitor environmental performance and conformance with the Environmental Specifications;
- Notify the ECO and RE immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- Notify the ECO and at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigation measures may be implemented timeously;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them;
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract;
- Undertake rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the RE and the ECO;
- Rehabilitating services, utilities, private/public property and other areas adversely affected by construction activities outside of demarcated areas.

1.4.4. Contractor's EMP

The Contractor will also set up his / her own management system to ensure and monitor the application of the EMP and associated Environmental Specifications. This system shall, at a minimum, provide for:

- The preparation of Method Statements as required ;
- The effective and accountable management of construction activities relative to the Environmental Specifications;

- Prominent attention to management of any risk might be posed by proposed activities prior to commencement;
- Reporting on a regular basis and as required on environmental issues;
- Recording, in writing, all communication / correspondence with all pertinent stakeholders and other parties on environmental issues; and
- Regular, constructive and proactive liaison with the ECO.
- To operate works in environmentally and safely compliance
- To see to it that no open excavations along the road open, and everyone is safe.

1.1.4. General Accountability

Table 1.1: General accountability and responsible official

Document	Accountability	Designation/Department	Official
Authorisation / Record of Decision	Project management compliance	Tangos Consultant & Client	From Engineering
Authorisation / Record of Decision	Design & construction management compliance	Tangos Consultant &Client	From Engineering
Authorisation / Record of Decision	Implementation, in conjunction with EMP, RODs	EO/Contractor	From Contractor, Environmental Officer
EMP	Site and EMP compliance	ECO	From Contractor and Environmental Consultants
EMP	Project management implementation	EO, Contractor	From Contractor and Environmental Officer
EMP	Project and site: implementation and enforcement	EO, Client, and Engineer	From All Organizations
EMP	Construction Implementation	Contractor, Engineer	From Contractor, and Engineer

2. IMPACT ASSESSMENT

2.1. Potential issues Identified during the Impact Assessment

Potential issues identified are as per the Environmental Management Plan report compiled for this project. In order to ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason a clearly defined rating scale is provided to assess the impacts associated with the environmental investigation.

Each impact identified will be assessed in terms of probability (likelihood of occurring), extent (spatial scale), intensity (severity) and duration (temporal scale). To enable a scientific approach to the determination of the impact significance (importance), a numerical value will be linked to each rating scale (refer to table 2.1- 2.5). The sum of the numerical values will define the significance. The following criterion was applied to the impact assessment for the construction proposed project:

Table 2.1: Probability

Category	Rating	Description
Definite	3	More than 90 percent sure of a particular fact or of the likelihood of that impact occurring
Probable	2	70 to 90 percent sure of a particular fact or of the likelihood of that impact occurring
Possible	1	40 to 70 percent sure of a particular fact or of the likelihood of that impact occurring
Improbable	0	Less than 40 percent sure of a particular fact or of the likelihood of that impact occurring

Table 2.2: Extent

Category	Rating	Description
Site	1	Immediate project site
Local	2	Up to 5 km from the project site
Regional	3	20 km radius from the project site
Provincial	4	Provincial

Category	Rating	Description
National	5	South African
International	6	Neighbouring countries/overseas

Table 2.3: Duration

Category	Rating	Description
Very short-term	1	Less than 1 year
Short-term	2	1 to 5 years
Medium-term	3	5 to 10 years
Long-term	4	10 to 15 years
Very long-term	5	Greater than 15 years
Permanent	6	Permanent

Table 2.4: Intensity

Category	Rating	Description
Very low	0	Where the impact affects the environment in such a way that natural, cultural and social functions are not affected
Low	1	Where the impact affects the environment in such a way that natural, cultural and social functions are only marginally affected
Medium	2	Where the affected environment is altered but natural, cultural and social function and processes continue albeit in a modified way
High	3	Where natural, cultural or social functions or processes are altered to the extent that they will temporarily cease
Very high	4	Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease

Table 2.5: Significance Rating

Score	Significance Rating
2 – 4	**Low**

Score	Significance Rating
5 – 7	**Low to Moderate**
8 – 10	**Moderate**
11 – 13	**Moderate to High**
14 – 16	**High**
17 – 19	**Very High**

Based on the information contained in the tables above, the potential impacts are assigned as significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and Intensity/Magnitude (**I**) and multiplying this sum by the probability (**P**) of the impact.

S= (E+D+I) *P

2.1.1. Soil

i. Loss of soil resource

- *Source of soil impacts*

Construction	Operational	Decommissioning	Closure
•			

- *Impacts*

Theme	Probability	Extent	Duration	Intensity	Significance
Loss of soil resource	Possible	Site	Short term	Very low	Low to moderate
With Mitigation	Improbable	Site	Short term	Very low	low

- *Impact on Soil during the construction phase:*

The total volume of soil and rocks that will be excavated during construction is relatively small and thus should not lead to major erosion problems and impacts on soil.

Soil Pollution from on-site as well as off-site works may occur by the intentional or accidental leakages of used chemicals, fuel, or oil products (from equipment and vehicles) on construction site.

- ***Impact on soil during operation phase:***

The main concern during operation is when pump station is related to soil quality rather than soil quantity and is primarily attributed to generate sewage management through mechanically failure, due to no routine sewage system maintenance.

- ***Mitigations measures during construction phase:***

- The soils require stripping and stockpiling for future use and rehabilitation.
- Top soil and sub soils must be restored separately,
- Top soil must be protected from erosion and compaction. Regular cleaning of weed/ alien species must be done. Sub soil may be used as berms or other water diversion structures during construction on the upslope side of the construction activities.
- Soil that will be returned to the site must be stored in the vicinity of the excavation.
- Top soil must be used during rehabilitation of the site
- The Impact is regarded as a low to moderate significance. The implementation of recommended mitigation measures will reduce to low significance, which will remain up to such time that the area is rehabilitated.
- Topsoil is a resource of high conservation value to current and future generations because it is a gene bank containing seeds of indigenous species and forms the growing medium for plants, flowers and trees. It is usually nutrient rich and has a good texture for plant growth. It is therefore an important medium for the successful rehabilitation and landscaping of disturbed land and is a valuable part of the environmental system.

- ***Mitigations measures during operational phase:***

It is anticipated that after construction, maintenance must be implemented by the local municipality to avoid the current situation of pollution on the soil posed by sewage wastes when overflow on the ground

ii. <u>Soil Contamination/Pollution</u>

Construction	Operational	Decommissioning	Closure
•	•		

- *Impacts*

Theme	Probability	Extent	Duration	Intensity	Significance
Soil contamination	Possible	Site	Short term	Very low	Low to moderate
With Mitigation	Improbable	Site	Short term	Very low	low

Identified potential soil pollution will result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, wastewater containing cement and concrete waste, detergents, solid waste, litter and other such substances. Rainwater running into exposed areas containing cement, oil, diesel, sewage and other such substances could also result in soil pollution threat to site and adjacent properties. However, this type of pollution can be avoided with the implementation of mitigation strategies.

The impact is regarded as of low to moderate significance. The mitigation of impact the will reduce the significance to low, which will remain, up to such time that the area is rehabilitated after construction.

2.1.2. Erosion

Construction	Operational	Decommissioning	Closure
•	•		

Impacts of Erosion

Theme	Probability	Extent	Duration	Intensity	Significance
Erosion	Probable	Site	Permanent	Medium	Moderate to high
With Mitigation	Improbable	Site	Short term	Very low	Low to moderate

All disturbed surfaces at the site will be susceptible to erosion when the vegetation cover and top soil is removed. Therefore, the erosion potential is expected to be moderate. The impact is considered to be

Theme	Probability	Extent	Duration	Intensity	Significance

permanent with a moderate to high significance. Implementation of mitigation measures will reduce the impact to low significance

2.1.3. Natural vegetation

Loss of vegetation due to site clearance

Construction	Operational	Decommissioning	Closure
•			

Impacts

Theme	Probability	Extent	Duration	Intensity	Significance
Vegetation removal	Definite	Site	Permanent	Very low	low
With Mitigation	Definite	Site	Permanent	Very low	Low

The project site is characterised by small seasonal grown grass, small alien species, Scattered trees, Grootvlei wetland with reed bed, stone crusher, old existing vandalized improper function sewer pump station, and Strubenvale houses, small stream, mine fields, acid mine drainage, existing access road Blesbokspruit river, Considering that the proposed project is located within road reserves. Vegetation such as grass will be removed, however, none as protected species. Grass species that can be accommodated on the project design will not be removed; and will form part of the landscaping/or vegetation management after the construction phase. Grootvlei Wetland, or Blesbokspruit River / watercourse will not be affected by the construction, as the site is located outside of delineated 32 meters of buffer zone.

The project site, outside of the construction footprint must be rehabilitated to its original condition or better. The construction development and is considered to be of low significance.

2.1.4. Alien Plant Invasion

Construction	Operational	Decommissioning	Closure
•	•		

Impacts

Spread of alien plants	Possible	Site	Short	Low	Low to moderate
With Mitigation	Improbable	Site	Very short	Very low	Low

Construction activities at the proposed project area could encourage spread of alien invader plant species via imported material and construction vehicles. This is a potentially negative impact of medium significance at the site, and it could be cumulative and prevail beyond the operational phase if not managed properly.

The impact is considered to be of low significance.

2.1.5. Air Quality

Dust deposition

Construction	Operational	Decommissioning	Closure
•			

Impacts

Theme	Probability	Extent	Duration	Intensity	Significance
Dust Deposition	Definite	Local	Short term	Medium	Moderate
With Mitigation	Improbable	Site	Very short term	Low	Low

Aspects associated with the construction phase will definitely cause dust deposition to the area. Vehicle entrainment of dust from construction sites represents a relatively large source of fugitive dust emissions.

Gaseous and particulate emissions from vehicle tailpipes are far lower and therefore of less significance in terms of their impacts. Various components of the bio-physical and socio-economic environment *may* be impacted by the atmospheric emissions associated with the construction phase. Such components include: ambient air quality, local residents, road users, employees and the aesthetic environment.

Therefore, the dust potential is expected to be moderate. The impact is considered to be permanent during the construction phase with a moderate to high significance should no remedial measures be implemented, but could reduce to low significance if mitigated.

2.1.6. Noise

Construction	Operational	Decommissioning	Closure
•			

Impacts

Theme	Probability	Extent	Duration	Intensity	Significance
Noise impact	Definite	Local	Short term	Medium	medium
With Mitigation	Probable	Site	Very short term	Low	Low

The impact, in terms of the ambient noise levels resulting from the noise emissions from the construction activities, is very much limited to the area of specific activities. This holds for both the day and night because of the assumption that construction activities would be very much reduced during the night.

This is a potentially negative impact of medium significance at the site, and it could be cumulative and prevail beyond the accepted level if not managed properly.

2.1.7. Sites of Archaeological and Cultural Interest

Damage to sites of archaeological and cultural interest

Construction	Operational	Decommissioning	Closure
•	•	•	

Impacts

Theme	Probability	Extent	Duration	Intensity	Significance
Damage to sites of archaeological and cultural interest	Probable	Local	Very short term	Low	Low to moderate
With Mitigation	probable	Site	Very short term	Very low	Low

No signs of heritage resources such as archaeological sites were found that could be significantly impacted on during the construction phase. Due to the fact that there are old abandoned mine buildings, assessment has to be undertaken.

3. ENVIRONMENTAL MANAGEMENT MEASURES

3.1. Soil

Management Objective

To conserve soil resources and to maintain the viability of soil disturbed by the development and associated infrastructure and to ensure that plants, flowers and trees can be sustained during landscaping.

3.1.1. Loss of soil resource

Management criteria

- Topsoil up to a maximum of 30 cm must be removed before construction from all areas where physical disturbance of the surface will occur;
- Topsoil (up to a maximum of 30 cm) that is removed must be stockpiled for re-use in subsequent landscaping/ rehabilitation activities;
- The topsoil should be stockpiled separately from the subsoil and any other materials; and shall not be used for building or any maintenance activities;
- Soil heaps should not be higher than 2 metres;
- Soil heaps must be covered to prevent wind and water erosion;
- No remnants of stockpiles may be left in positions or states that may be eroded during and after construction;
- Movement of plant/ machinery/ vehicle must be avoided in order to prevent compaction.
- Top soil stockpiles must not be compacted.
- All hardened/ cleared areas must be ripped prior to rehabilitation;
- Stockpiles must be monitored regularly to avoid soil erosion and soil structure damage

3.1.2. Soil contamination/ Pollution

Management Objective

To conserve soil resources and to control potential contamination maintain from the development and its associated infrastructure.

Management criteria

- The contractor should ensure that there is an incident management system, including procedures and training, for dealing with incidents as prescribed by the Environmental Awareness guideline. Spillage incidents (i.e. chemicals, oils, diesel, etc.) should be reported to the Local Municipality, Department of Human Settlement Water and Sanitation (DHSWS) and GDARD. Appropriate remedial measures must be implemented in consultation with these regulatory authorities;
- If spills do occur and soils become contaminated must be reported to EO, ECO, Site Manager, Contractor, CeO Project Manager.
- After removal of the contaminated soils, the affected areas must be landscaped and rehabilitated;
- Berms must be constructed to direct all runoff into existing storm water systems;
- The engineers must prepare temporal storm water channel for unexpected rains during construction. These measures may include, but not be limited to:
  - silt fences;
  - brushwood; and
  - Rows of sawdust-filled onion bags.
- The contractor must prevent wastewater runoff into any of the surrounding roads, streets and streams;
- Contaminated runoff must be prevented entering the City of Ekurhuleni storm water system or the adjacent environment.
- In the event of any pollution entering an environmentally sensitive area and/or buffer zone as a result of the contractor's actions, the contractor shall be responsible for all costs incurred to assist in pollution control and/or to clean up the polluted area. The responsibility of the remediation of the pollution/erosion event will ultimately lie with the applicant;

- In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act (Act No. 36 of 1998), shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas. The public shall not call upon any organisation to assist with clean-up activities before the matter has been discussed with the contractor. The ECO must be notified immediately following any pollution event.

3.2. Erosion

Management Objective

To ensure the prevention of erosion.

Management criteria

- During construction no stockpile of soil material is allowed to me higher than 1.5m.
- Hips of soil must be prevented on site.
- During rehabilitation area has to be levelled to the slope where water can infiltrate better than more water runoff.
- Where trees removed must be replanted back.
- Where possible upslope storm water must be diverted around the work site and other disturbed areas
- Install sediments barriers (e.g. Gabions, or stone pitching) downslope of the building site to filter course sediments.
- Restrict the construction vehicle access to one entry point where possible.
- Place all stockpiles on the construction site and behind a sediment barriers where possible.

3.3. Natural Vegetation

Management objective

To minimise vegetation destruction, land degradation, erosion and vegetation loss.

Management criteria

- Once re-construction is complete, rehabilitation of all un-built areas must be undertaken in order to restore the aesthetic and ecological value of the area;
- Only indigenous vegetation may be utilised for the rehabilitation of disturbed areas. Rehabilitation should be undertaken according to the following schedule:
  - Infilling of all excavation work, ensuring that subsoil is filled in first, to ensure that topsoil is present on the surface in order to ensure a suitable plant growth medium. Substrate that is not suitable for plant growth should not be used for infilling of excavations unless used at a suitable depth e.g. deeper than 2 m;
  - Removal of all construction rubble from the site, including substances that cannot be used for infilling of excavations must be undertaken; and
  - Soil erosion prevention measures should include the placement of silt fences, staked grass sods and rows of sawdust filled onion bags.

3.4. Alien plant Invasion

Management objective

To ensure control and management of the potential alien-plant invasions.

Management criteria

Monitoring strategy must be used as tool to control any outbreak of alien invasive plants.

Effective rehabilitation of the disturbed area must done to prevent natural areas from affected by alien species.

Washing of vehicles wheel prior to be delivered onto site to prevent seeds from other areas.

Visual walk, every three months to see any regeneration of alien species to be removed.

Early identification and eradication method must applied for any new spotted alien species and must be removed through hand pulling the weeds.

But as compare to proposed site of the pump station does not require herbicide, since it is a small area, and within 500m of regulated area of wetland.

3.5. Storm Water Management

Management objective

To reduce the impact of the construction activities on storm water management facilities.

Management Criteria

- Natural (storm water) runoff must be diverted away from the construction area towards the storm water drains or channels. In addition, it must be ensured that storm water is not allowed to collect to form ponds or excessively muddy conditions;
- Special care must be taken in areas susceptible to erosion, e.g. steep slopes. The contractor must ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system;
- Appropriate measures, e.g. erection of silt traps, or drainage retention areas, to prevent silt and sand entering drainage lines or watercourses must be taken;
- The contractor must clear any partial or complete blockage of the storm water drainage system as a result of construction activities at his/her own expense;
- Litter traps must be cleaned regularly (after any rain); and
- Erosion protection must be provided at storm water discharge points.

3.6. Air Quality

Management objective

To reduce the potential of PM 10 deposition in and around the proposed project site.

Management Criteria

Dust control measures, which will be implemented during the construction phase, are outlined in Table 6.1. Control techniques for fugitive dust sources generally involve watering, chemical stabilization, and the reduction of surface wind speed through the use of windbreaks and source enclosures.

Table 6.1: Dust Control Measures to be implemented during Construction Activities

Construction Activity	Control Measures
Speed limit 20-40km/h	Reduce vehicle speed to reduce dust being blow all around site.
Truck transport	Wet suppression
Dust entrainment	➢ Reduction of unnecessary traffic and strict speed control ➢ Require haul trucks to be covered; and ➢ Wet material being hauled
Materials storage, handling and transfer operations	Wet suppression
Earthmoving and dozing operations	Wet suppression
General construction	Wind speed reduction, wet suppression & early paving of permanent parking
Open areas (wind-blown emissions)	Early re-vegetation, compaction and stabilization of disturbed soil; Reduction of frequency of disturbance
Conditions Enforcement	All laid down conditions must be enforce to be complied with.
Monitoring	Visual monitoring has to be implemented by EO, on site.

3.7. Noise

Management objective

To minimise the noise impact on the surrounding environment and construction personnel.

Management Criteria

The following remedial measures should be adhered to:

- Construction activities must be undertaken during the day from 07:00-17:00.
- No working over weekend, and arrangement must be made, if it is required to work during over weekend,
- All the equipment, especially the diesel powered construction and earth moving equipment, will be well maintained;

- Ensure all vehicle noise emissions are within industry norms;
- The maintenance schedule will include the checking of exhaust and intake silencers. Any change in the noise emissions characteristics of equipment must serve as an indicator for its immediate withdrawal from service and placement on the maintenance schedule;

- No blasting is required on site, but if blasting required, it must be done during the day.
- Noise monitoring will be undertaken by the contractor on the machineries to see if machineries' are in good conditions..

3.8. Sites of Archaeological and Cultural Interest

Management Objective

To ensure that the construction activities does not impact negatively on sites of Archaeological and cultural interest that occurs on and close to the project site.

Management Criteria

If archaeological or heritage sites are exposed during construction work, work must be halted and it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the findings can be made. No Old burial grounds (if found) was found during assessment on proposed site, but during construction if find any heritage resources notify to the ECO, Engineer, Contractor, Client Manager who will advise the contractor as to the mode of action, which will include informing the South African Heritage Resources Agency (SAHRA).

3.9. Impact of Blasting (if any) on Adjacent Properties

No blasting is allowed within residential areas

3.10. Impact on Road

Management Objective

To ensure that the entrances to the proposed project site from the existing roads in the area are safe.

Management Criteria

- The constructor will be in continuous consultation with the relevant parties during the construction phase;
- The constructor should arrange with the relevant parties to remove commercial/advertising signage, where necessary, in order to improve sight distances at the entrances of the project site from the existing roads where necessary;
- Signage to reduce speeds and warning of large trucks crossing roads, including flasher lights should be implemented ;
- Illumination or the use of reflectors on both the horse and trailer of all the construction haulage trucks should be implemented on and off site;
- Vehicles will keep to a 40 km speed limit to minimize wear and ensure safety within and around the construction site; and
- The constructor should comply with all technical standards according to the Provincial Roads Authority.

4. MANAGEMENT OF CONSTRUCTION SITE

4.1. Accommodation and Site Camps

- No accommodation, temporary or otherwise, is allowed at facilities other than those approved in accordance with the relevant specifications. Staff shall be accommodated off-site, wherever this is possible;
- No site camp may be situated on any area demarcated as sensitive or restricted;
- Site camps shall be properly fenced and adequately demarcated;
- No domestic animals are allowed on the site;
- No uncontrolled cooking facilities are permitted, in the field or working area;
- No open fires are permitted in the field, except under strictly controlled conditions and subject to the statutory requirements of local ordinances and the National Veld and Forest Fire Act, 1998, (No. 101 of 1998);
- No littering or dumping of solid waste of any description is permitted on the site. All litter, especially plastics, as well as other material capable of being dispersed through the surrounding properties and constituting a hazard to adjacent business and residential activities shall be

regularly collected, at least on a daily basis, and properly stored prior to disposal to an approved site;

- Construction waste shall be recycled wherever possible, in accordance with the principles to be included in the waste management plan;
- Site management procedures shall include a written waste management plan prescribing the safe and hygienic collection, temporary storage and off-site disposal of all domestic waste;
- Site and contract management procedures included in the waste management plan shall also investigate and address waste avoidance and waste minimisation during construction;
- Provision must be made for adequate chemical sanitation facilities and no French drains will be permitted on site; and
- All facilities shall be regularly inspected by designated site management staff for compliance with the provisions of this EMP.

4.2. Restriction to Working Area and Hours

All construction activities should be restricted to the designated areas in order to be able to control and minimise the impact on the existing neighbouring properties. Working areas are defined as those areas required by the contractor to undertake the works as agreed with the ECO.

Working hours for all operations shall be limited to between 07h00 and 17h00 during weekdays (Monday to Friday) and between 07h00 and 13h00 on Saturdays. No work may take place on a Sunday or Public Holidays. Any deviations to these work hours must be cleared with the Engineers, Client, and Labour official prior to implementation.

4.3. Ablution Facilities

The contractor will be responsible for the provision of:

- A minimum of two chemical toilets shall be provided per 15 persons;
- Toilets provided by the contractor must be easily accessible;
- All toilets will be located at a designated area within the construction site area. However, this must be authorised by the ECO before erection;
- Chemical toilets must be placed ouside the delineated wetland and its buffer zone and or 1:100 year flood line area.

- The toilets shall be of a neat construction and shall be provided with doors and locks and shall be secured to prevent them from falling over;
- Toilets shall be placed outside areas susceptible to potential erosion;
- The contractor shall supply toilet paper at all toilets at all times. Toilet paper dispensers shall be provided in all toilets. S.H.E bins must also be made available and serviced in female toilets at all times;
- It is the responsibility of the contractor to make sure that staff make use of the provided toilets;
- The contractor (or reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets;
- Records shall be kept of the maintenance of all chemical toilets.
- The contractor shall ensure that the toilets are emptied on a weekly basis or as required and before any builders' or other public holidays;
- The contractor shall ensure that no spillage occurs when chemical toilets are cleaned and emptied. Any accidental spillage must be reported to the ECO and the client, and cleaned up immediately;
- The contractor shall ensure that the toilets are protected from vandals;
- If the contractor (or reputable toilet-servicing company) fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the ECO (or public) may request the contractor to suspend all construction work until the requirements have been met; and
- Biodegradable soaps are recommended for all washing areas on site.
- Monitoring of condition of chemical toilets.

4.4. Waste Management

Waste Management refers to all solid waste, including construction debris ,hazardous wastes, general wastes, i.e. surplus food, food packaging, organic waste etc. The contractor shall be responsible for the establishment of a refuse control and removal system that prevents the spread of refuse within and beyond the construction site.

- The contractor shall ensure that all waste are disposed of by him/her and the sub-contractors' employees into the waste bins supplied and arrange to be emptied on a daily basis. These bins must have lids, be adequate in number and accessibility;

- Waste shall be separated into recyclable and non-recyclable waste, and shall be further separated as follows:
    - Hazardous waste, consisting of substances that may be harmful to the receiving environment, and therefore require precautionary measures when handled. Examples include (but not limited to) oil, paint, diesel etc.;
    - General waste, consisting of non-hazardous substances and substances that cannot be recycled. Examples include (but not limited to) construction rubble, excess construction materials that cannot be reused, and food waste;
    - Reusable construction material, which can be used at other construction sites; and
    - Recyclable waste shall preferably be deposited in separate bins painted in different colours. Recyclable material includes paper, tins and glass. The contractor is advised that "Collect-a-Can" collect tins, including paint tins, chemical tins, etc. for recycling.
- Waste bins shall be watertight, wind-proof and scavenger proof and shall be appropriately placed throughout the site and shall also be conspicuous (e.g. painted bright yellow). Waste must also be protected from rain, which may cause pollutants to leach out;
- Particular caution is to be exercised with regards to handling of hazardous waste, to ensure that it does not spill or leak from the waste collection containers;
- The contractor or the appointed Waste Removal Company shall collected refuse out of the construction site. Waste must be disposed of at a registered site, which is also approved of by the contractor and the local authority;
- Record must be kept of waste quantities disposed, re-used or recycled. Records of the end use/disposal site, location, person etc. must be kept on site.
- Waste may not be burned or buried on or near the site;
- The contractor shall provide cleaning services to clean up the contractors camp and construction site on a daily basis. These areas shall then be inspected by the contractor to ensure compliance with this requirement;
- A litter patrol around the construction area is to take place twice weekly to ensure that all litter is cleared up;
- The contractor shall be warned, in writing, by the ECO of any infringement and will be expected to clear the litter within 24 hours of the notification; and

- The contractor shall be responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the contract.
- The ECO shall inform and advise the contractor as to the best waste disposal procedure;

4.5. Eating Areas

The contractor shall, in conjunction with the ECO, designate restricted areas for eating. The contractor shall provide adequate refuse bins that must be cleaned on a daily basis. No fire required for cooking purposes on site, contractor must provide any alternative plan if fire is required on site. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited.

4.6. Smoking area

The contractor shall, in conjunction with the ECO, designate restricted areas for smoking. Area must be away from working area, where non-smoker cannot be affected.

4.6. Hazardous Subsatnces/ Chemical Management

The constructor shall only store fuel and chemicals on site after obtaining authorisation from the ECO who will have conducted proper investigation and regulation requirement and obtain necessary authorisation. The contractor shall ensure that:

- All fuels and chemicals that will be used during construction (e.g. Petrol, diesel, grease, oil, brake fluid,) are stored and handled carefully so as to prevent pollution and or fire;
- In the event of a spill, appropriate steps must be undertaken to prevent widespread pollution. These liquids shall be confined to specific and secured areas within the contractor's camp and shall be clearly marked;
- The liquids will be stored in a bounded area with adequate containment (at least 110% of total volume stored) with an impermeable floor beneath them for potential spills or leaks, in such a way that does not pose any danger of pollution even during times of high rainfall;
- In addition, the contractor must ensure that workers do not smoke or take part in any activity that may result in sparks in the vicinity of fuels and other flammable substances to prevent ignition;

- Refuelling of vehicles shall only take place at a predetermined area, where adequate measures are in place to prevent fire and or pollution. A specialist waste contractor shall dispose of any hazardous waste off-site at a licensed hazardous waste disposal site; and
- The contractor will be responsible for ensuring that any party delivering potentially dangerous chemicals and oil to site is aware of the appropriate storage and drop-off locations and procedures. Transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimise the potential leakage and prevent spillage onto the soil.
- Spill kits and fire extinguishers must be available on site for in case if there is fire and any leakages.

4.7. Spillage Control

The constructor should ensure:

- Drip trays must be put in relevant locations (inlets, outlets, points of leakage, etc) so as to prevent such spillage or leakage during transfer;
- The contractor shall stand any equipment that may leak, and does not have to be transported regularly, on watertight drip trays to catch any pollutants;
- The drip trays shall be of a size that the equipment can be placed inside it. Drip trays shall be cleaned regularly and shall not be allowed to overflow;
- Substances, which cannot be reused, must be disposed of according to the relevant waste disposal procedure. The contractor shall also keep the necessary materials and equipment on site to deal with spillage of the relevant hazardous substances present on site;
- The contractor shall set up a procedure for dealing with spills, which will include notifying the ECO and the relevant authorities immediately following the spillage event. These procedures must be developed with consultation and approval by the appointed ECO; and
- The clean-up of spills caused as a result of the construction activities, and any damage to the environment, shall be for the contractor's own account. A record must be kept of all spills and the corrective action taken.

4.8. Handling of Hazardous Material

All relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials must be strictly complied with. In addition the constructor should:

- Obtain the advice of the manufacturer with regard to the safe handling of hazardous materials supplied;
- Ensure that there is an emergency procedure in place to deal with accidents and incidents (e.g. spills) arising from hazardous substances;
- Ensure that all personnel on site are properly trained concerning the proper use, handling and disposal of hazardous substances;
- Report major incidents (i.e. spills in excess of 50 litres) to the ECO immediately. Any spill incidents must be cleaned up immediately and in according with the emergency procedure; and
- Supply the ECO with a list of all hazardous materials that would be present on site during the construction period. The same applies to any sub-contractor that must provide the contractor with this information.

4.9. Vehicles

- Site vehicles are only permitted within the demarcated construction camp, as required, to complete their specific task;
- All construction vehicles should be in a good working order to reduce possible noise pollution. Compliance with the as outlined in the national noise-control regulations (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992) No. 5479 of 1999 must be conformed with at all times;
- On-site vehicles must be limited to approved access routes and areas (including turning circles and parking);
- Servicing and maintenance of vehicles on-site shall be avoided as far as possible;
- Driver awareness and safety management programmes must be devised, implemented and recorded, for audit and monitoring purposes;
- The Contractor must place appropriate warning signs at the entrances / exits to the site, as well as at all level street crossings. The last mentioned signs shall be in addition to the normal signage

present at “private” level crossings and shall indicate to road users the nature of the activity occurring in the immediate site; and

- Construction will be limited to normal working hours, in order to limit disturbance from vehicles and construction activity to the neighbouring properties.

4.10. Control of the use of Cement and Concrete

Cement and concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result the contractor must ensure that:

- Concrete may only be mixed on mortar boards, and not directly on the ground;
- The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste (washing of visible signs onto the soil surface is not acceptable); and
- All aggregate must also be removed from site and appropriately disposed of.

4.11. Temporary Fencing

- The contractor must ensure that the construction camp and all sites are enclosed with a fence for the duration of the construction period;
- The mesh size should be small enough for the fence to act as a catch net for wind-blown debris and as a demarcation of the site;
- The fence will serve to prevent public access to the camp/site, for public safety and security reasons; and
- The contractor must maintain the fence for the duration of the construction period. All temporary fences must be removed and the site restored on completion of the project.

5. SITE REHABILITATION

5.1. REMOVAL OF SITE MATERIALS

After construction, any area cleared or disturbed (as a result of the activity) within and outside the boundaries of the construction site shall be rehabilitated to a state as agreed by the GDARD, Local Authority, Community and Project compliance according to the specifications of a landscape architect and the ECO.

All construction equipment and excess aggregate, gravel, stone, concrete, bricks, temporary fencing and the like shall be removed from the site upon completion of the work. No discard materials of whatsoever nature shall be buried on the site, or on any vacant or open land in the area, only be disposed of at the appropriate registered waste disposal site.

5.2. LANDSCAPING AND PREPARATION OF PLANTING

Topsoil that is disturbed or removed during construction and excavation must be replaced, preferably using topsoil stockpiled prior to excavation activities, or with topsoil sourced from elsewhere. However, where possible, soils from different areas should not be mixed. Care must be taken not to mix the topsoil with the subsoil during shaping operations.

6. EMERGENCY PROCEDURES

- The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include, but are not limited to, fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc.
- The contractor must ensure that lists of all emergency telephone numbers/contact persons (including fire control) are kept up to date and that all numbers and names are posted at relevant locations throughout the duration of the construction period.

- The Contractor is to explain ad implement emergency procedures and plans for the event such as fire, explosion, spillages of hazardous substances, evacuation, etc. to staff prior to any construction activity taking place. The following associated activity must be undertaken by the contractor:
- Development and compilation of emergency procedure and plan.
- Emergency Procedure and plan is to describe the measures required to manage emergencies during the construction phase and transportation and or storage of hazardous material and wastes.
- The contractor is to ensure that emergency procedures mock training sessions are carried out on hoc basis.
- The contractor is to inform his employees of the locality of designated emergency meeting point.

6.1. Fire

- The contractor must take all reasonable measures to ensure that fires are not started as a result of construction activities on site, and shall also ensure that their operations comply with the Occupational Health and Safety Act (Act No. 85 of 1993);
- No large open fires are permitted on site;
- Sparks generated during welding, cutting of metal or gas cutting can result in fires. Every possible precaution shall therefore be taken when working with this equipment near potential sources of combustion;
- Such precautions include having an approved fire extinguishers immediately available at the site;
- The contractor shall ensure that there is basic firefighting equipment available on site at all times. The contractor shall appoint a member of his staff to be responsible for the installation and inspection of this equipment; and
- The contractor is to ensure that he/she has the contact details of the nearest fire station in case of an emergency.

6.2. Safety

The contractor must ensure:

- Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993) and Construction Regulation 2014;
- That reasonable measures are taken to ensure the safety of all site staff;
- That all construction vehicles using public roads are in a roadworthy condition, that drivers adhere to the speed limits and that their loads are secured and that all local, provincial and national regulations are adhered to;
- That all accidents and incidents are recorded and reported to the ECO; and
- The contractor is to ensure that he/she has the contact details of the nearest emergency rooms (hospitals) to the site, of both private and public hospitals.

7. MANAGEMENT AND MONITORING

This section focuses on the systems and procedures required to ensure that the environmental specifications contained in the EMP are effectively implemented, monitored, enforced and recorded.

7.2. Location of the Environmental Management Plan

All contractors on site shall at all times have a copy of the EMP in their respective site office (located in the construction camp).

7.3. Training and Awareness

- All site staff shall be made formally aware of the contents of this EMP and its conditions;
- Project management shall ensure that all contractors, sub – contractors or service providers of any nature are certified as being aware of, conversant with and sufficiently trained in the performance of their duties so as to be able to apply this EMP to all applicable aspects of their work and behaviour on site;
- Training records must be regularly monitored and measures to ensure that new contractors or staff are trained or re-trained as necessary;
- The ECO shall devise and conduct specific environmental training interventions of a general environmental or task / discipline - specific nature, in conjunction with the construction functions concerned. Such courses shall include:

- General environmental awareness, as part of normal induction training or stand – alone module for all levels of project staff;
- Specific programme for machine and vehicle operators;
- Specific programme for delegated Environmental Officers operating on an Site staff must be made available for attendance and certification of competence in terms of such training material; and
- The currency and application of environmental training of site staff will be measured and reported per site audits conducted.

7.4. Communication with Property owners

- Contractors and all project staff shall treat the property and privacy of adjoining landowners and / or communities with the utmost respect;
- Any action that may be construed as causing nuisance or harm to the person or property of others shall be avoided. Non – compliance must be followed up and dealt with accordingly;
- The Project and Construction Manager must establish formal contact with the landowners where properties occur within a 100 m – 1 km radius. Such landowners must be provided with the contact numbers of relevant project and site management staff, with whom any complaint, concern or issue can be lodged for immediate attention;
- Communications structures should include a central “hot line” where complaints can be logged and followed up, independently by immediate site management;
- Special arrangements must be made regarding communication with landowners or parties affected by blasting on site; and or proposed activity.
- A complaint register recording the names and nature of complaints /communications must be maintained, for follow – up and audit purpose.

7.5. General Monitoring and Reporting

- The appointed ECO as well as the contractors on site are responsible for ensuring compliance with the EMP; and RoDs Conditions
- It is suggested that periodic EMP compliance reports (audits) are compiled by the ECO and submitted to the contractor for his/her review and correction of non-compliance issues. It is the responsibility of the ECO to report any non-compliance, which is not correctly rectified to GDARD, Local Municipality, and any affected department;

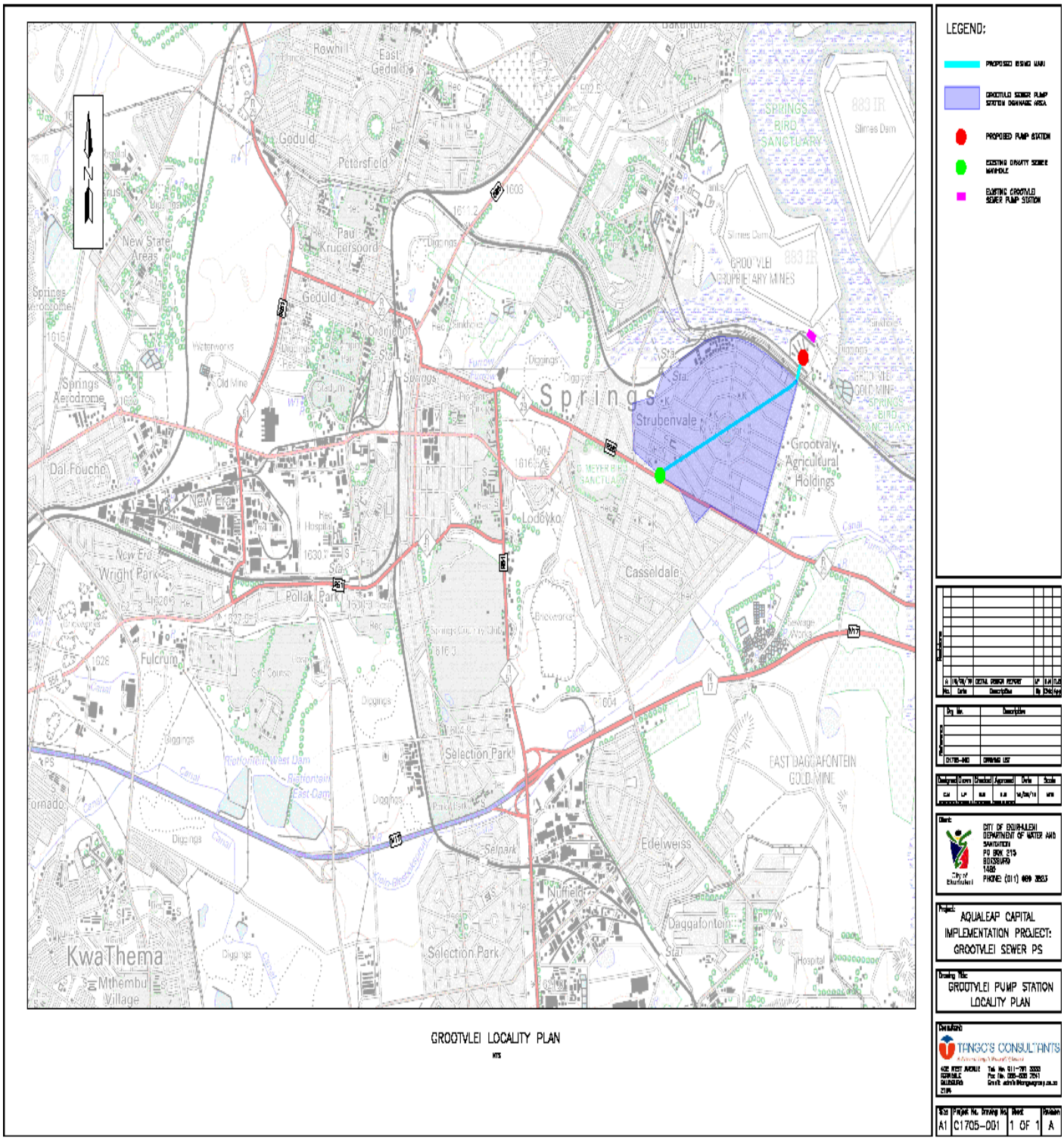
- Interested and Affected Parties must be allowed access to the EMP document. They have the right to monitor specific aspects of the EMP (e.g. noise regulations, working hours stipulated) in conjunction with the contractor in a reasonable and informal manner, without unreasonably disrupting construction activities. No member of the public may, however, enter construction site without prior approval from the contractor;
- The contractor shall keep a record of all complaints received from the community and communicate them to the ECO. These complaints must be addressed and mitigated within reason;
- Records relating to the compliance/non-compliance with the conditions of the EMP as well as audit reports shall be kept in good order and shall be made available to CoE, GDARD, DWS, and any affected department within seven days after a written request has been received; and
- It is suggested that all records be kept for at least two years following construction activities for reference purposes.

8. GENERAL CONDITIONS

- This EMP shall be binding on all the parties involved in the construction phases and shall be enforceable at all levels of contract and operational management within the project;
- The EMP shall be deemed a binding commitment by the parties to act within the intent and spirit of sound environmental management and to cooperate and enforce the specifications contained therein, as and where necessary;
- The EMP recognises and enables the force of law attached to environmental aspects of the project;
- Work shall at all times be approached with due concern for the natural and social environment. Management and site procedures shall be directed towards minimising environmental impact and / or damage in all aspects of the work;
- Archaeological remains, artificial features and structures older than 60 years are protected by the Natural Heritage Resources Act, Act 25 of 1999. Should any archaeological artefact (e.g. ostrich eggs, shell flasks), unmarked human burials or heritage resources be exposed during excavation for the purpose of laying foundations or site clearing and levelling, construction in the vicinity of the finding must be stopped. An archaeologist must be called to the site for inspection and the South African Heritage Agency advised accordingly. Under no circumstance may any artefacts be destroyed or removed from the site;

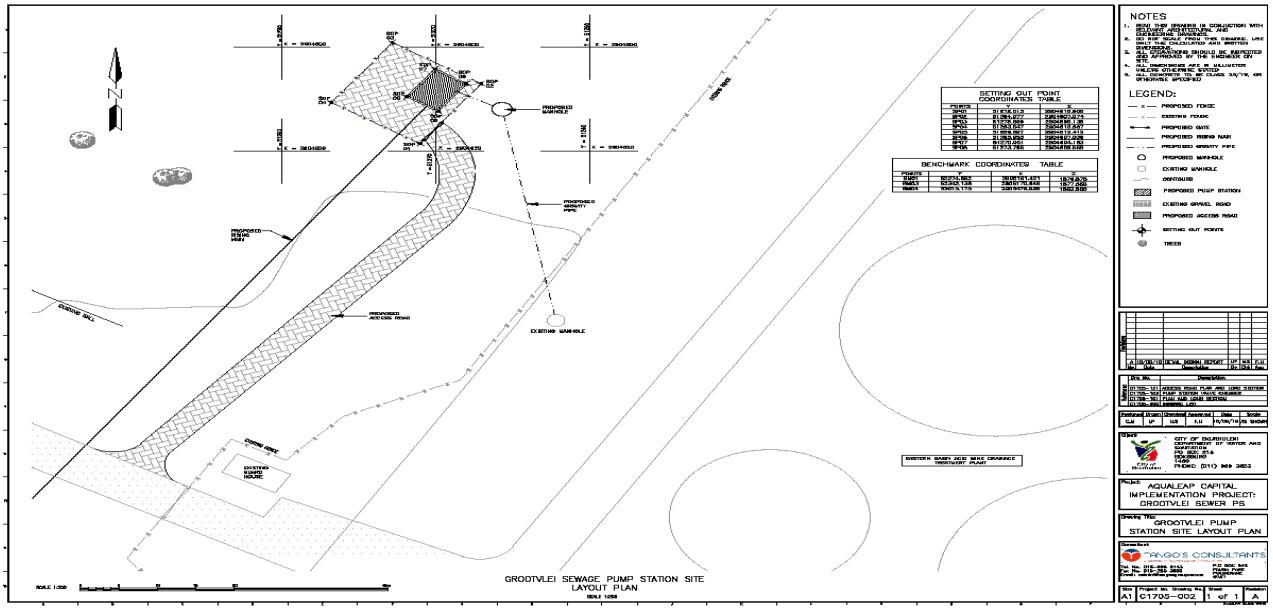
- The gaining of water for construction purposes must at all times comply with the permitting and licence requirements of the Department of Water Affairs and the local municipality;
- Blasting work that may be required on site shall be carried out entirely within the provisions of the Explosives Act, Act 26 of 1956 and all other relevant engineering and safety standards;
- Execution of work falling within the ambit of this EMP and Environmental Specifications shall be carried out in accordance with Method Statements, where required by the Resident Engineer (RE) and / or Environmental Control Officer (ECO). A method statement is a written submission by the Contractor to the RE setting out the plant, materials, labour, timing and method the Contractor proposes using to carry out an activity, in such detail that the Resident Engineer and ECO are able to assess whether the Contractor's proposal is in accordance with the EMP and its specification and will produce results in accordance with the intent of the specifications;
- The RE or a designated Engineer / Manager may, at his / her sole discretion, stop any work, activity or process not in accordance with this directive;
- This EMP and Environmental Specifications are applicable to the Works in its entirety. The EMP shall be expanded, customised and added to as may be necessary to meet any specific condition that may be encountered on the site as a whole;
- Once having been accepted/approved by GDARD and by CoE, this EMP shall be seen as a dynamic document. However, any substantial changes shall be submitted to department for acceptance before any such changes may be effected; and
- Project and Site Management personnel shall furthermore establish appropriate management structures, liaison and communication forums to integrate all construction activities into existing safety programmes. Accountability, joint functions and specific responsibilities must be clearly defined in formal documentation

APPENDIX A: THE LOCALITY MAP FOR THE PROPOSED PROJECT

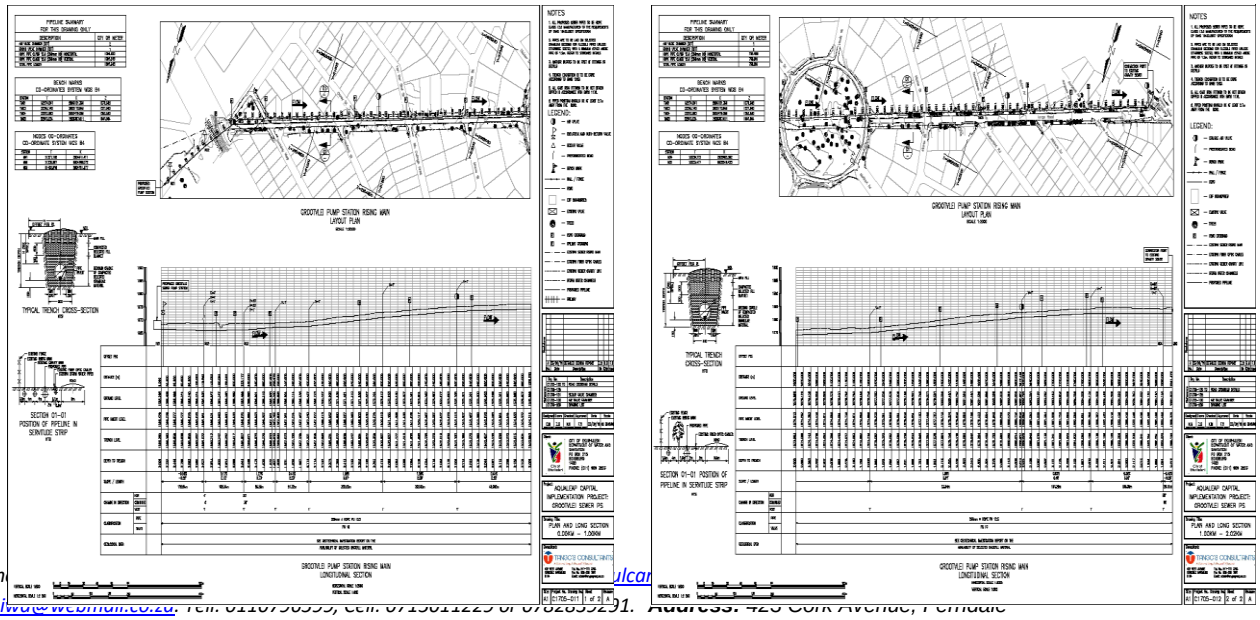


APPENDIX B: PROPOSED PROJECT ILLUSTRATION

Proposed sewer pump station and upgrading paved road to intersect Van Niekerk Road



Proposed upgrading sewer rising main pipe from 150mm diameter – 250mm diameter pipe from sewer pump station to convey sewerage along Largo road on the road reserve to connect at corner Largo Road and Ermelo Road



APPENDIX C: WEEKLY ENVIRONMENTAL AND SAFETY CHECKLIST

APPENDIX D: MONTHLY ENVIRONMENTAL AUDIT CHECKLIST

APPENDIX E: ENVIRONMENTAL INCIDENT REPORT