

# APPENDIX G

Environmental Management Programme (EMPr)

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# ENVIRONMENTAL MANAGEMENT PROGRAMME

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## The proposed construction of the Ganspan WWTW and related bulk sewer infrastructure

**Proponent:** Phokwane Local Municipality  
**MDA Ref No:** 40738  
**Date:** March 2017



Town & Regional Planners,  
Environmental & Development  
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## **1. INTRODUCTION**

### **1.1 Project and associated construction activities**

The proposed project entails the construction of a WWTW and related infrastructure (including pipeline) at Ganspan, Northern Cape Province.

Please refer to the map in Appendix A of the Basic Assessment Report for an indication on the locality of the proposed activities.

### **1.2 Objectives of the EMPr**

The EMPr aims to fulfil the requirements in terms of the National Environmental Management Act (Act 107 of 1998), with the following objectives:

- To identify, predict and evaluate actual and potential impacts on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits and promoting compliance with the principles of environmental management;
- To identify and employ the modes of environmental management best suited to ensuring that the activity is pursued in accordance with best environmental management practices;
- To be able to respond to unforeseen events; and
- To provide feedback on compliance.

### **1.3 Implementation of the EMPr**

The proponent, namely Phokwane Local Municipality is responsible for the implementation of the EMPr. All contractors should be supplied with a copy of the EMPr and should ensure that construction staff adheres to the mitigation measures.

## 2. PREPARATION OF THE EMPr

### 2.1 Person(s) who prepared the EMPr

- i) Mr Neil Devenish
- ii) Me Hanlie Stander

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### 2.2 Expertise of the person(s) who prepared the EMPr

- i) Mr Neil Devenish

Key qualifications:

- Key competencies and experience include development control applications (applications and appeals pertaining to rezoning, consolidations, subdivisions etc.) township establishment applications, environmental management and control applications.

Education:

- B. A. (Sociology, Geography) University of the Free State, SA, 1994
- Master of Town and Regional Planning, University of the Free State, SA, 1996
- Managing the Environmental Impact Assessment Process, Environmental Management Unit, PU for CHE, 2000
- Environmental Management Consulting, South African Institute of Ecologists & Environmental Scientists, 2001
- Water Law of South Africa, The South African Institution of Civil Engineers (SAICE), 2006

- ii) Me Hanlie Stander

Key qualifications:

- Key competencies and experience include environmental management and research in zoology and environmental management.

Education:

- B.Sc. (Zoology), University of the Free State, South Africa, 2005

- B.Sc. Honors (Zoology), University of the Free State, South Africa, 2006
- M.Sc. (Zoology), University of the Free State, South Africa, 2012

### **3. RECOMMENDED MANAGEMENT AND MITIGATION MEASURES**

#### **3.1 Planning phase and Construction phase**

- i) Permits need to be obtained for the removal / transplantation of protected species (if any) located within the proposed development area. Care must be taken to prevent unnecessary damage to vegetation near to construction activities.
- ii) The necessary precautions with regard to road safety should be implemented by construction vehicles.
- iii) Proper sanitation, water and waste facilities should be in place for construction workers.
- iv) Washing and chemical toilet facilities must be provided on site during the construction phase. Chemical toilets should be cleaned regularly.
- v) Clean water should be made available daily to workers on site.
- vi) Fire-fighting equipment should be available on site, where applicable.
- vii) If artefacts or graves are uncovered during construction activities, work in the immediate vicinity is to be stopped until the project Archaeologist has been consulted.
- viii) A blasting permit will be obtained should blasting activities be undertaken.
- ix) Adjacent landowners will be notified of proposed blasting, 24 hours prior to blasting events.
- x) It is proposed that all maturation dams / sludge lagoons / sludge ponds must be lined to prevent groundwater seepage.

- xi) All no-go areas must be demarcated under guidance of the Environmental Control Officer (ECO).
- xii) Storm water management measures must be implemented in order to prevent the contamination of storm water as well as the ingress of storm water at the WWTW.
- xiii) Caution must be taken to ensure that construction materials are not dumped or stored within waterway(s) and -buffer zone(s) of 32 m.
- xiv) Emergency plans must be in place in case of spillages into the water resource(s).
- xv) Erosion control must be implemented so as to reduce erosion and sedimentation into the water source(s).
- xvi) Any construction activities near the waterway(s) should be limited through proper demarcation and appropriate environmental awareness training. The Contractor is responsible to inform all staff of the need to be vigilant against any practice that will have a harmful effect on waterways.
- xvii) Infilling, excavation, drainage and hardening of surfaces should not occur unnecessarily in waterway(s) (i.e. permanent, seasonal or temporary), or within 32 m thereof. This 32 m buffer zone should be extended in areas where slope in combination with rainfall will potentially provide conditions for the transportation and deposition of materials within the water resource(s).
- xviii) The design of drainage systems must ensure there is no contamination, eutrophication or increased erosion of the waterway(s). Drainage systems should be maintained regularly in order to minimize the runoff of harmful chemical substances into the waterway(s).
- xix) It should be ensured that the proposed activities have minimal effect on the flow of water through the waterway(s).
- xx) The necessary Water Use Authorisations should be obtained before delineated surface water boundaries are disturbed (if any).

### **3.2 Handling and storage of materials**

- i) All chemicals used during the development, including fuel for the construction vehicles, should be stored in a proper storeroom or protected area to prevent pollution.
- ii) Vehicles should be serviced at designated areas. No oil, diesel or other chemicals may be spilled or discharged anywhere.
- iii) Where applicable, the contractors must ensure that all relevant national, regional and local legislation regarding storage, transport, use and disposal of petroleum, chemical, harmful or hazardous substances and materials are adhered to, where required.
- iv) Cement and concrete mixing, if applicable, should only take place within the construction site. No concrete may be mixed directly on the ground.
- v) All environmental problems occurring on the site such as chemical spillage, wasteful water disposal, etc. should be reported to the ECO.

### **3.3 Waste management**

- i) Waste refers to all construction debris and domestic waste generated due to construction activities.
- ii) The contractor will be responsible for the removal of construction waste.
- iii) Suitable containers should be placed on site to collect all solid waste. These should be emptied regularly.
- iv) No littering is permitted. During the construction period the site shall be maintained in a neat and tidy condition.
- v) All solid waste produced should be disposed of at an authorized landfill site.
- vi) No dumping, burning or burying of waste may take place on site.
- vii) All hazardous waste (if any) should be disposed of at an authorized hazardous landfill site. Re-usable hazardous material should be re-used or sold to recycling contractors.

### 3.4 Soil, erosion and vegetation management

- i) Construction activities should be limited to designated construction areas to prevent peripheral impacts on surrounding natural habitats. Construction vehicles should also keep to constructed roads where possible, so that natural vegetation is not destroyed unnecessarily.
- ii) All human movement and activities must be contained within designated construction areas in order to prevent peripheral impacts on surrounding natural habitat.
- iii) Erosion management is important. Rehabilitation of disturbed areas is important to help the recovery of the vegetation.
- iv) Removed topsoil is to be stockpiled in an area where it will not be disturbed. For example, one layer of bricks or stones can be placed around the stockpiled topsoil to protect topsoil from washing away during rainstorms.
- v) Topsoil is to be placed on the disturbed areas once construction is completed. Re-spreading is preferably to be done to its natural level or to a maximum of 10 cm.
- vi) An alien control and monitoring programme must be developed, starting during the construction phase and to be carried over into the operational phase.
- vii) Any proclaimed weed or alien species that germinates during the contract period must be cleared by hand / approved chemicals before flowering thereof.
- viii) Imported fill material should be monitored during and after construction for the presence of any alien species. Any such species should be removed immediately.
- ix) No open fires allowed. Provision should be made that no accidental fires are started.
- x) No firewood shall be collected on site or in surrounding areas, without written consent from the landowner.
- xi) Firefighting equipment must be available on site.
- xii) Species, especially grasses, trees and shrubs occurring in the region must be used to rehabilitate disturbed areas.



### **3.6 Noise control**

- i) The noise levels will be kept to an acceptable level and comply with the standards as per legislation.
- ii) Construction activities should be limited to normal daytime hours, where possible.
- iii) Noise levels should be kept as low as possible during the construction phase in order not to disturb adjacent landowners.

### **3.7 Air pollution**

- i) Dust will be controlled during the construction phase, when necessary.
- ii) Construction activities should be limited to normal daytime hours, where possible.
- iii) The operation of construction vehicles will be limited to 35km/hour to limit the formation of dust.
- iv) The design of the works will be in such a manner as to minimize turbulence and the release of hydrogen sulphide (H<sub>2</sub>S).
- v) The following were also considered during the planning phase, to limit odours in the nearby vicinity:
  - Plant orientation and the impact of covering tanks.
  - Buffer zone (between boundary of works and nearest public building).
  - Wind factor and dilution.

### **3.8 Safety and security**

- i) The contractors must comply with the Occupational Health and Safety Act, National Building Regulations and any other national, regional or local regulations with regard to safety on site.
- ii) Construction contracts must include safety and security measures for staff.
- iii) Precautions to ensure that construction staff and sites are visible should be implemented.

- iv) Proper PPE should be provided to the employees and used correctly by employees.
- v) Fire extinguishers must be available on site and in the construction camp (if any).

### **3.9 Heritage management**

- i) Known heritage resources (if any) must be avoided as far as possible.
- ii) Employees should be encouraged and informed of the need to be on the look-out for potential fossils / buried archaeological material.
- iii) In the case of the discovery of any stone tools or other archaeological or palaeontological material, the work in the immediate vicinity should temporarily cease and reported to the archaeologist and SAHRA. Should any human remains be exposed, the archaeologist as well as the local SAPS should be notified.
- iv) Appropriate measures should be undertaken by the ECO until the archaeologist / SAPS visits the site. This should include the following:
  - Site should be fenced with 'danger tape'
  - Position of finding should be recorded
  - Depth of finding should be recorded
  - Digital image of the finding should be taken
- v) Note that no information on the findings may be made public without the consent of the archaeologist / SAPS.
- vi) Construction activities in the area may only continue after approval from the archaeologist and SAHRA.

### **3.10 Site clean-up and rehabilitation**

- i) Temporary structures and office sites (if any) shall be dismantled and removed after completion of the construction phase of the project.
- ii) All waste, equipment, materials, etc. used during construction must be cleared from the site. The contractors must ensure that the site is cleared and rehabilitated to the satisfaction of the ECO.

- iii) An alien plant control and monitoring programme should be implemented.
- iv) Re-vegetation of disturbed areas must be undertaken with site indigenous species.
- v) After completion of the construction phase, a waterway monitoring program must be initiated that ensure that the waterway is adequately rehabilitated.

### **3.11. Environmental Awareness Plan**

- i) The contractors should ensure that all employees and any third party are adequately trained with regard to the implementation of the EMPr, before any of the contractor's obligations are carried out by the above mentioned parties. This includes training regarding any environmental legal requirements as well as any other obligations. The appointed ECO (or external specialists) should conduct the required training.
- ii) The management (including the executive as well as middle) as well as general labour levels should be targeted during the training sessions.
- iii) Environmental Awareness Training Programmes should include, but not limited to, the following:
  - Names, positions and responsibilities of personnel to be trained in various training sessions
  - Schedules indication dates for various training sessions
  - Framework for various training sessions
  - Summarised content of training sessions
  - Importance of conformance with environmental regulations and policies
  - Impacts that various work activities may have on various environmental aspects
  - Roles and responsibilities of employees to ensure conformance with the EMPr, best practices as well as other environmental policies
  - The potential consequences should the specified operating procedures not be adhered to
  - Implementation of various mitigation measures

- Information on the protected / species of concern that may be observed on / near the construction site
  - Information on the possible occurrence of archaeological and/or historical findings on site
  - Importance of:
    - not littering
    - using supplied toilet facilities
    - using water sparingly
    - minimising the occurrence of pollution (air, soil, surface water or groundwater resources)
    - re-use of material where possible (limit the generation of waste)
- iv) All records of all training sessions should be available on site. An induction presentation on environmental awareness as well as the EMPr shall be given to all employees, in a language that is understood by the employees.
- v) The on-site ECO as well as the contractor should monitor the performance of employees to ensure that the above is adhered to.

#### 4. OPERATIONAL PHASE

- i) Soil erosion occurrences should be attended to immediately.
- ii) If it is decided to irrigate with the treated water, regular monitoring should be undertaken to ensure that the treated water complies with the DWS regulations. Also note that the applicable water authorisations should be in place before any irrigation is undertaken.
- iii) An action plan should be available and implemented immediately, in case the treated water to be used for irrigation does not comply with the DWS regulations to ensure that it is rectified as soon as possible.
- iv) The noise levels will be kept to an acceptable level and comply with the standards as per legislation.
  - Noise measured (external) at the WWTW site boundary will not be more than 40-50dB(A).
  - The day time noise level will not exceed 55-65dB(A).
  - The noise level limits measured at a distance of approximately 1m from the following mechanical and electrical facilities shall be less than 80dB:
    - Hydraulic and pneumatic equipment
    - Gears and drivers
    - Pumps
    - Etc.
- v) Air pollution will be mitigated.

## 5. DECOMMISSIONING /CLOSURE

It is not anticipated that the proposed project will cease in the nearby future. However, if decommissioning is decided upon, a rehabilitation plan will be developed and submitted for approval. The end-use of the area will be kept in mind during the compilation of the rehabilitation plan.

- i) Activities associated with the decommissioning phase of the WWTW, will be limited to the rehabilitation of areas disturbed during the construction phase. All disturbed areas will be rehabilitated according to best practices.
- ii) All temporary infrastructure related to the construction phase will be removed from site.
- iii) Temporary concrete surfaces (if any) will be removed and compacted areas ripped.
- iv) The establishment of natural occurring vegetation will be encouraged, where applicable.
- v) No waste will be dumped on site and any waste occurring on site will be removed and disposed of according to best practices.
- vi) Establishment of extensive alien vegetation species will be monitored.
- vii) A rehabilitation plan will be developed, if it is decided to decommission the WWTW, before the cessation of the operation aspects of the proposed project.
- viii) The rehabilitation plan will include management and mitigation measures to be implemented during the decommissioning of the project.

## 6. COMPLIANCE AND MONITORING

- i) The proponent should ensure that the contractors adhere to the recommendations of the EMPr and conditions of the Environmental Authorisation during construction.
- ii) An Environmental Control Officer (ECO) can be appointed separately or can be part of the contractor's team to monitor the construction phase.
- iii) Regular monitoring and / or spot inspections at least every fortnight during the construction phase is recommended.
- iv) Inspections should be documented and any shortcomings addressed immediately.
- v) An independent ECO should be appointed to undertake a monitoring audit at least on a monthly basis during construction, unless otherwise stated in the EA.
- vi) The applicant shall report any pollution incident occurring during the construction and operational phases to DWS.

## SUMMARY OF RECOMMENDED MANAGEMENT AND MITIGATION MEASURES

ECO - Environmental Control Officer / IECO - Independent Environmental Control Officer / SO - Safety Officer

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
<b>General measures to consider</b>	1.1.	Any construction is disruptive and the environment must be given consideration with every activity undertaken	Applicant / Contractor	Contractor / ECO	On-going	At all phases
	1.2.	All relevant standards relating to legislation should be adhered to (including waste emissions, waste disposal, noise regulations, etc.)	Applicant / Contractor	Contractor / ECO	On-going	At all phases
	1.3.	According to Section 28 of the NEMA Act 107, every person who cause, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring and if it can't be avoided or stopped, to minimize and rectify such pollution or degradation of the environment.	Applicant / Contractor	Contractor / ECO	On-going	At all phases



Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	1.4.	The pollution control provision in Section 19(1) of the National Water Act (Act 36 of 1998) should be adhered to at all times.	Applicant / Contractor	Contractor / ECO	On-going	At all phases
Planning phase	2.1.	Permits will be obtained for the removal / transplantation of protected species (if any) that are located within the construction area where no alternatives are possible. Care will be taken to prevent unnecessary damage to vegetation near to construction activities.	Contractor	Applicant / ECO	Once off	Before site preparation / construction activities are undertaken
	2.2.	Water Use Authorisations will be obtained before any delineated surface water boundaries are disturbed (if any).	Applicant	Contractor / ECO	Once off	Before site preparation / construction activities are undertaken

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	2.3.	The necessary Environmental Authorisation will be obtained before any activities listed in the Regulations (Regulations 982, 983, 984 and / or 985 of 2014) are undertaken.	Applicant	Contractor / ECO	Once off	Before site preparation / construction activities are undertaken
	2.4.	The necessary precautions with regard to road safety will be implemented for construction work to be undertaken within road crossings (if any).	Contractor	SO / ECO	Continual	Before site preparation / construction activities are undertaken
	2.5.	Proper sanitation, potable water and waste facilities will be in place before construction activities are undertaken.	Contractor	SO / ECO	Continual	Before site preparation / construction activities are undertaken
	2.6.	A blasting permit will be obtained before blasting activities is undertaken (if any).	Applicant	Contractor / ECO / SO	Once off	Before site preparation / construction activities are undertaken

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
<b>Construction phase - general</b>	3.1.	Care will be taken to prevent unnecessary damage to vegetation near to construction activities.	Contractor	ECO	On-going	Throughout construction phase
	3.2.	The necessary Water Use Authorisations will be available on site (if any).	Contractor	ECO	On-going	Throughout construction phase
	3.3.	The necessary precautions with regard to road safety will be implemented for construction work within road crossings (if any).	Contractor	ECO / SO	On-going	Throughout construction phase
	3.4	Proper sanitation, water and waste facilities will be in place for construction workers throughout the construction phase.	Contractor	ECO	On-going	Throughout construction phase
	3.5	Chemical toilets will be cleaned and serviced regularly and proof thereof will be available on site.	Contractor	ECO	On-going	Throughout construction phase
	3.6.	Potable water will be made available daily to workers on site.	Contractor	ECO / SO	On-going	Throughout construction phase
	3.7.	Fire-fighting equipment will be available on site, where applicable.	Contractor	ECO / SO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	3.8.	If artefacts or graves are uncovered during construction activities, work in the immediate vicinity will be stopped until the project Archaeologist and SAHRA has been consulted.	Contractor	ECO	On-going	Throughout construction phase
	3.9.	Adjacent landowners will be notified of proposed blasting, 24 hours prior to blasting activities.	Contractor	ECO / SO	On-going	Throughout construction phase
	3.10.	All no-go areas will be demarcated under guidance of the Environmental Control Officer (ECO). The design of drainage systems will ensure that there is no contamination of storm water with dirty water.	ECO	IECO	On-going	Throughout construction phase
<b>Handling and Storage of materials</b>	4.1.	All chemicals used during the development, including fuel for the construction vehicles, will be stored in a proper storeroom or protected area to prevent pollution.	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	4.2.	Vehicles will be serviced at designated areas. No oil, diesel or other chemicals may be spilled or discharged anywhere.	Contractor	ECO	On-going	Throughout construction phase
	4.3.	Where applicable, the contractors will ensure that all relevant national, regional and local legislation regarding storage, transport, use and disposal of petroleum, chemical, harmful or hazardous substances and materials are adhered to, where necessary.	Contractor	ECO	On-going	Throughout construction phase
	4.4.	Cement and concrete mixing, if applicable, will only take place within the construction site. No concrete will be mixed directly on the ground.	Contractor	ECO	On-going	Throughout construction phase
	4.5.	All environmental problems occurring on the site such as chemical spillage, wasteful water disposal, etc. will be reported to the ECO. The ECO should implement best practices to rectify the impacts thereof on the	Contractor / ECO	IECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
		environment.				
	4.6.	Spill response equipment must be available during the handling and loading of hazardous waste (if any)	Contractor / ECO	IECO	On-going	Throughout construction phase
	4.7.	Hazardous substances to be stored in bunded area. Bund walls will have a capacity of at least 110% of the total capacity of the stored volume.	Contractor	ECO	On-going	Throughout construction phase
	4.8.	No oil, diesel or other chemicals may be spilled or discharged anywhere and contact with bare soil should be avoided at all cost.	Contractor	ECO	On-going	Throughout construction phase
	4.9.	Drip trays will be used during the servicing of vehicles as well as the transfer of chemicals / substances from transportation vehicles. Best practices will be used to empty the drip trays.	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	4.10.	All environmental problems occurring on the site such as chemical spillage, wasteful water disposal, etc. will be reported to the ECO. The ECO should implement best practices to rectify the impacts thereof on the environment.	Contractor	ECO	On-going	Throughout construction phase
<b>Waste Management (Note that waste refers to all construction debris and domestic waste generated due to construction activities.)</b>	5.1.	The contractor is responsible for the removal of construction waste.	Contractor	ECO	On-going	Throughout construction phase
	5.2.	Suitable containers will be placed on site to collect all solid waste. These will be emptied regularly.	Contractor	ECO	On-going	Throughout construction phase
	5.3.	No littering is permitted. During the construction period the site will be maintained in a neat and tidy condition.	Contractor	ECO	On-going	Throughout construction phase
	5.4.	All solid waste produced will be disposed of at an authorized landfill site. Recyclable waste will be sold to recycling contractors, where possible.	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	5.5.	No dumping, burning or burying of waste will be undertaken on site.	Contractor	ECO	On-going	Throughout construction phase
	5.6.	All hazardous waste will be disposed of at an authorized hazardous landfill site. Recyclable hazardous waste be re-used or sold to recycling contractors, where possible.	Contractor	ECO	On-going	Throughout construction phase
	5.8.	A waste management plan will be compiled and designed to ensure adequate waste management activities	Contractor	ECO	On-going	Throughout construction phase
	5.9.	Areas used for waste storage and loading of materials should be lined and bund walls have to be erected to contain any spills that might occur.	Contractor	ECO	On-going	Throughout construction phase



Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
Soil, erosion and vegetation management	6.1.	Construction activities will be limited to designated construction areas to prevent peripheral impacts on surrounding natural habitats. Construction vehicles will also keep to constructed roads where possible, so that natural vegetation is not destroyed unnecessarily.	Contractor	ECO	On-going	Throughout construction phase
	6.2.	Access roads or temporary crossings must be non-erosive, structurally stable and not induce flooding / safety hazard.	Contractor	ECO	On-going	Throughout construction phase
	6.3.	If any access road or temporary crossing is impaired, it will be repaired immediately to prevent any future / further damage.	Contractor	ECO	On-going	Throughout construction phase
	6.4.	All human movement and activities will be contained within designated construction areas in order to prevent peripheral impacts on surrounding natural habitat.	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	6.5.	Erosion management is important. Rehabilitation of disturbed areas will be undertaken to help the recovery of the vegetation.	Contractor	ECO	On-going	Throughout construction phase
	6.6.	Stockpiled material will be stockpiled in an area where it will not be disturbed by vehicles.	Contractor	ECO	On-going	Throughout construction phase
	6.7.	Stockpiled material will be protected from washing away during rainstorms. For example, one layer of bricks or stones can be placed around the stockpiled topsoil.	Contractor	ECO	On-going	Throughout construction phase
	6.8.	Stockpiled material will be placed on the cleared areas once construction is completed. Re-spreading of topsoil is preferably to be done to a maximum of 10 cm.	Contractor	ECO	On-going	Throughout construction phase
	6.9.	An alien control and monitoring programme will be developed starting during the construction phase and will be carried over into the operational phase.	Contractor	ECO	On-going	Throughout construction phase and operational phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	6.10.	Any proclaimed weed or alien species that germinates during the contract period will be cleared by hand / approved chemicals before flowering thereof.	Contractor	ECO	On-going	Throughout construction phase
	6.11.	Imported fill material will be monitored during and after construction for the presence of any alien species. Any such species will be removed immediately.	Contractor	ECO	On-going	Throughout construction phase and during operational phase
	6.12.	No open fires allowed. Provision will be made that no accidental fires are started.	Contractor	ECO	On-going	Throughout construction phase
	6.13.	No firewood will be collected on site or in surrounding areas, without the written consent from the landowner.	Contractor	ECO	On-going	Throughout construction phase
	6.14.	Firefighting equipment will be available on site.	Contractor	ECO / SO	On-going	Throughout construction phase
	6.15.	Species, especially grasses, trees and shrubs occurring in the region will be used to rehabilitate disturbed areas.	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	6.16.	No animals may be harmed / captured / trapped and / or hunted. This must be strictly enforced.	Contractor	ECO	On-going	Throughout construction phase
	6.17.	Animals found at the construction site will be removed and relocated to a suitable area by a suitable person.	Contractor	ECO	On-going	Throughout construction phase
	6.18.	Compacted soils (such as dirt tracks not to be utilised during the operational phase) must be ripped to ensure the establishment of natural occurring vegetation.	Contractor	ECO	On-going	Throughout construction phase
Noise and dust and odour control	7.1.	Construction activities will be limited to normal daytime hours.	Contractor	ECO	On-going	Throughout construction phase
	7.2.	Noise levels will be kept as low as possible during the construction phase in order not to disturb adjacent landowners.	Contractor	ECO / SO	On-going	Throughout construction phase
	7.3.	Proper mitigation measures will be implemented to limit noise (e.g. the installation of silencers, where required).	Contractor	ECO / SO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	7.4.	Proper mitigation measures will be implemented to limit the formation of dust (e.g. wetting of construction area, when required).	Contractor	ECO	On-going	Throughout construction phase
	7.5.	The speed of the construction vehicles will be limited to avoid dangerous conditions, the formation of dust and the excessive deterioration of roads being used.	Contractor	ECO	On-going	Throughout construction phase
	7.6.	The design of the works will be in such a manner as to minimize turbulence and the release of hydrogen sulphide (if any).	Contractor	ECO	On-going	Throughout construction phase
	7.7.	The odour level at the site boundary will be monitored.	Operational Manager	ECO	On-going	Throughout operational phase
	7.8.	A hydrogen sulphide emission will be monitored.	Operational Manager	ECO	On-going	Throughout operational phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	7.9.	The following were also considered during the planning phase, to limit odours in the nearby vicinity: <ul style="list-style-type: none"> <li>- Plant orientation and the impact of covering tanks.</li> <li>- Buffer zone (between boundary of works and nearest public building).</li> <li>- Wind factor and dilution.</li> </ul>	Designer / Contractor / Promoter	ECO	On-going	Throughout planning phase
<b>Safety and Security</b>	8.1.	The contractors will comply with the Occupational Health and Safety Act, National Building Regulations and any other national, regional or local regulations with regard to safety on site. Construction contracts will include safety and security measures for staff.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.2.	Precautions to ensure that construction staff and sites are visible and proper PPE will be provided to all employees.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.3.	Construction work within road reserves will accommodate road users as far as possible. This includes the following:				

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	8.3.1.	Roads will be crossed in half widths at a time to minimise the impact on vehicular traffic, where possible.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.3.2.	Construction along and across existing roads will be executed in such a manner that both pedestrian and vehicular traffic is accommodated at all times.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.3.3.	The contractor will be required to maintain adequate access to all public and private property at all times.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.3.4.	Contractor will supply, erect and maintain road signs for all work areas conforming to the prescribed layout and requirement of the South African Road Traffic Signs Manual and other relevant notices.	Contractor	ECO / SO	On-going	Throughout construction phase
	8.4.	Fire extinguishers will be available on site and in the construction camp (if any).	Contractor	ECO / SO	On-going	Throughout construction phase
	8.5.	The contractor will be required to maintain adequate access to all public and private	Contractor	ECO / SO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
		property at all times.				
<b>Heritage Management</b>	9.1.	Known heritage resources (if any) must be avoided as far as possible.	Contractor	ECO	On-going	Throughout construction phase
	9.2	<p>Employees should be encouraged and informed of the need to be on the look-out for potential fossils / buried archaeological material.</p> <p>In the case of the discovery of any stone tools or other archaeological or palaeontological material, the work in the immediate vicinity should temporarily cease and reported to the archaeologist and SAHRA. Should any human remains be exposed, the archaeologist as well as the local SAPS should be notified.</p>	Contractor	ECO	On-going	Throughout construction phase
	9.3	Appropriate measures should be undertaken by the ECO	Contractor	ECO	On-going	Throughout construction



Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
		<p>until the archaeologist / SAPS visits the site. This should include the following:</p> <ul style="list-style-type: none"> <li>• Site should be fenced with 'danger tape'</li> <li>• Position of finding should be recorded</li> <li>• Depth of finding should be recorded</li> <li>• Digital image of the finding should be taken</li> </ul>				phase
	9.4	Note that information on the findings may not be made public without the consent of the archaeologist / SAPS.	Contractor	ECO	On-going	Throughout construction phase
	9.5	Construction activities in the area may only continue after approval from the archaeologist and SAHRA	Contractor	ECO	On-going	Throughout construction phase
<b>Site Clean-up and Rehabilitation</b>	10.1.	Temporary structures and office sites (if any) will be dismantled and removed after completion of the construction phase of the	Contractor	ECO	On-going	Throughout construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
		project.				
	10.2.	All waste, equipment, materials, etc. used during construction will be cleared from the site. The contractors will ensure that the site is cleared and rehabilitated to the satisfaction of the ECO.	Contractor	ECO	On-going	Throughout construction phase
	10.3.	An alien plant control and monitoring programme will be implemented.	Contractor	ECO	On-going	Throughout construction phase
	10.4.	Re-vegetation of disturbed areas will be undertaken with site indigenous species. Hydroseeding will be implemented if the establishment of natural occurring vegetation does not occur within reasonable time.	Contractor	ECO	On-going	Throughout construction phase
<b>Operational Phase</b>	11.1.	Regular inspections of the construction area will be done to identify leakages. These will be attended to immediately.	Applicant	DESTEA / DWS	Maintenance inspections should be undertaken every six months.	During operation

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	11.2.	Soil erosion occurrences will be attended to immediately.	Applicant	DESTEА / DWS	Maintenance inspections should be undertaken every six months.	During operation
	11.3.	Measures will be implemented to minimise the loss of water at any section of the WWTW.	Applicant	DESTEА / DWS	Maintenance inspections should be undertaken every six months.	During operation
	11.4.	Regular monitoring will be undertaken to ensure that the water to be used for irrigational purposes (if any) complies with the DWS regulations. The applicable DWS approvals will be obtained before any irrigation activities are undertaken.	Applicant	DWS	Maintenance inspections should be undertaken every six months.	During operation

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	11.5.	An action plan will be available and implemented immediately, in case the water to be utilised for irrigational purposes (if any) does not comply with the DWS regulations to ensure that it is rectified as soon as possible.	Applicant	DWS	Maintenance inspections should be undertaken every six months.	During operation
<b>Decommissioning / Closure</b>	12.1.	It is not anticipated that the proposed project will cease in the nearby future. However, if decommissioning is decided upon, a rehabilitation plan will be developed and submitted for approval. The end-use of the area will be kept in mind during the compilation of the rehabilitation plan.	Applicant	DESTEA	Six months before the proposed decommissioning is undertaken	During operation
<b>Compliance and Monitoring</b>	13.1.	The applicant will ensure that the contractors adhere to the recommendations of the EMPr and conditions of the Environmental Authorisation during construction.	Applicant	ECO	On-going	During site preparation as well as construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
	13.2.	An Environmental Control Officer (ECO) will be appointed to monitor the construction phase. Note that the ECO may be appointed separately or can be part of the contractor's team.	Contractor	Applicant	Before construction activities are undertaken	The ECO will be employed until rehabilitation of the site is completed.
	13.3.	Regular monitoring and / or spot inspections at least every fortnight during the construction phase is recommended.	ECO / Contractor	IECO	At least every two weeks	During site preparation as well as construction phase
	13.4.	Inspections should be documented and any shortcomings addressed immediately.	ECO / Contractor	IECO	Shortcomings should be addressed immediately	During site preparation, construction phase as well as operational phase
	13.5.	An independent ECO will be appointed to monitor the construction phase. A report will be provided to the contractor upon completion thereof. The findings thereof should be made available to NC DENC, should it be	Independent ECO	DESTEA	Monthly, or as indicated in the Environmental Authorisation	During site preparation and construction phase

Objective	Nr	Mitigation measure	Executing party	Monitoring party	Timeframe	Project Stage
		requested.				
	13.6.	Any emergency or unforeseen impact will be reported to the relevant environmental department within 24 hours after identification for telephonic approval and will be confirmed in writing.	Contractor / ECO	ECO / IECO	On-going	At all times
	13.7.	During the operational phase the WWTW and associated infrastructure must be routinely audited and maintenance schedule adjusted accordingly in order to prevent sewage leaking.	Applicant	DESTEA / DWS	On-going	During the operational phase