

Construction Phase Environmental Management Programme (cEMP) for the Northern Area Bulk Water Augmentation Scheme: Muldersvlei Bulk Water Treatment Facility, Reservoir and Associated Infrastructure

Fifth Draft

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Construction Phase Environmental Management Programme (cEMP) for the Northern Area Bulk Water Augmentation Scheme: Muldersvlei Bulk Water Treatment Facility, Reservoir and Associated Infrastructure

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Abbreviations and Definitions

cEMP	Construction Phase Environmental Management Programme
CoCT	City of Cape Town
Construction Phase	This is the phase during which physical construction activities take place. It is preceded by the detailed design phase and succeeded by the operational phase.
DEADP	Western Cape Provincial Department of Environmental Affairs and Development Planning
Design Phase	This is the phase during which the detailed design of the WTP and pipelines takes place. It includes detailed landscape and architectural designing as well as layout and routing of the pipelines. It starts before the construction phase but may continue even after construction activities have commenced. For the purposes of this document they are regarded as discrete and separate phases.
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011
EMP	Environmental Management Programme
MS	Method Statement
NABWAS	Northern Area Bulk Water Augmentation Scheme
NEMA	National Environmental Management Act (No 107 of 1998)
oEMP	Operational Phase Environmental Management Programme
Operational Phase	The operational phase succeeds the construction phase and commences when water treatment at the WTP or storage of potable water at the bulk reservoir starts. There may still be some construction taking place around the facility which will still be covered by the construction phase so the oEMP may commence before the cEMP has been completely phased out.
WTP	Water Treatment Plant

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1. Introduction

1.1 Background to this management programme

This document details the draft Construction Phase Environmental Management Programme (cEMP) and accompanies the application for Environmental Authorisation for the development of the Northern Area Bulk Water Augmentation Scheme: Muldersvlei Bulk Water Treatment Facility, Reservoir and Associated Infrastructure (NABWAS). It is based on the assumption that the preferred alternative and associated mitigation measures as detailed in the Environmental Impact Assessment Report (EIR) would be approved *in toto* by the Western Cape Provincial Department of Environmental Affairs and Development Planning (DEADP). It also made use of standard clauses found in other Environmental Authorisations for the delineation of roles and responsibilities under the assumption that they too will form an explicit part of the Authorisation. It is intended that a final version will be submitted for approval by DEADP containing additional details once the record of decision has been issued.

Since it is entirely possible that additional conditions may be required of the applicant by DEADP, and that some recommended mitigation measures may be deemed unnecessary, the first task in the implementation of this cEMP will be to update section 3 (below) to accurately reflect the conditions of approval. However, this document details the manner in which the conditions of authorisation and environmental best practice will be applied to this development by the City of Cape Town. Since it is unlikely that anything contained in the Environmental Authorisation will change the contents of sections 1 and 2, these two sections shall not be changed or amended unless specifically required by DEADP as part of the Authorisation process. Specifications for the amendment of the specifications in section 3 are detailed in that section.

This document has been compiled by Errol Cerff on instructions from, and using information supplied by Chand Environmental Consulting. It has been amended to incorporate responses to stakeholder comments and queries and an adjustment to the preferred option made in June 2012. Errol Cerff has more than 15 years experience in environmental management, environmental auditing and systems design. He has audited operations as diverse as mining concerns to sweet factories. This has resulted in the development of a keen sense of the components of practical and implementable management plans. His recent experience in auditing a number of large construction activities has resulted in the development of an approach to environmental management plans which focus more on who performs the tasks and with what desired outcome than on providing details on how the tasks much be achieved. Furthermore, this experience has resulted in a focus on recognising existing organisational structures and using them for environmental management rather than inventing new ones which would necessarily be add-ons. His skills and experience are therefore well suited to the drafting of this cEMP. His curriculum vitae is available on request.

1.2 Structure and function of this Environmental Management Programme

This cEMP primarily focuses on specifying desired outcomes of environmental management activities and the organisational structures and procedures to produce and check such outcomes during the detailed design and construction phases. The practical details of how such outcomes are achieved are left to the engineers and other contractors involved. They are required to develop Method Statements (MS) detailing how the outcomes will be achieved before commencing construction activities. This approach is deemed preferable since the

engineers and other contractors are more familiar with approaches and techniques involved and how they will affect costing for the implementation of the requirements of this draft cEMP. It is therefore logical to require them to provide the details rather than to prescribe them in the sections below.

The document is organised in three discrete sections:

- **Section One:** details the background to the draft cEMP, the construction activities that will take place and an indication of how these activities could affect the surrounding environment based upon a synthesis of specialist investigations detailed in the EIR compiled by Chand Environmental Consulting.
- **Section Two:** details the organisational structures and responsibilities for implementing, checking and rectifying the activities required to mitigate any negative impacts resulting from construction activities.
- **Section Three:** details environmental protection specifications for the most likely construction activities. These will form the bases for Method Statements provided by the contractors. This list is NOT exhaustive and provision is made for the Engineer and/or ECO to develop additional specifications and call for further Method Statements as required.

The final cEMP is to be included in all contract documentation. Compliance with the provisions of that cEMP is mandatory for all parties involved in the construction of the Water Treatment Works and associated infrastructure including the pipelines.

1.3 Scope

This cEMP provides environmental specifications for the implementation of mitigation measures specified in the Environmental Impact Assessment Report (EIR) for the Design and Construction Phases of the construction of the Water Treatment Plant, associated facilities and the pipelines as approved. Environmental specifications for the Operational Phase are contained in a separate volume. The mandate for the development and limits of these environmental specifications are derived from the Environmental Authorisation issued in terms of the National Environmental Management Act (No 107 of 1998) (NEMA) and other environmental legislation. As such, the mandate of the cEMP does not extend beyond environmental management. While there is some overlap with Health and safety management plans, this cEMP is not intended to provide health and safety specifications. The management of the overlap between the two disciplines is detailed in section 2.2.

1.3.1 Description of Activities

The activities which may affect the environment and are the subject of this cEMP relate to the construction of the following facilities as detailed in the EIR.

The Muldersvlei component of the NABWAS comprises a Water Treatment Plant, a reservoir and a system of pipelines carrying raw water to and treated water from the WTP. The following description provides context to the Environmental Management Programme. Final details of orientation and location of the various components will result from the detailed design phase.

The WTP/reservoir complex will be between 25 and 32 ha in extent, the exact boundaries of which will be finalised during the detail design phase. Agricultural activities will be able to continue directly beyond the boundaries of the site.

The WTP will have a capacity of 500 Mℓ/day, with a storage capacity of 300 Mℓ in the reservoir. This Reservoir will be a rectangular excavation and embankment-type which is concrete lined and is fully enclosed.

The major components of the WTP/ reservoir complex include the following:

- Lime silos (each 11.5 m high (approximately 7 m above ground level and the tallest structures on the site);
- Sludge tanks (approximately 8.7 m high and 30 m diameter, projecting above ground, approximately 1 500 m² in extent);
- The inlet building (approximately 8.6 m high above ground level);
- Double-storeyed administration buildings (approximately 8 m high and 900 m² in extent);
- Workshop buildings (approximately 6 m high);
- The reservoir (approximately 31 500 m² in extent and largely set into the hillside slope);
- Filter buildings (approximately 4 m high and 1 000 m² in extent);
- Flammable store;
- Disinfection building comprising on-site sodium hypochlorite generation units and storage tanks;
- Filter beds (approximately 4000 m² in extent); and
- Settling tanks (approximately 14 800 m² in extent).

External areas would either be covered in grass or asphalt hardstanding.

Ancillary services for the combined WTP and reservoir site will include:

- internal access roads,
- domestic water supply,
- domestic waste removal,
- sewage treatment and effluent disposal,
- stormwater drainage,
- telecommunications,
- electricity supply and
- lighting.

On-site generation of sodium hypochlorite is proposed, for use in disinfection. This will eliminate the need for chlorine gas to be stored on site. This also negates the facility being declared a major hazardous installation. This process involves using electrolysis to convert ordinary salt dissolved in water, to produce sodium hypochlorite. The sodium hypochlorite solution is dosed directly into the product water stream, where the free chlorine produced acts as a disinfectant. Hydrogen gas produced in the process is safely vented into the atmosphere.

Electricity will be supplied by on-site turbines with an alternative supply from Eskom, with a backup diesel generator for emergencies.

Sewage will be treated with a commercial sewage treatment package plant to specifications of the General Authorisation provided for under the National Water Act, 1998 (Act No. 36 of 1998). The maximum capacity of the plant will be approximately 5 m³/day. The treated effluent will be irrigated onto landscaped areas located around the WTP facility in summer, but in winter is likely to be discharged to the nearest watercourse, located to the south west of the facility. The treated effluent will be treated to the general effluent standards as determined by the Department of Water Affairs (as prescribed within GG No 26187 GN 399 of 26 March 2004) and should therefore not pose a problem in terms of odour and groundwater contamination. In addition, the quality of the effluent discharged will be regularly monitored by the City of Cape Town to ensure compliance

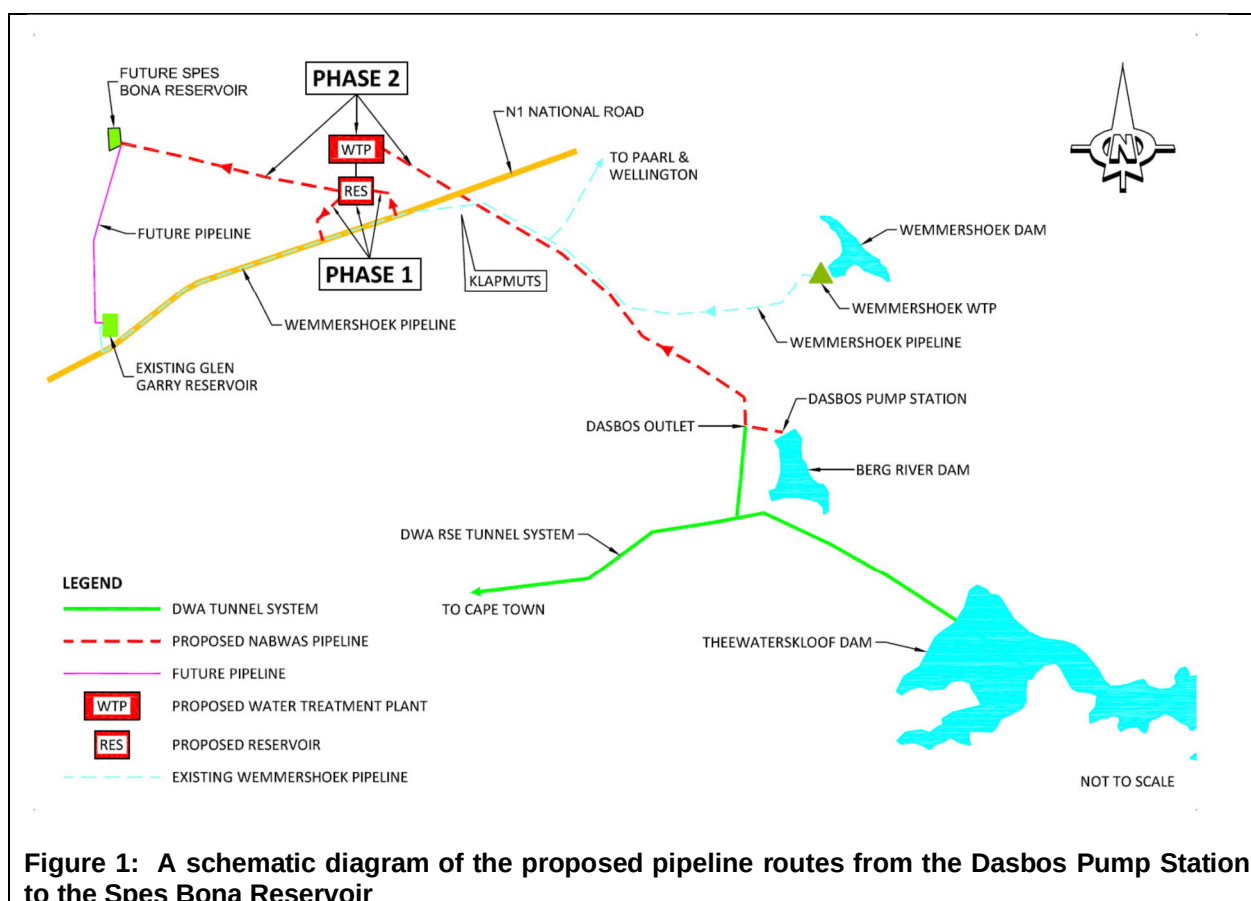
Potable water supply will be obtained on site from the WTP.

Domestic waste will be disposed of at an appropriately licensed landfill.

Tarred access roads will be constructed from existing farm roads (where practically possible) which will have a 20 m wide road reserve with a 9.5 m wide paved surface. Where the road is located on a private property, the land required for the 20 m reserve will be purchased by the CoCT from the relevant landowner.

The premises will have access control at the entrance and 24 hour patrols inside the perimeter security fence.

The total length of the proposed pipeline from the Dasbos Pump Station at the Berg River Dam, to the Dasbos outlet and on to the planned transfer reservoir at Spes Bona, just north of Durbanville, is approximately 40 km with pipeline sizes ranging from 1 500 mm to 2 000 mm in diameter, depending on the final design and possible agricultural demand. The area to be disturbed along the pipeline route will be limited to a width of 27 m. A typical excavation trench would have an estimated top width of 9.4 m and a depth of approximately 3.2 m. These dimensions will vary with pipe depth below ground level. The areas inside the 27 m zone which are not being excavated will be used as working space for construction machinery and for temporary storage of construction materials. A permanent servitude, which is approximately 15 m wide, will be required for the pipelines. A schematic indication of the main proposed pipeline corridor between the Berg River Dam and the Spes Bona Reservoir is indicated in Figure 1 below. The details of orientation will result from the detailed design phase.



1.3.2 Affected environment

The table below summarises the potential impacts of activities which must be addressed during the design and construction phases. The specialist reports in the EIR provided more

detail but this table provides context to the specifications which follow in this cEMP. (Impacts associated with the operational phase are dealt with in a separate volume).

Table 1: Summary of impacts in affected environments

Receiving Environment	Risk/ Potential Impacts
Freshwater rivers and streams, wetlands and riparian vegetation	• Disruption of freshwater and riparian ecology through alteration of normal functioning of the ecosystems resulting from: - o Contamination of surface water with silt or spilled chemical pollutants - o Contamination through accidental release of sewage from portable toilets - o Disruption of stream flow through diversions or other physical obstructions such as litter - o Removal of or damage to riparian vegetation making stream banks vulnerable to erosion - o Erosion of stream beds and banks from constructions activities
Ground water systems	• Contamination of the soil and ground water with chemical contaminants
Endangered terrestrial vegetation	• Disruption of endangered terrestrial ecosystems through alteration of normal functioning of the systems resulting from: - o Removal of vegetation for construction of facilities and associated services such as roads - o Damage to vegetation by heavy plant - o Smothering of terrestrial vegetation with dust - o Endangering terrestrial vegetation through contamination of the ground water system
Agricultural land and potential	• Disruption of agricultural activities through: - o Loss of agricultural land through expropriation - o Damage to agricultural land by heavy plant and equipment - o Smothering of crops with dust
Surrounding human communities	• Disruption to normal traffic flow through road closures • Influx of contract workers and job seekers resulting in pressure on local housing and services and posing security problems • Possible security risks resulting from influx of workers and prospective workers • Increased ambient noise levels • Elevated dust levels • Disruption of sense of place resulting from construction activities
Visual landscape (including heritage landscape)	• Disruption of visual landscapes and potentially the heritage of the area through the construction of buildings or removal of vegetation and other landscape elements
Archaeological environment	• Disruption of archaeological artefacts during construction and as a result of placement of infrastructure

A summary of the mitigation measures recommended in the Second Revised Draft EIR and which will be implemented by this and the operational phase EMP is contained in Annexure 1.

1.3.3 Applicable legislation

The impacts detailed in the previous sub-section are governed by legislation which is used to set performance criteria in the specifications which follow. Please note that this is not intended to comprise a comprehensive legal review; merely a list of the legislation associated with the identified impacts below. This list does not remove the responsibility of all parties concerned from complying with other legislation not listed below.

Table 2: Summary of applicable legislation

Impact	Applicable legislation
General threat to environmental quality	• National Environmental Management Act (No 107 of 1998) (s28(1)) • CoCT By-law: Environmental Health
Protection of water resources including prevention of pollution of Water and diversion of flows	• National Water Act (No 36 of 1998) (s19), (s3(3)) • CoCT By-law: Storm water management

Impact	Applicable legislation
Management of waste including discharge to a natural watercourse	• National Environmental Management Act (No 108 of 1998) s28 • National Environmental Management: Waste Act (No 59 of 2008) (chapter 4) • National Water Act (No 36 of 1998) (GA 3.7) • CoCT By-law: Integrated Waste Management • CoCT By-law: Waste Water
Noise generation	• Environment Conservation Act (No 73 of 1989) (Regulation 25) • National Environmental Management: Air Quality Act (No 39 of 2004) s34 • CoCT By-law: Relating to Streets, Public Places and the Prevention of Noise Nuisances
Pollution prevention and safe handling of hazardous and flammable substances and equipment	• Occupational Health and Safety Act (No 85 of 1993) (s 9(1)) • Hazardous Substances Act (No 15 of 1973) • Hazardous Substances Regulations (August 1995) • CoCT By-law: Community Fire Safety
Dust and smoke	• National Environmental Management: Air Quality Act (No 39 of 2004) (s 27, 32, 34, 35) • CoCT By-law: Air Pollution Control
Protection of heritage resources	• National Heritage Resources Act (No 25 of 1999) (s44(1))
Endorsement of this cEMP	• National Environmental Management Act (No 107 of 1998) (s24(e))
Prevention of veld fires	• National Veld and Forest Act (No 101 of 1998 as amended)
Control of invasive alien plant species	• Conservation of Agricultural Resources Act (No 43 of 1983)

1.3.4 Legal Status

This draft cEMP is an intrinsic part of the suite of conditions of approval of the WTP and associated infrastructure. As such, compliance with the specifications is mandatory by all parties concerned. It must be included with, and form an explicit component to all contracts associated with this development. Changes to the specifications may only take place with the express, written consent of the competent authority: the Western Cape Provincial Department of Environmental Affairs and Development Planning. The varying responsibilities in this regard are detailed in the following section.

The draft version of this cEMP, as it has been written prior to commencement of the detailed design and construction phases, will be reviewed and revised during detailed design. Any changes will be made with the written consent of the Department of Environmental Affairs and Development Planning.

2. Implementation of the EMP

2.1 Organisational structure

The sub-sections that follow detail the responsibilities and lines of reporting for the key role-players in the design and construction phases. As a result of a meeting held with staff of the Bulk Water Branch on 5th October 2011, it is understood that CoCT intends using different contractors for different elements of the construction, but with a single overarching Engineer to oversee and project manage the works on behalf of the CoCT. The Engineer may be a CoCT employee, or may be a consulting engineer appointed by the City. This will be decided upon during preliminary detailed design. In the organograms below, this appointee is termed “Engineer” and any other specialists appointed by the Engineer are referred to as “Contractors”. Since the responsibilities attendant on these appointments do not differ between disciplines, no distinction is drawn between a landscape architect or a civils contractor, or indeed any other discipline. There may also be sub-contractors to the Contractors, and since the same obligations and responsibilities apply and so will not be repeated. The only exception to this is the direct appointment of the Environmental Control Officer (ECO) by CoCT. The reason for this is that the ECO is required to oversee and report on compliance by the Engineer as an independent third party. Direct appointment by the City reduces the potential for bias on the part of the ECO towards the source of contract payment thus introducing a more rigorous impartiality.

2.1.1 Structure and Responsibility

Box 1 provides an overview of the responsibilities of the Applicant (in this case CoCT) and the ECO.

Box 1: Excerpts from various Environmental Authorisations (EAs) on the roles of the ECO and Applicant

- Authorisation of the activity is subject to the conditions contained in this authorisation, which form part of the environmental authorisation and are binding on the holder of the authorisation.
- The holder of the authorisation shall be responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder's behalf, including but not limited to, an agent, servant, contractor, sub-contractor, consultant or person rendering a service to the holder of the authorisation.
- The holder of this authorisation must appoint a suitably qualified and experienced Environmental Site Manager/ Environmental Control Officer (“ECO”) for the construction phase of the development, before commencement of any land clearing or construction activities, to ensure that the mitigation/rehabilitation measures and recommendations referred to in this authorisation are implemented and to ensure compliance with the provisions of the EMP.

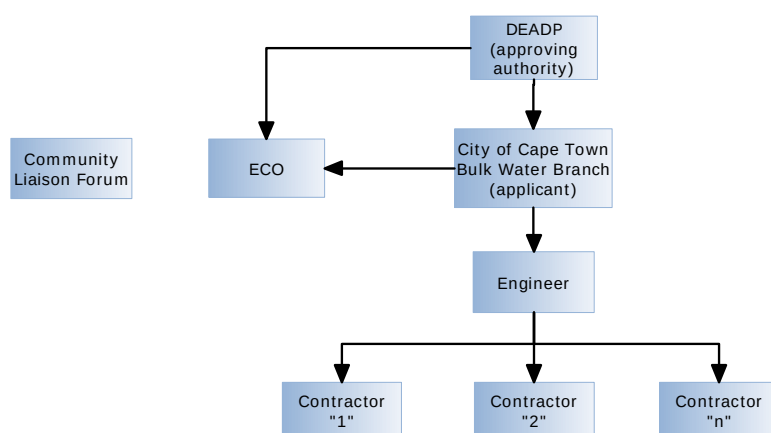


Figure 2: Lines of responsibility for the implementation of this cEMP

From the excerpt in Box 1 it is clear that ultimately, full responsibility for compliance with the conditions of authorisation (implementation of this cEMP being one of them) rests with CoCT. This responsibility is imposed upon

CoCT by DEADP (Figure 2). Responsibility for complying with the conditions of authorisation is conferred through contractual agreement onto the Engineer and from the Engineer to Contractors of various descriptions, again via contractual agreement. Thus each contractor is accountable to the Engineer for compliance and the Engineer is accountable to CoCT for compliance. Thus non-compliance at any level below CoCT requires corrective action on the part of the next tier up. Similarly, non-compliance on the part of CoCT requires action by DEADP.

The ECO is directly accountable to the applicant: CoCT and to DEADP as a consequence of the imposition of responsibility in the EA for the activities detailed in this cEMP.

In response to recommendations in the Second Revised Draft EIR, the establishment of a voluntary Community Liaison Forum is likely to be required as a condition of authorisation. Since this Forum has no decision-making function and does not itself undertake any construction activities, there is no direct line of responsibility in Figure 2 since only limited responsibilities are imposed by DEADP on the Forum and these revolve primarily on reporting which will be dealt with in the next section.

Details of the responsibilities and actions required of each of these role-players are presented in section 3 below. However, an overview of the range of responsibilities and how they will link with those in the operational phase have summarised in Table 3 below.

Table 3: Summary of responsibilities for the implementation of this cEMP

Phase of development	Design			Construction			Operat ional
	Start	Mid	End	Start	Mid	End	Start
City of Cape Town							
Appoint Engineer(s)	x						
Appoint ECO	x						
Participate in detailed design	x	x	x				
Commission traffic management plan			x				
Commission landscape architect			x				
Notify DEADP of commencement			x				
Finalise and approve penalty system for the cEMP			x				
Submit version 1 of the cEMP to DEADP			x				
Establish Community Liaison Forum			x				
Manage Community Liaison Forum				x	x	x	
Manage Engineer and ECO contracts	x	x	x	x	x	x	
Take any actions required to ensure compliance	x	x	x	x	x	x	x
Appoint operational staff						x	
Accept handover from Engineer (contractors) and ECO						x	
Commission WTP and pipelines							x
Approve version 1 of oEMP							x
Take responsibility for ongoing management and compliance							x
Consulting Engineer							
Accept appointment	x						
Finalise detailed design	x	x	x				
Appoint contractor(s)			x				
Approve the Contractor(s) Waste Management Plan prior to the commencement of construction activities			x				

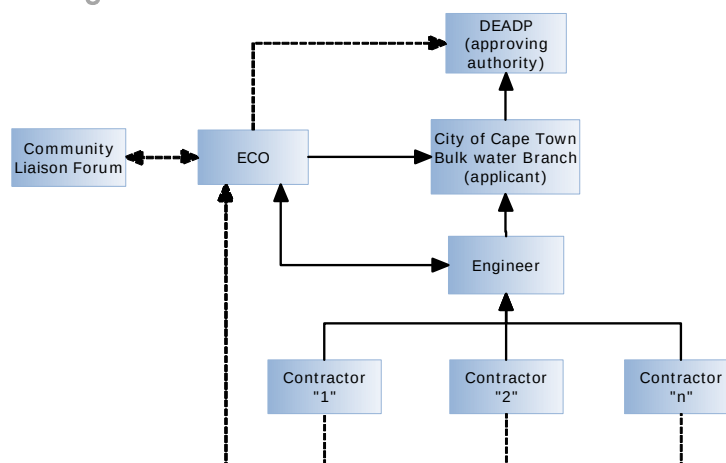
Phase of development	Design			Construction			Operat ional
	Start	Mid	End	Start	Mid	End	Start
Approve site establishment and maintenance MS prior to establishment			x				
Approve construction activities MS prior to commencement of construction activities			x				
Manage compliance by contractors				x	x	x	
Hand over to City of Cape Town operational staff						x	
Environmental Control Officer (ECO)							
Accept appointment	x						
Provide input to detailed design	x	x					
Provide input to structure and siting of construction camp(s)			x				
Revise draft cEMP to incorporate conditions of approval			x				
Provide input to traffic management plan			x				
Provide input to landscape plan			x				
Provide input to Contract(s) Waste Manage Plans			x				
Provide input to site establishment and maintenance MS			x				
Provide input to construction activities MS			x	x	x	x	
Conduct induction training				x	x	x	
Review MS developed by the Contractor(s)				x	x	x	
Monitor construction compliance with cEMP				x	x	x	
Report to CoCT and the Engineer on compliance during construction				x	x	x	
Design of Rules of Engagement for Community Liaison Forum		x	x				
Receive and respond to community and stakeholder inputs/ feedback				x	x	x	
Compile and submit closure inspection and compliance report						x	
Finalise and customise draft oEMP into version 1.							x
Obtain approval for version 1 of oEMP							x
Notify DEADP of changes to oEMP							x
Handover Community Liaison Forum to operational staff						x	
Transfer documentation to operational staff						x	
Transfer environmental management to operational staff						x	
Community Liaison Forum							
Establishment			x				
Inception				x			
Engage in information sharing with ECO and construction team				x	x	x	
Act as a conduit for stakeholder and community feedback				x	x	x	x
Monitor construction activities				x	x	x	
Monitor operational activities							x
Environmental Responsible Staff Member							
Accept appointment							x
Assume functions of environmental management							x
Assume management of Community Liaison Forum							x
Ensure that contents of oEMP are included in Event Management System and Risk Register as appropriate							x

Phase of development	Design			Construction			Operat ional
	Start	Mid	End	Start	Mid	End	Start
Implement the requirements of the oEMP							x

2.1.2 Communication and Reporting Structures

Figure 3: Lines of reporting for this cEMP

The lines of reporting compliance are depicted in Figure 3. Contractors are required to report environmental non-compliance directly to the Engineer as and when it becomes apparent. However, it is the explicit function of the ECO in the role of facilitator and monitor to gather information on compliance as well as non-compliance by the Contractors and a regular basis and report to the Engineer and CoCT directly for action. These reports are then submitted to DEADP as specified in the EA.



Finally, the ECO provides feedback on compliance at the Community Liaison Forum meetings and provides feedback on progress on responses to any negative or positive feedback from stakeholders.

More details on these lines of reporting and the nature of the reporting are contained in section 3.

2.1.3 Community Engagement

Engagement with stakeholders and especially the surrounding community is essential. In this development road closures and other traffic obstructions may occur, about which the stakeholders will need prior notice. There is also a need for a portal to accept and process feedback from stakeholders. To this end the Community Liaison Forum will be established. The draft rules of engagement and responsibilities are detailed in section 3.

2.1.4 Review and Maintenance of the EMP

This draft cEMP is a living document and as such will require modification or amendment to suit changing circumstances. The procedure for making amendments or changes while ensuring that the integrity of the cEMP is maintained is detailed in section 3.

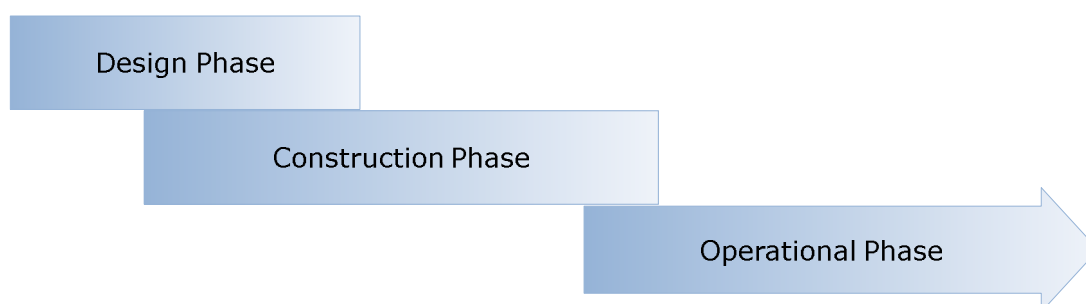
2.2 Links to other management plans

This cEMP is designed to manage environmental consequences of activities taking place during the design and construction phases of the development. However, it does not stand in isolation. It necessarily links with other management plans during the construction phase and the Operational Phase Environmental Management Programme. For the purposes of this draft cEMP and the subsequent draft oEMP the following definitions of the three phases of development are used.

Table 4: Definitions of the three phases of development for the purposes of this cEMP

Design Phase	This is the phase during which the detailed design of the WTP and pipelines takes place. It includes detailed landscape and architectural designing as well as layout and routing of the pipelines. It starts before the construction phase but may continue even after construction activities have commenced. There may thus be a functional overlap in schedule between the two phases. However, for the purposes of this document they are regarded as discrete and separate phases. Since there is no conflict between the activities and responsibilities during the two phases, this overlap is not considered to be an impediment to effective implementation.
Construction Phase	This is the phase during which physical construction activities take place. It is preceded by the detailed design phase and succeeded by the operational phase. However, as noted in the previous cell some detailed design may continue into the construction phase. Furthermore, some construction may continue after the WTP has become operational resulting in some overlap between this phase and the operational phase. Since implementation of the operational phase is the responsibility of the CoCT and not the Engineer or ECO, there is no conflict as result of the two phases running concurrently.
Operational Phase	The operational phase succeeds the construction phase and commences when water treatment at the WTP starts. There may still be some construction taking place around the facility which will still be covered by the construction phase so the oEMP may commence before the cEMP has been completely phased out.

The possible overlap between the phases is depicted in the schematic below. The Scheme will be implemented in components, so the phases in Table 4 will be implemented for each component. The implementation of the components will overlap.



Details of the linkages with other management plans are presented in Table 5 below.

Table 5: Description of linkages with other management plans

Name of Management Plan	Nature of linkage
Traffic	A Traffic Management Plan is recommended in the EIR since there will be numerous disruptions to road and possibly rail traffic that will need to be planned to minimise disruption of surrounding communities. Should this be a condition of authorisation, the Traffic Management Plan will be compiled during the design phase. The ECO is required to liaise with the Traffic Engineer and firstly ensure that the mitigation measures recommended in the EIR are implemented and secondly to ensure that any specific actions required in other Method Statements are included in amended Method Statements and implemented.
Landscaping	Similarly a landscape plan for the WTP premises needs to be reviewed by the ECO. The ECO is then required to monitor the contractors' activities and identify actions taking place during construction that could impair or prevent effective implementation of the landscape plan- e.g. spoiling of topsoil. Any such actions will be reported to the Contractor and/ or Engineer for appropriate action.

Name of Management Plan	Nature of linkage
Rehabilitation	The same philosophy applies to the development of a restoration and rehabilitation plan for areas which are disturbed during construction of the pipelines. This is to be reviewed by the ECO who in turn must identify any actions taking place during construction that could affect the implementation of the rehabilitation plan and report any such actions to the contractor and/ or Engineer for appropriate response.
Health & Safety	The distinction between environmental matters and health & safety matters is not always clear. In order to avoid duplication or omission of significant issues, the procedure for developing Method Statements detailed in section 3 requires collaboration and joint sign-off between the ECO and Health & Safety agent.
Operational Environmental Management Programme	The cEMP deals with activities during the construction phase but must transfer responsibility to the environmentally responsible person for the operational phase. Section 3 contains specifications for this handover.

Details of the specifications follow. Each individual specification will need to be checked and confirmed or amended in the final cEMP before implementation to reflect the contents of the EA and how they will be implemented as appropriate. The draft specifications that follow contain the minimum requirements for the specifications. Compliance requires that at least the details presented below are complied with but this does not prevent additional elements being added. A standard format has been used for all specifications. However not all cells are applicable in all cases. Where the cells are not applicable they are noted as such.

3.Environmental Management Specifications

This section provides specifications for the following:

1. Actions to be taken during the design phase
2. Responsibilities and function of the CoCT
3. Responsibilities and function of the Engineer
4. Responsibilities and function of the Contractor
5. Responsibilities and function of the ECO
6. Responsibilities and function of the Restoration Ecologist
7. Responsibilities and function of the Landscape Architect
8. Responsibilities and function of the Traffic Engineer
9. Responsibilities and function of the external auditor
10. Establishment and functions of the Community Liaison Forum
11. Complaints register
12. Development of Method Statements
13. cEMP amendment and change
14. Incident management
15. Emergency preparedness and response
16. Training and induction
17. Monitoring, checking and auditing
18. Records and record keeping
19. Reporting
20. Enforcement
21. Waste management
22. Site camp establishment and maintenance
23. Construction activities
24. Temporary site closure
25. Site closure and rehabilitation
26. Handover to operational staff

Environmental Specification 1: Actions to be taken during the detailed design Phase

Version No.	draft	Date of Approval
1. Background The assessment of possible impacts and recommendation of mitigation measures conducted during the EIA dealt with numerous permutations of design. In fact some the mitigations measures require specific design considerations. For this reason, the input of the ECO is required during the Detailed Design Phase to provide input to and report on the successful implementation of recommended design changes in accordance with the conditions of authorisation.		
2. Objectives - To ensure that where possible and practicable, recommended mitigations measures are incorporated into the detailed design. - To ensure that there is an impartial report on the implementation of the recommended mitigation measures by the ECO.		
3. Specifications The following actions shall take place in the detailed design phase and must be completed before construction may commence: - The detailed designs of all structures shall be finalised. These shall be designed to: - Maximise the use of recycled or reused article; - Maximise the use of renewable resources and minimise the use of non-renewable resources; - Maximise the use of energy and water efficient devices; - Minimise the amount of maintenance required on the buildings and avoid the use of polluting or hazardous substances in the finishing surface and coatings; - Facilitate final decommissioning and re-use or recycling of the resulting break-down materials; - Ensure that in the event of total power failure, no pollutants can discharge to the environment; and, - Ensure that no more than 35 m³ treatment residue is held on site at any one time. - Contingency plans must be developed to remove the waste in the event of failure of the waste disposal company to provide removal services. - In addition to any other specialists, CoCT shall appoint: - An ECO; - Landscape Architect; - Restoration Ecologist; and, - Traffic Engineer. - The draft cEMP must be updated to include any additional conditions of authorisation or accommodate any changes in construction methods resulting from the detailed design phase, approved by CoCT and submitted to DEADP. - This draft version of the cEMP must include details of the penalty system to be implemented which includes: - the magnitude and nature of penalties for various infractions; - how the penalties will be levied; - which "green" charity or cause will be the beneficiary of the penalties; and, - how the penalties will be paid to the beneficiary. - Changes to the designs can take place once construction has commenced but they should have the input of the ECO to ensure that the mitigation measures are not compromised and that any changes required are made to environmental specifications.		

- The Rules of Engagement for the Community Liaison Forum shall be developed by the CoCT and the Forum established.
- The final route, layout and construction methods of the pipelines and WTP shall be determined in collaboration with the ECO to ensure that all recommended mitigation measures have been included as detailed below.
- The cost of implementing the cEMP and general environmental protection must be estimated to be included in the tender specifications for the Contractors.
- The registration of the servitude for the pipelines shall include provision for CoCT to have rights and responsibilities for the control of invasive plant species.

Summary of recommended mitigation measures from the Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011

Note: the recommended mitigation measures detailed below have been paraphrased from the EIR. Where the original recommended mitigation measure is impractical, conflicts with other recommendations or is not sufficiently stringent, it has been changed. The original recommendations are presented verbatim in Annexure 1.

- The pipeline design shall be:
 - Designed to minimise vertical and horizontal footprint (as shallow and narrow as possible).
 - Aligned to avoid wetlands and rivers - especially for sites listed to be of moderate to high conservation importance. Where this is impossible artificial stabilisation using structures such as gabions to be kept to a minimum.
 - Aligned to avoid crossing roads or railway lines or make use of existing crossings.
 - Ensure that the bedding medium does not form a preferential drainage line.
 - Commented upon by the freshwater ecologist prior to finalisation.
- A post construction rehabilitation plan shall be developed in collaboration with a restoration ecologist and approved prior to the commencement of construction. This plan must highlight and minimise any construction activities which could limit rehabilitation success. Such activities must be avoided where possible. The restoration ecologist is to be appointed by the CoCT.
- Compensation for expropriated land and lost production shall be finalised prior to construction.
- The pipeline route should:
 - Be above the valley floor .
 - Be separated from public scenic road edges by vineyards or other relevant planted agricultural land.
 - Avoid running alongside scenic drive edges.
 - Avoid crossing tree-lined main approach avenues.
 - Be set back a minimum 5 m from tree canopy drip lines where running parallel with, and adjacent to, belts of trees.
 - Be separated from private roads by planted tree.
 - Be set back a minimum 10 m from the edge of a river or watercourse
 - Be laid below watercourse and stream beds.
 - Run close to and preferably on the southern side of the (disused) railway embankment running along the valley.
 - Follow existing vineyard and other agricultural boundaries wherever possible, particularly where farm service roads are already in existence.
 - In order to prevent any impingement upon the County Fair Farm the following route shall be used:

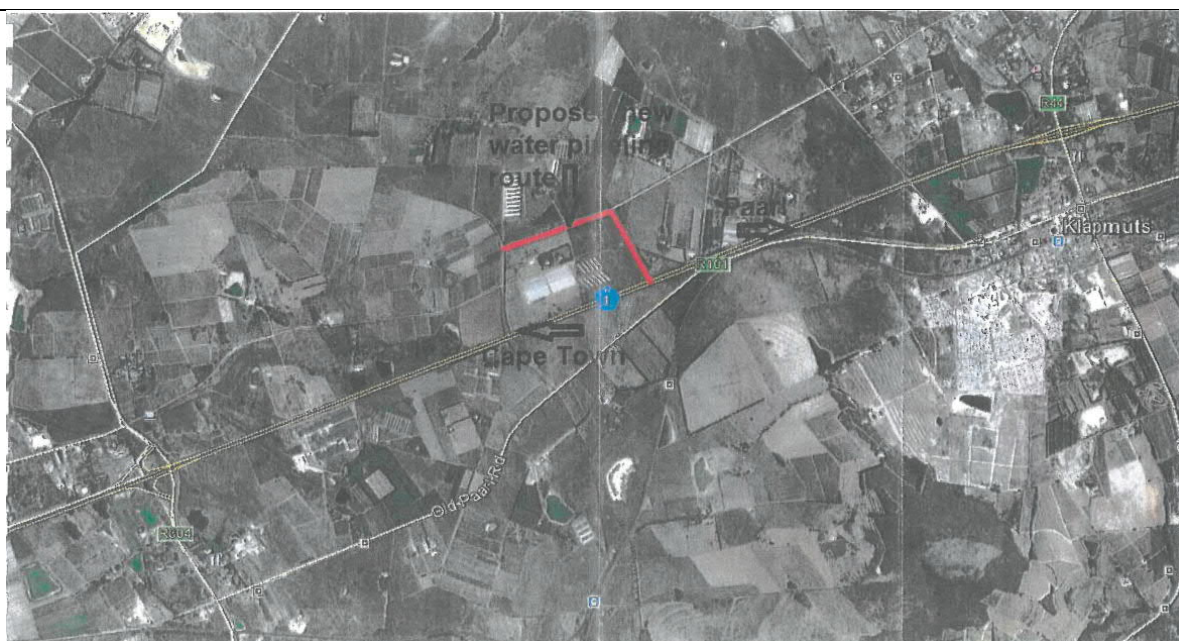


Figure 4: Pipeline route to be followed

- Avoid bisecting or encroaching on vineyards and tunnel farming infrastructure.
- Avoid the use of obtrusive service structures.
- The WTP and associated infrastructure design shall:
 - Minimise the footprint.
- The visual impact of the WTP infrastructure shall be mitigated by:
 - Blending and varying colours and textures to fit in with the existing environment.
 - Grading earth embankments within the perimeter fence to the proposed reservoir into the natural contours.
 - Landscaping the WTP premises to blend with the surrounding environment.
 - Ensuring that only essential security lighting is used and that it faces away from the perimeter.
 - Employing sustainable design elements such as:
 - Using renewable and natural materials and elements where possible, as well as recycled and reconstituted materials.
 - Using locally produced, as opposed to imported materials.
 - Planning construction and finishing to limit repainting/re-finishing intervals; and replacement and repair costs.
- Construction of the pipelines shall:
 - Be planned in collaboration with a restoration ecologist to ensure that activities do not occur during construction which will limit post-construction rehabilitation. The restoration ecologist shall be appointed by the CoCT.
 - Limit stream flow disruption. Temporary diversions to be designed to flush sediment accumulations. Crossings to occur in late summer or when the streams are dry whenever possible. Bank erosion must be prevented. All diversions to be removed once construction has been completed. Post-construction rehabilitation to be signed-off by the ECO.
- Soil disturbance shall be kept to a minimum.
 - Removal of vegetation shall be kept to a minimum
 - Exposed soil shall be protected from erosion.
 - Construction areas shall be restored to the natural slope and geomorphology through rehabilitation.
 - Exposed soil shall be revegetated as soon as construction has ceased.
 - Post-construction rehabilitation to be signed-off by the ECO.
- Rare and endangered plants are to be fostered.
 - Ecologically sensitive areas shall be demarcated and maintained as no-go zones.
 - All invasive aliens to be removed within the servitude of the pipeline where indigenous vegetation or riparian areas are affected.
 - A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring.
 - A nursery is to be established on-site to care for the rescued plants.
 - The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed.
 - Post-construction rehabilitation to be signed-off by the restoration ecologist.
- Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation.
 - Topsoil stockpiles to be protected against wind and rain dispersal.
 - Any topsoil run-off to be trapped and re-stockpiled.
 - No stockpile run-off may be permitted to enter any watercourse.
- Watercourses shall be protected from contamination.
 - All building materials should be stored away (at least 100 m) from aquatic ecosystems or outside 100 yr floodline, but within the 27 m construction footprint and the areas bunded appropriately such that there will be no runoff to watercourses.

- If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse.
- Vehicle and plant washing shall take place at least 50 m from watercourses the wash bay shall be constructed in such a way that waste water is contained within bunds and preventing from contaminating soil or any adjacent water bodies and any effluent water contained and treated prior to discharge to the watercourse.
- No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses.
- Measures to reduce dust production and dispersal shall be included in a method statement submitted by the contractor.
- The burial/cemetery site on the Farm Simonsvlei alongside the Klappmuts Road is a no-go area and shall be demarcated as such.
- Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these shall be reported to the South African Heritage Resources Agency and not be disturbed or removed without official approval.
- The existing water pipeline to County Fair must not be damaged during construction. In the event that any damage does occur, County Fair is to be notified immediately and repairs effected without delay.
- Construction of the WTP shall:
 - Be planned in collaboration with a restoration ecologist to ensure that activities do not occur during construction which will limit post-construction rehabilitation.
 - Take place in the dry season to minimise impacts of blasting and bulk earth moving.
 - Limit stream flow disruption. Temporary diversions to be designed to flush sediment accumulations. Crossings to occur in late summer or when the streams are dry. Bank erosion must be prevented. All diversions to be removed once construction has been completed. Post-construction rehabilitation to be signed-off by the restoration ecologist.
- Soil disturbance shall be kept to a minimum.
 - Removal of vegetation shall be kept to a minimum.
 - Exposed soil shall be protected from erosion.
 - Construction areas shall be restored to the natural slope and geomorphology through rehabilitation.
 - Exposed soil shall be revegetated in a phased manner so that rehabilitation commences in each area as construction in that area is completed.
 - Post-construction rehabilitation to be signed-off by the restoration ecologist.
- Rare and endangered plants are to be fostered.
 - Ecologically sensitive areas shall be demarcated and maintained as no-go zones.
 - All invasive aliens to be removed within the servitude of the pipeline where indigenous vegetation or riparian areas are affected.
 - A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring (at least twenty plants of the rare *Athanasia capitata* associated with Area BA4 would have to be relocated).
 - A nursery is to be established to care for the rescued plants.
 - The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed.
 - Post-construction rehabilitation to be signed-off by ECO.
- Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation.
 - Topsoil stockpiles to be protected against wind and rain dispersal. (Note potable water may not be used for this purpose)
 - Any topsoil run-off to be trapped and re-stockpiled.
 - No stockpile run-off may be permitted to enter any watercourse.
- Watercourses shall be protected from contamination:
 - All building materials should be stored away (at least 50 m) from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff to watercourses.
 - If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse.
 - Vehicle and plant washing shall take place at least 50 m from watercourses and any effluent water contained and treated prior to discharge to the watercourse.
 - No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses.
- Measures to reduce dust production and dispersal shall be included in a method statement submitted by the contractor. Use of potable water for dust suppression is not permitted.
- Local labour to be used wherever practical.
- The burial/cemetery site on the Farm Simonsvlei alongside the Klappmuts Road is a no-go area and shall be demarcated as such.
- Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these shall be reported to the South African Heritage Resources Agency and not be disturbed or removed without official approval.
- The access road to the WTP shall be constructed within the development corridor of the pipeline from the reservoir to the Wemmershoek pipeline in order to maintain access to the dam for farm animals and avoid the Renosterveld remnant.

4. Performance Criteria

- Compliance with this environmental specification will require each of the above recommendations to be addressed and noted as either incorporated into detailed designs or rejected and the reason provided.
- Compliance requires the implementation of these recommendations during construction.

Compliance also requires that the ECO monitor implementation of this specification during construction.
5. Responsibilities - The CoCT is responsible for appointing the relevant parties for the detailed design phase and ensuring that the recommendations for mitigation are evaluated and incorporated or rejected accordingly. - The ECO is responsible for providing input to the final design and reporting on the incorporation of the recommendation mitigation measures. - DEADP is responsible for ensuring that this step is included in the detailed design phase. - The Engineer is responsible for ensuring that the incorporated mitigation measures are implemented during construction. - The ECO is responsible for monitoring such implementation. - The ECO is responsible for notifying CoCT of any breaches detected. - The ECO is responsible for informing DEADP of any breaches detected to which the CoCT has not responded. - The external auditor is responsible for verifying that the ECO took all actions for which he/she is responsible and reporting any breaches as required. - DEADP is responsible for taking any action required in the event of non-compliance by CoCT with this specification. Report of such a breach can arise from the ECO, the external auditor or any other third party such as a member of the Community Liaison Forum.
6. Monitoring and reporting - The ECO shall compile a report detailing each of the above specifications and how they were addressed prior to construction. It is acknowledged that not all recommended mitigation measures may be possible. The report must detail the reasons they were not possible. This report shall be available for the first external audit and presented to the Community Liaison Forum. - The external auditor shall verify the actions of the ECO and report accordingly. - This report shall be reviewed by the external auditor and submitted to DEADP as evidence of compliance.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 1 to Environmental Specification 26 inclusive.
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure of the Contractors to implement this specification and the adopted mitigation measures without due cause shall comprise a breach which may attract a penalty of between R500 to R2 000 per day until the mitigation measures as adopted are implemented.

Environmental Specification 2: Responsibilities and functions of CoCT			
Version No.	draft	Date of Approval	
1. Background There are numerous responsibilities incumbent upon the CoCT arising from the recommendations in the EIR and from the conditions of authorisation. This environmental specification provides a checklist to ensure that each function is completed. While the responsibilities with CoCT the actual execution of the functions can be delegated.			
2. Objectives To ensure that all functions required of the CoCT are executed in accordance with the EA.			
3. Specifications The functions of the CoCT during the detailed design phase are: - Appoint an ECO; - Appoint external auditor - Appoint a landscape architect; - Appoint a traffic engineer; - Appoint a restoration ecologist; - Ensure that each of the above specialists completes their assigned tasks prior to construction commencing; - Ensure that detailed designs incorporate all recommended mitigations possible; - Fulfil the administration notification requirements of the EA; - Approve the amended cEMP; - Monitor compliance with the EA and cEMP; - Develop rules of engagement for the Community Liaison Forum and manage the Forum once established; and, - Take actions required in the event of non-compliance. The functions of the CoCT during the construction phase are: - Monitor compliance with the EA and cEMP through the ECO and external auditor; and, - Take actions required in the event of non-compliance.			
4. Performance Criteria Compliance with this environmental specification will require each of the above requirements to be addressed and noted as either incorporated into detailed designs or rejected and the reason provided for any breach.			
5. Responsibilities - CoCT is responsible for fulfilling the items in this specification and for ensuring that the details are implemented by the Engineer and for taking any action required in the event of a breach by the Engineer. - The ECO is responsible for monitoring the implementation of this specification by the Contractor and reporting any non-compliance initially to CoCT but in the event of no action resulting; to DEADP for action. - DEADP is responsible for ensuring that CoCT complies with this specification and taking any action required in the event of a breach.			
6. Monitoring and reporting - The ECO shall monitor compliance with this environmental specification and report any non-compliances for attention CoCT. If this is not resolved the non-compliance shall be reported to DEADP. - The action of CoCT and the ECO shall be reviewed by the external auditor.			
7. Related documents The following documents relate to this environmental specification:			

Environmental Specification 1 to Environmental Specification 26 inclusive.
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure of the Engineer to ensure that the Contractors implement the adopted mitigation measures comprises a breach and may attract a penalty of between R500 to R2 000 per day until the specification is incorporated as designed.

Environmental Specification 3: Responsibilities and functions of the Engineer			
Version No.	draft	Date of Approval	
1. Background The Engineer is the “agent” of CoCT and as such is responsible for ensuring that the responsibilities of the CoCT are duly executed in the design and construction phases			
2. Objectives To provide a checklist of responsibilities and functions of the Engineer in terms of the EA.			
3. Specifications The Engineer shall: - Ensure that all contracts with Contractors contain the cEMP and that adherence to the cEMP is explicitly made mandatory in all contract documents; - Require the contractors to provide Method Statements as required by the environmental specifications and as recommended by the ECO during construction; - Ensure that all Method Statements are jointly signed off by the ECO and the Health & Safety Agent to ensure that they do not conflict and that there is no duplication or omission of essential instructions. It is therefore important that all MS are integrated documents including aspects of environmental management, Health & Safety Management and quality management; - Review, comment on and approve or reject the submitted Method Statements; - Receive Contractor(s) Waste Management Plans and in collaboration with the ECO and ensure that they comply to the environmental specification, if not amendments shall be completed prior to any construction work commencing; - Receive Contractor(s) Site Establishment and Maintenance Method Statement and in collaboration with the ECO ensure that they comply to the environmental specification, if not amendments shall be completed prior to any construction work commencing; - Receive Contractor(s) Construction Activities Method Statement and in collaboration with the ECO ensure that they comply to the environmental specification, if not amendments shall be completed prior to any construction work commencing; - Ensure that all contractors adhere to the cEMP; - Receive and review compliance reports from the ECO; - Receive and respond to external audit reports; - Take appropriate and speedy action in the event of non-compliance including issuing of penalties; - Plan for and respond to any incidents or emergencies; and, - Provide compliance reports to the CoCT and DEADP as per the conditions of authorisation.			
4. Performance Criteria Compliance with this specification shall be the execution of the above listed functions.			
5. Responsibilities - The Engineer is responsible for ensuring the implementation of the above specifications by the Contract(s). - The Contractor(s) are responsible for implementing the above specifications where appropriate. - The ECO shall monitor the execution of the above responsibilities and implementation thereof and report to CoCT.			

6. Monitoring and reporting • The ECO shall monitor the execution of the above functions and responsibilities and report any noncompliance to CoCT for action. • The ECO shall monitor implementation of the specifications as appropriate. • The external auditor shall review and comment on the ECO reports on compliance.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 1 to Environmental Specification 26 inclusive.
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made.

Environmental Specification 4: Responsibilities and functions of the Contractor(s)			
Version No.	draft	Date of Approval	
1. Background The Contractor has numerous responsibilities and functions which include implementing the adopted mitigation measures and the conditions of authorisation which must be implemented effectively, if the environmental protection required of the development is to be achieved. Since the Contractor(s) will be performing the physical work involved in construction, it is critical that their roles in environmental management be clearly defined.			
2. Objectives To ensure that the Contractors have a clear understanding of responsibilities and functions in environmental management during the construction phase.			
3. Specifications The Contractor(s) shall: - Sign acceptance and adherence to the cEMP as part of the contract with the Engineer; - Comply with all aspects of the cEMP in the execution of his designated construction activities; - Submit Method Statements required by the Engineer; - Amend Method Statements as required by the Engineer; - Compile a Waste Management Plan to the satisfaction of the ECO, Health & Safety Agent and Engineer prior to commencing any construction activities; - Compile a Site Establishment and Maintenance Method Statement to the satisfaction of the ECO, Health & Safety Agent and Engineer prior to establishing any site camps; - Compile a Construction Activities Method Statement to the satisfaction of the ECO, Health & Safety Agent and Engineer prior to commencing any construction activities; - Ensure that all employees adhere to the approved Waste Management Plan, Site Establishment and Maintenance Management Plan and all Method Statements and reasonable instruction from the ECO; - Ensure that all employees and subcontractors comply with all aspects of the cEMP; - Respond to any reports of non-compliances from the ECO without delay; and, - Respond to any incidents immediately as per the relevant environmental specification.			
4. Performance Criteria Compliance with this specification shall be the execution of the above listed functions.			
5. Responsibilities - The Contractor(s) is responsible for ensuring the complete execution of the above functions and the implementation of the cEMP and related Method Statement and management plans. - The Engineer shall review the performance of the contractor(s) and be held responsible for the execution of the above responsibilities and functions by the Contractor(s).			
6. Monitoring and reporting - The ECO shall monitor the execution of the above functions and responsibilities and report any noncompliance to CoCT for action. - The external auditor shall review the ECO monitoring reports.			
7. Related documents The following documents relate to this environmental specification: Environmental Specification 1			

to
Environmental Specification 26 inclusive.

8. Breach

- Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.
- Failure by the Contractor(s) to implement the above specifications or any aspects of the cEMP and/or Method Statements and/or Management plans comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of the Engineer and ECO.

Environmental Specification 5: Responsibilities and functions of the ECO

Version No.	draft	Date of Approval
1. Background The ECO is intended to be an impartial third party who facilitates and monitors compliance with the cEMP, EA and environmental best practice. The ECO shall also act as a resource providing suggested advice and technical input as required for implementation of sound environmental practices. This function is pivotal to the successful protection of the environment during the construction phase and the successful post-construction rehabilitation. The construction activities are likely to be phased with construction occurring at more than one site at a time. The ECO is required to monitor compliance at all construction sites. If the Contractors choose to appoint their own environmental staff members (who can be termed Environmental Site Officers (ESO), Environmental Officers (EO) or Designated Environmental Officers (DEO) as preferred by the Contractor(s) this does not detract from the primary responsibility of the ECO appointed by CoCT to oversee and facilitate compliance.		
2. Objectives To provide a checklist of responsibilities and functions to guide the ECO in the protection of the environment and implementation of mitigation measures.		
3. Specifications The ECO shall: - Be appointed at the start of the detailed design phase and continue operating until the last elements of the construction phase (including rehabilitation) have been signed off. (The retention of the ECO's services for the notification phase is at the discretion of the CoCT and would be determined by the number of outstanding issues remaining at the end of construction. The issue of a closure certification (Environmental Specification 25) should obviate the need for this extension to the contract of the ECO. - Compile a checklist detailing actions and outcomes that must be fulfilled by the Contractor in order to be compliant with the cEMP and associated documents and the Environmental Authorisation. This checklist will form the basis of the regular compliance monitoring by the ECO. This checklist must be updated if any Method Statements or designs change. This checklist must include all conditions of authorisation and all specifications included in this cEMP. - Provide input to the detailed design and layout of the pipelines and WTP. - Provide input to the siting and establishment of the site camp(s) within the specified and approved 27 wide development envelope or within the perimeter fence of the WTP. No materials storage or other activities may take place outside of the specified areas without LUPO approval. - Review and comment on the Contractor(s) Waste Management Plans. - Review and comment on the Contractor(s) site establishment and maintenance Method Statement. - Review and comment on the Contractor(s) construction activities Method Statement. - Compile a report detailing compliance with the mitigation measures detailed in Environmental Specification 1. - Provide inputs to and ensure that requirements of the landscape architect, traffic engineer, and restoration ecologist are incorporated into the cEMP and Method Statements as required. - Conduct weekly compliance site inspection monitoring at each centre of construction against the checklist comprising: - Physical inspection of the sites and operations; - Compiling and referencing a photographic record of all observations;		

- o Reporting any non-compliances to the CoCT in writing immediately; - o Monitor progress with response to the report of non-compliance to ensure that response is within the specified time frame; and, - o Recommend that the Engineer imposes a penalty if the corrective is either not taken or not taken within the time frame specified. • Attend technical site meetings (and any other site meetings at the request of the Contractor) and report on compliance and response to any non-compliances identified. • Maintain a complete set of records and reports on all facets of compliance with the EA and this cEMP in an ordered and accessible manner. • Maintain a complaints and response register. • Report any significant non-compliance to the Engineer and CoCT. • Recommend a work stoppage to the Client in the event of serious and potentially damaging non-compliance. • Recommend penalties to the Engineer to address repeated or persistent non-conformance. • Participate in the investigation and sign-off of incident investigations. • Compile and submit monthly compliance reports to the Engineer and CoCT. • Review and comment on Method Statements and management plans submitted by the contractors in collaboration with the Health & Safety Agent to ensure that there is no conflict or omission of duties. • Update compliance checklists if any Method Statements change or if there are amendments to the cEMP. • Call for any additional Method Statements the local circumstances may require. • Attend all meetings of the Community Liaison Forum. • Co-operate with the external auditor and provide information as requested. • Ensure that induction training is conducted on all sites by the Contractor(s) and that a training register is maintained to ensure that only trained staff are permitted on site. • Sign-off on the implementation of the rehabilitation plans • Sign off on the implementation of the landscaping plan; • Complete environmental closure inspection reports as each facet of construction is completed (see Environmental Specification 25). • Update and finalise the oEMP for handover. • Handover all documentation to operational staff of the NABWAS WTP at the end of his/her contract.	
Minimum criteria for the selection of the ECO • Minimum of a tertiary degree in environmental management or appropriately related field; • Demonstrated experience in compiling and reviewing EMPs; • At least 5 years experience as an ECO; and, • At least 2 years experience with design phase applications of environmental management.	
4. Performance Criteria • Compliance with this specification shall be the execution of the above listed functions.	
5. Responsibilities • The ECO is responsible for implementing the above specification. • CoCT is responsible for ensuring that the ECO fulfils these duties effectively. • The external auditor shall review the performance of the ECO and submit a report to DEADP accordingly.	
6. Monitoring and reporting • The Engineer may report any non-compliance by the ECO to CoCT but since there	

is not direct line of responsibility this is regarded as voluntary function. • The external auditor shall review the execution of the above functions and responsibilities at the frequency required by the EA and report any noncompliance to CoCT for action.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 1 to Environmental Specification 26 inclusive.
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.

Environmental Specification 6: Responsibilities and functions of the Restoration Ecologist

Version No.	draft	Date of Approval
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1. Background

Rehabilitation of the areas disturbed by construction requires a number of actions prior to, during and after construction to be successful. These must be also planned in advance to ensure that nothing occurs during construction that would limit or hamper the post-construction rehabilitation.

2. Objectives

- To provide a checklist of responsibilities for the restoration ecologist.

3. Specifications

The Restoration Ecologist shall:

- Be appointed in the design phase;
- Complete a restoration plan detailing:
 - o How the mitigation measures detailed in the EIR and presented in the cell below will be accommodated;
 - o pre-construction search and rescue efforts;
 - o nursery or propagation operations;
 - o specifications for topsoil removal and storage during construction;
 - o specifications for activities or actions which MUST take place to facilitate post-construction efforts as well as those which must NOT occur
 - o post-construction rehabilitation plans (including maintenance of invasive plant species removal program within the pipeline servitudes); and
 - o maintenance and monitoring plans for the operational phase.
- Ensure that appropriate provisions to cater for these specifications have been included in the cEMP and Method Statements as appropriate.
- Provide detailed inputs to the oEMP for maintenance of the rehabilitated areas.
- Manage the nursery during the construction phase.
- Monitor the compliance with specifications during the construction phase.
- Rehabilitate the disturbed areas once construction has ceased in accordance with the plan.
- Handover rehabilitated areas to the operational staff for maintenance.

Summary of recommended mitigation measures from the Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011

- A post construction rehabilitation plan shall be developed in collaboration with a restoration ecologist and approved prior to the commencement of construction. This plan must highlight and minimise any construction activities which could limit rehabilitation success. Such activities must be avoided where possible.
- Rare and endangered plants are to be fostered.
 - Ecologically sensitive areas shall be demarcated and maintained as no-go zones.
 - All invasive aliens to be removed within the servitude of the pipeline where indigenous vegetation or riparian areas are affected.
 - A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring.
 - A nursery is to be established to care for the rescued plants.
 - The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed.
 - Post-construction rehabilitation to be signed-off by the ECO.
- Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation.
 - Topsoil stockpiles to be protected against wind and rain dispersal.
 - Any topsoil run-off to be trapped and re-stockpiled.
 - No stockpile run-off may be permitted to enter any watercourse.
- Soil disturbance shall be kept to a minimum.
 - Removal of vegetation shall be kept to a minimum.
 - Exposed soil shall be protected from erosion.
 - Construction areas shall be restored to the natural slope and geomorphology through rehabilitation.
 - Exposed soil shall be revegetated as soon as construction has ceased.
 - Post-construction rehabilitation to be signed-off by the restoration ecologist.

- Watercourses shall be protected from contamination: - All building materials should be stored away (at least 100 m) from aquatic ecosystems and the areas banded appropriately such that there will be no runoff to watercourses. - If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse. - Vehicle and plant washing shall take place at least 50 m from watercourses the wash bay shall be constructed in such a way that waste water is contained within bunds and preventing from contaminating soil or any adjacent water bodies and any effluent water contained and treated prior to discharge to the watercourse. - No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses. - Post-construction rehabilitation to be signed-off by the restoration ecologist.
4. Performance Criteria Compliance with this specification shall be: - the execution of the above listed functions - the successful rehabilitation of the disturbed areas outside the perimeter fence of the WTP.
5. Responsibilities - The ECO shall review the performance of the restoration ecologist and submit a report to CoCT accordingly. - The Contractor(s) is responsible for implementing any actions specified in the rehabilitation plan. - The Engineer is responsible for ensuring that the Contractor(s) complies with any instruction contained in the rehabilitation plan and for taking any actions required in the event of non-compliance. - The ECO is responsible for monitoring compliance with the specifications above and in the rehabilitation plan by the Contractor(s) and reporting any non-compliance to the Engineer and CoCT. - The restoration ecologist is responsible for monitoring compliance with the specifications of the rehabilitation plan during construction and amending instructions as required. - The restoration ecologist is responsible for implementing the rehabilitation plan. - The ECO is responsible for signing off on the rehabilitation plan.
6. Monitoring and reporting - The ECO shall incorporate all requirements of the restoration ecologist in the cEMP, method statement and compliance checklist as appropriate - The ECO shall review the execution of the above functions and responsibilities at regular intervals and report any noncompliance to CoCT for action.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 23
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure by the Contractor to implement the above specifications comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT.

Environmental Specification 7: Responsibilities and functions of the Landscape Architect			
Version No.	draft	Date of Approval	
1. Background Landscaping of the WTP premises is a requirement for the mitigation of negative impacts on the visual and heritage environments. A landscape architect is required to give input to the design or the structures as well as the layout and landscaping of the premises to reduce visual impact.			
2. Objectives To provide a checklist of responsibilities for the landscape architect.			
3. Specifications The Landscape Architect shall: - Be appointed in the design phase; - Complete a landscape plan detailing: - How the mitigation measures detailed in the EIR and presented in the cell below will be accommodated; - specifications for activities or actions which MUST take place to facilitate post-construction efforts as well as those which must NOT occur; - post-construction landscaping plans; and, - maintenance and monitoring plans for the operational phase. - Ensure that appropriate provisions to cater for these specifications have been included in the cEMP and Method Statements as appropriate; - Provide detailed inputs to the oEMP for maintenance of the landscaped areas; - Monitor the compliance with specifications during the construction phase; - Landscape the WTP premises once construction has ceased in accordance with the plan; and, - Handover landscaped areas to the operational staff for maintenance.			
Summary of recommended mitigation measures from the Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011 - The WTP and associated infrastructure design shall: - Minimise the footprint. - The visual impact of the WTP infrastructure shall be mitigated by: - Blending and varying colours and textures to fit in with the existing environment. - Grading earth embankments to the proposed reservoir into the natural contours. - Landscaping the WTP premises to blend with the surrounding environment. - Ensuring that only essential security lighting is used and that it faces away from the perimeter. - Employing sustainable design elements such as: - Using renewable and natural materials and elements where possible, as well as recycled and reconstituted materials. - Using locally produced, as opposed to imported materials. - Planning construction and finishing to limit repainting/re-finishing intervals; and replacement and repair costs.			
4. Performance Criteria Compliance with this specification shall be: - the execution of the above listed functions - the successful rehabilitation of the disturbed areas inside the perimeter fence of the WTP.			
5. Responsibilities - The ECO shall review the performance of the landscape architect and submit a report to CoCT accordingly. - The Contractor(s) is responsible for implementing any actions specified in the landscape plan. - The Engineer is responsible for ensuring that the Contractor(s) complies with any instruction contained in the landscape plan and for taking any actions required in the event of non-compliance.			

• The ECO is responsible for monitoring compliance with the specifications above and in the landscape plan by the Contractor(s) and reporting any non-compliance to the Engineer and CoCT. • The landscape architect is responsible for monitoring compliance with the specifications of the landscape plan during construction and amending instructions as required. • The landscape architect is responsible for implementing the landscape plan. • The ECO is responsible for signing off on the landscape plan.
6. Monitoring and reporting • The ECO shall incorporate all requirements of the landscape architect in the cEMP, method statement and compliance checklist as appropriate • The ECO shall review the execution of the above functions and responsibilities at regular intervals and report any noncompliance to CoCT for action.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 23
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to implement the above specifications comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT. • Failure by the Engineer to take action against the Contractor(s) when in breach of the above specifications comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT. • Failure by the landscape architect to implement the above specifications and complete rehabilitation of the areas inside the WTP perimeter fence comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT. • Failure by CoCT to take action against the Engineer to ensure compliance shall require action on the part of DEADP in accordance with co-operative governance but still upholding the conditions of authorisation.

Environmental Specification 8: Responsibilities and functions of the Traffic Engineer

Version No.	draft	Date of Approval
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1. Background

Where pipelines need to cross-existing roads and highways, interruptions to traffic flow can be anticipated. In order to ensure compliance with legislative conditions and to minimise the impact on surrounding communities the appointment of a traffic engineer has been recommended as a mitigation measure.

2. Objectives

- To provide a checklist of responsibilities for the traffic engineer.

3. Specifications

The Traffic Engineer shall:

- Be appointed in the design phase;
- Complete a construction phase traffic management plan detailing:
 - o How the mitigation measures detailed in the EIR and presented in the cell below will be accommodated;
 - o specifications for activities or actions which must take place during construction to notify surrounding communities and minimise risk of danger and disruption; and,
 - o comply with legislative requirements.
- Ensure that appropriate provisions to cater for these specifications have been included in the cEMP and Method Statements as appropriate
- Monitor the compliance with specifications during the construction phase.

Summary of recommended mitigation measures from the Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011

Where pipelines need to cross-existing roads and highways, interruptions to traffic flow can be anticipated.

(a) Impact on National Roads

The proposed pipeline routes cross the N1 in a number of locations and connections need to be made to the Wemmershoek pipeline, which is located in the median of the N1, in the Muldersvlei area. The N1 is under the control of the South African National Road Agency Ltd (SANRAL). The SANRAL has indicated that open trench excavation across the N1 is not allowed and therefore pipe jacking would have to be utilised. However, where connections need to be made to the existing Wemmershoek pipeline, it is expected that some encroachment onto the roadway is unavoidable.

(b) Impact on Provincial Roads

Apart from the N1, all of the other pipeline crossings across major access roads would be across roads under the jurisdiction of the Roads Infrastructure Branch of the Provincial Department of Transport and Public Works. This Department has indicated that through-traffic must be provided as far as possible on all paved roads. One-way traffic is, however, allowed on gravel roads.

(c) Impact on Railway lines

All railway lines would have to be crossed by means of pipe jacking, unless permission is obtained from Spoornet at the detail design stage to use open cut excavation in the case of disused railway lines.

- Traffic accommodation measures would need to be formulated during the detail design stage of the project and in consultation with traffic law enforcement. This should form part of a traffic management plan to be included for this phase of the development.
- The requirements of SANRAL, the Department of Transport and Public Works and Spoornet must be satisfied.
- Appropriate signage will need to be erected to warn road users where traffic interruptions are to take place and speed control measures will need to be enforced where appropriate.

Increased traffic on farm roads

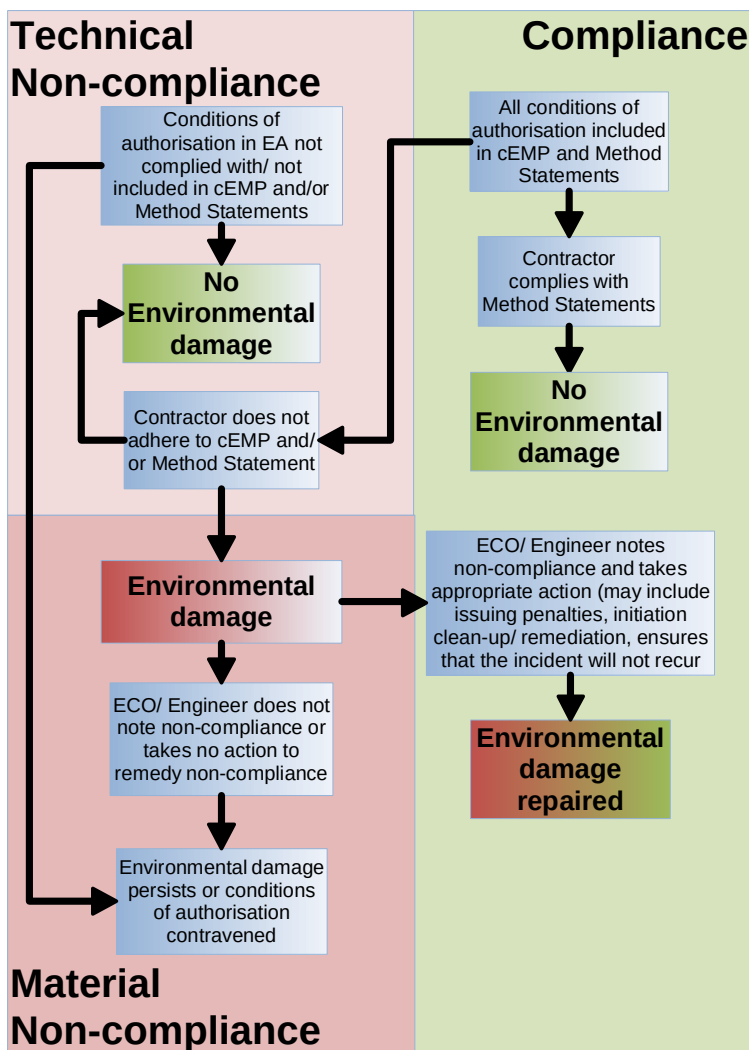
There will be more traffic on farm roads associated with the construction activities, however, the implementation of speed control measures and other safety controls such as flag men on site will mitigate impacts to acceptable levels.

4. Performance Criteria Compliance with this specification shall be: • the execution of the above listed functions • the implementation of the traffic management plan.
5. Responsibilities • The ECO shall review the performance of the traffic engineer and submit a report to CoCT accordingly. • The Contractor(s) is responsible for implementing any actions specified in the landscape plan. • The Engineer is responsible for ensuring that the Contractor(s) complies with any instruction contained in the traffic management plan and for taking any actions required in the event of non-compliance. • The ECO is responsible for monitoring compliance with the specifications above and in the traffic management plan by the Contractor(s) and reporting any non-compliance to the Engineer and CoCT. • The traffic engineer is responsible for monitoring compliance with the specifications of the traffic management plan during construction and amending instructions as required. • The traffic engineer is responsible for addressing any complaints regarding notification processes obtained from stakeholders.
6. Monitoring and reporting • The ECO shall incorporate all requirements of the traffic engineer in the cEMP, method statement and compliance checklist as appropriate • The ECO shall review the execution of the above functions and responsibilities at regular intervals and report any noncompliance to CoCT for action.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 23
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to implement the above specifications comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT. • Failure by the Engineer to take action against the Contractor(s) when in breach of the above specifications comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT. • Failure by CoCT to take action against the Engineer to ensure compliance shall require action on the part of DEADP in accordance with co-operative governance but still upholding the conditions of authorisation.

Environmental Specification 9: Responsibilities and functions of the external auditor

Version No.	draft	Date of Approval	
1. Background The Environmental Authorisation frequently specifies the need for external audits in addition to checking by the ECO and the frequency thereof. Due to the complexity of the activities in this construction, the inclusion of this condition in the authorisation is recommended. In anticipation of this requirement the following specification is issued.			
2. Objectives To provide a checklist of responsibilities for the external auditor.			
3. Specifications - The external auditor shall review all documentation and records held by the ECO on a six monthly basis during construction. - Conduct physical site inspections. - Compile a report detailing: - Documentation reviewed; - Details of compliance and non-compliance using the definitions of compliance detailed below; - An assessment of the efficiency and or effectiveness of the ECO; - An assessment of the record and document keeping of the ECO; - An assessment of the effectiveness of the cEMP; - Any recommendations for improvement; and, - An overall statement of compliance. - Submit the audit report to the CoCT which will then be copied to DEADP.			

When auditing compliance, it is useful to distinguish between difference types of non-compliance as this will inform the degree of severity/ materiality of the finding. The figure below illustrates two types of non-compliance.



In discussing the figure, it is useful to first discuss the nature of compliance. Clearly, if the conditions of the Environmental Authorisation are fully incorporated into the EMPs and Method Statements and no environmental damage results, a finding of compliance is the logical outcome.

However, if all the conditions of the Record of Decision are fully incorporated into the EMPs and Method Statements but the contractor fails to implement them BUT the ECO notes the failure to comply and takes remedial action and no environmental damage results, the finding is also of compliance. In this instance, whilst the contractor was non-compliant, the ECO was fully compliant in taking remedial action so the end result complied with the intent of the Environmental Authorisation from an audit perspective.

In considering non-compliance then; if not all of the conditions of the Environmental Authorisation are incorporated into either the EMP or the Method Statements a finding of non-compliance is obvious. However, as already noted, this has far less significance than if there had been environmental damage, so there needs to be a way of distinguishing between the two types of non-compliance.

For this reason it is convenient, for the purposes of this audit report, to distinguish

between Technical non-compliance and Material non-compliance. The former deals with non-compliances which do not result in environmental damage and are largely administrative in nature and the latter deals with non-compliances that do result in environmental damage and are therefore of much greater significance. The latter, which result in environmental damage and therefore contravene environmental legislation require immediate attention.

4. Performance Criteria

- Compliance with this specification shall be external audits covering the above details at frequency specified by the EA.

5. Responsibilities

- CoCT shall appoint the auditor at the frequency specified in the EA.
- The external auditor shall review all documentation and conduct all activities specified above.
- The ECO shall co-operate with the external auditor, provide a guided site tour and supply all documentation required.

6. Monitoring and reporting

- The Engineer shall respond to any recommendations by the external auditor.
- The ECO shall amend the cEMP and/or any other documentation as recommended by the external auditor in collaboration with CoCT.

7. Related documents

The following documents relate to this environmental specification:

- Environmental Specification 5

• Environmental Specification 18 • Environmental Specification 19
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the ECO to take actions recommended by the external and endorsed by CoCT comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT.

Environmental Specification 10: Establishment and functions of the Community Liaison Forum			
Version No.	draft	Date of Approval	
1. Background The EIR recommends the establishment of a Community Liaison Forum to act as an information portal between the contractors and the surrounding communities. Since the Forum has no decision-making or voting functions it does not have a constitution but rather its operations and activities are guided by “rules of engagement”.			
2. Objectives To provide a checklist of responsibilities and functions of the Community Liaison Forum.			
3. Specifications CoCT shall: - Develop the rules of engagement of the Community Liaison Forum; - Establish the Community Liaison Forum comprising representatives of community and stakeholder groups; and, - Provide secretariat functions and logistics such as venue and refreshments for the Community Liaison Forum meetings. The Community Liaison Forum shall: - Comprise of representatives of stakeholder or community groups only- individuals may not be members; - Have no decision-making or veto powers; - Meet monthly or as specified in the EA; - Be attended by the ECO; - Elect its own chairperson; - Adopt its rules of engagement; - Keep accurate minutes of the meetings; - Be entitled to receive updates on construction progress, road closures and any other information that the ECO may feel necessary; - Provide complaints to the ECO and or Engineer and expect report-back on the response or remedial action as appropriate; and, - Perform a monitoring function on behalf of the community during the construction and then again during the operational phase. The rules of engagement shall reflect the different functions of these two phases of operation.			
4. Performance Criteria Compliance with this specification shall be the establishment and regular meeting of the Community Liaison Forum.			
5. Responsibilities - The external auditor shall review the performance of the Community Liaison Forum and report to the CoCT. - The ECO shall be responsible for arranging meetings and organising venues but is NOT responsible for the chairing of the meeting or of the functioning of the Community Liaison Forum. - CoCT shall be responsible for ensuring that the ECO fulfils the functions described above and in the specification dealing with the functions and responsibilities of the ECO in this regard.			
6. Monitoring and reporting - The ECO shall monitor the Community Liaison meetings. - The external auditor shall review the role and functioning of the ECO in the Community Liaison Forum and responses to queries or complaints.			
7. Related documents The following documents relate to this environmental specification:			

• Environmental Specification 1 • Environmental Specification 2 • Environmental Specification 5 • Environmental Specification 11
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the ECO to take actions specified above comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT.

Environmental Specification 11: Complaints register			
Version No.	draft	Date of Approval	
1. Background The construction of both the pipelines and the WTP will take place adjacent to and within existing communities. While the cEMP and other management plans are designed to minimise the negative impact on the surrounding communities, such impacts may occur through incorrect mitigation measures, mistakes or non-compliance with mitigation measures. A system to receive, analyse and respond to community members is critical as a community liaison function but also to receive feedback on the effectiveness of measures which were designed to limit such disturbances so that they can be improved.			
2. Objectives To provide a checklist of the components of a complaints management system.			
3. Specifications The Engineer and ECO shall: - Assign a contact details for complaints receipt; - Publicise the numbers in local media and at the Community Liaison Forum; - Maintain a register of all complaints received detailing: - Date and time of complaint; - Name of complainant; - Name of recipient of complaint; - Nature of complaint; - Name of the responsible person to whom the complaint was referred; - Date of referral; - Details of resulting action; - Date of resulting action; and, - Date of feedback to complainant. - Ensure that all complaints received are processed and responded to within 24 hours. Where remedial action will take longer than 24 hrs the complainant shall be notified of the time anticipated before final resolution and then notified once the remedial action is completed. - Report on complaints and complaint trends at the site meetings and in the monthly ECO reports.			
4. Performance Criteria - Compliance with this specification shall be the execution of the above listed functions. - Compliance shall constitute responses to all complaints with 24 hrs of receipt.			
5. Responsibilities - CoCT shall co-ordinate and maintain the register and ensure that response is received to any complaints within the specified time. - The Contractor(s) shall respond to complaints as they are received. - The ECO shall ensure that amendments are required to the cEMP and/or any other documentation to adequately respond to the complaints raised and prevent recurrence, that this is effected in a timely fashion.			
6. Monitoring and reporting - The ECO shall monitor the complaints to ensure that they are responded to by the responsible party within the time specified. - The external auditor shall review the functioning of the complaints register and the performance of the ECO in the management of complaints.			
7. Related documents The following documents relate to this environmental specification: Environmental Specification 5			

8. Breach

- Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.
- Failure by the ECO to take actions specified above comprises a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected to the satisfaction of CoCT.
- Failure by the Contractor to respond to a complaint within the specified time shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected.

Environmental Specification 12: Development of Method Statements			
Version No.	draft	Date of Approval	
1. Background The environmental specifications contained in this cEMP prescribe what must be achieved by the contractors and other parties involved in the design and construction of the WTP and pipeworks. The contractors are required to provide details on how this will be achieved based upon their experience and local conditions and resources.			
2. Objectives - To provide an initial checklist of activities which require Method Statements and a pro-forma for Method Statements. - To ensure that that activities comply with legislation and do not <i>inter alia</i>: - Contaminate soil, surface or ground water; - Unnecessarily divert or otherwise interfere with stream flows or water courses; - Impact on indigenous vegetation without reason; - Impact on surrounding communities more than necessary; - Have a footprint any larger than absolutely necessary; and, - Generate excessive waste.			
3. Specifications - The Contract(s) shall as a minimum, provide the Engineer with Method Statements for: - Incident management; - Waste management; - Site camp establishment and maintenance; and, - Construction activities which may impact on the environment. - Each method statement shall detail: - the title of the method statement, version number and date; - what work is to be done- e.g. cement batching; - where the work is to be done; - when the work is to be done; - what potential impacts are to be avoided; - what actions will be taken to avoid the environmental impacts; - who will be responsible for taking and checking these actions; and, - the measure used to assess the success of the method statement. - The method statement is to be submitted to both the ECO and Health & Safety Agent by the Engineer to ensure that both sets of requirements are met and there is no conflict or omission. - Where different Method Statements are required for the same work (each cement mixing) at different locations (WTP as opposed to on a stream bank) as dictated by local conditions- the distinctions in site application are to be made clear and both Method Statements are to be held by the ECO. - The method statement shall be amended in response to recommendations by either the ECO and Health & Safety Agent and Site Agent. Each MS must fully integrate all aspects of management: environment, health & safety, quality etc. - The effectiveness of the method statement is to be monitored by the ECO- in the event of it not being fully effective the ECO shall recommend changes which will then be incorporated into a revised method statement. - The requirements of the method statement shall be included in the ECOs monitoring checklist. - A complete set of current Method Statements is to be held by the ECO at all times.			
4. Performance Criteria Compliance with this specification shall be: - The generation of a full set of approved Method Statements - The implementation of the Method Statements			

• Prevention of environmental damage through the effective planning of activities as expressed in the Method Statements.
5. Responsibilities • The Contractor(s) shall generate and implement the Method Statements • The ECO and Health & Safety Agent shall review and comment on the Method Statements submitted by the Contractor(s) as required. • The ECO shall review the performance of the Method Statements and report any failures or recommendations to the Engineer for action by the Contractor.
6. Monitoring and reporting • The ECO shall monitor the execution of the above functions and responsibilities and report any noncompliance to CoCT for action. • The external auditor shall review and comment on the Method Statements, their implementation and effectiveness.
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 5 • Environmental Specification 9 • Environmental Specification 21 • Environmental Specification 22 • Environmental Specification 23
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to generate, amend or implement the required Method Statements shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the implementation is effected.

Environmental Specification 13: Maintenance and amendment of the cEMP			
Version No.	draft	Date of Approval	
1. Background The cEMP is a living document and once approved by DEADP is still be able to change to suit changing local conditions in order to be effective.			
2. Objectives To provide a procedure to guide amendment and modification of the cEMP without resulting in loss of integrity or having different versions in circulation.			
3. Specifications The ECO shall: - On appointment, revise the draft cEMP to include all conditions detailed in the EA and change all version numbers to version 1 and date the specifications accordingly; - Separate each environmental specification into individual files which reflect the name of the environmental specification and version number to facilitate amendment of individual specifications; - Issue version 1 on behalf of the CoCT to the Engineer and all contractors as part of the contract specifications; - Maintain a register of all Environmental Specifications and their version number; - Amend individual environmental specifications as required by: - Collaborating with the Health & Safety Agent; - Amending the environmental specification and changing the version number and date accordingly; - Submitting the amended version to CoCT for approval by DEADP; - Registering the amended version in the register; - Notifying all parties and the next site meeting of the amended version and distributing the new version as needed; - Request that the old version be destroyed by all holders of the version; and, - Notify DEADP of the amendment.			
4. Performance Criteria Compliance with this specification shall be: - the execution of the above listed functions - removal of old versions of the environmental specifications and replacement with the new versions - the maintenance of a register which reflects the removal and replacement with an amended version.			
5. Responsibilities - The CoCT is responsible for the development and maintenance of the cEMP and all its revisions. - The Contractor(s) is responsible for implementing the cEMP and its revisions.			
6. Monitoring and reporting - The ECO shall monitor the execution of the above functions and responsibilities and report any noncompliance to CoCT for action. - External auditor shall review the performance of the ECO and report on compliance to CoCT.			
7. Related documents The following documents relate to this environmental specification: - Environmental Specification 1 - Environmental Specification 5 - Environmental Specification 12 - Environmental Specification 18			

8. Breach

- Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.
- Failure by the ECO to amend the cEMP in response to changing conditions or at the reasonable request of the Contractor(s) or Engineer and with the approval of CoCT shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the amendments are incorporated and the cEMP updated.

Environmental Specification 14: Incident management			
Version No.	draft	Date of Approval	
1. Background Even with the best planning in the world, mistakes or unexpected events can occur. An incident management procedure ensures that any such event is responded to appropriately and quickly but more importantly that the event is analysed to determine its root causes so that procedures can be changed to reduce the likelihood of recurrence.			
2. Objectives To identify and investigate significant incidents in sufficient time to prevent persistent or cumulative environmental damage and through reviewing and improving existing management instructions ensure that the incident does not recur.			
Definitions A significant environmental incident is any inadvertent occurrence (including sabotage): - in which the performance criteria specified in any environmental specification or method statement have been inadvertently contravened, or - any environmental facet (air, water, soil) has been endangered or degraded through a spill or similar event. This will include but is not limited to: - spills of any liquid or solid onto the exposed soil, into the storm water drain or sewer or any natural watercourse - an accidental release of any gaseous substance to atmosphere Note: This definition is different from the definition of a significant incident defined in terms of section 30(1)(a) of NEMA as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed. The incidents dealt with by this procedure are localised and do not require the intervention of the Department of Water and the Environment. If the incident is deemed significant in terms of this legislation the procedure is overruled and the procedure legislated by the Department shall be assumed.			
3. Specifications - Any incident occurring in any working area of the NABWAS development will be reported to the contractor responsible for the area and the Engineer immediately. - Upon receiving a report of an incident, the contractor shall take any action required to prevent the impact of the incident from spreading. - Once the incident area has been stabilised, the contractor shall complete the incident investigation form in Annexure 2. This shall include a full investigation into the causes of the incident and how a recurrence can be avoided. - Once the form has been completed it shall be submitted to the Engineer for review within one day of the incident. - The ECO shall review the incident reporting form. Note: In the event of a significant incident which is defined in terms of section 30(1)(a) of NEMA as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed, the incident shall be reported to the National Department of Water and the Environment and an appropriate incident form completed and submitted to the regional office or as instructed by the competent official. - The Engineer shall sign-off that the incident has been investigated and signed off to his/her satisfaction. - The ECO shall report the incident at the site meeting and in the monthly compliance report.			

4. Performance Criteria • All incidents are fully documented and reviewed. • Management instructions have been amended in response to incident investigation. • The incident is not repeated.
5. Responsibilities • The Contractor(s) is responsible for ensuring that all staff respond to all incidents in accordance with this environmental specification. • The ECO shall review the incident reports and response. • The contractor is responsible for implementing any changes to procedures required to prevent a recurrence of the incident. • The ECO is required to amend the cEMP or environmental specifications to incorporate such changes as required.
6. Monitoring and reporting • The ECO shall monitor the execution of the above functions and responsibilities and report any noncompliance to CoCT for action. • The external auditor shall review and comment on the functioning and implementation of the incident management environmental specification.
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 1 • Environmental Specification 6 • Environmental Specification 7 • Environmental Specification 8 • Environmental Specification 12 • Environmental Specification 15 • Environmental Specification 16 • Environmental Specification 21 • Environmental Specification 22 • Environmental Specification 23 • Environmental Specification 24
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to respond to incidents in accordance with this environmental specification shall constitute a breach and may attract a penalty of between R500 to R2 000 per incident.

Environmental Specification 15: Emergency preparedness and response

Version No.	draft	Date of Approval
1. Background Emergency preparedness and response differs from incident management in the magnitude of the incident and the risk to the environment and human lives. This environmental specification draws attention to environmentally related aspects of such response but does not attempt to prescribe the contents of the comprehensive emergency response plan required by the OHSAct.		
2. Objectives To provide a checklist of environmental aspects to be considered in the development of a comprehensive emergency response plan.		
3. Specifications - The Contractor shall develop an emergency response plan for the construction activities. - The ECO shall review and determine whether: - environmental consequences (such as pollution of any environmental medium) of emergency response are adequately addressed in the emergency plan; - risks from environmental media are considered where appropriate (i.e. flooding of a river washing hazardous chemicals downstream); and, - nature of operations and the position of equipment and chemicals reflects the provisions made in the plan – e.g. hazardous chemicals stored above the flood line.		
Minimum Requirements (Courtesy of Ecosense CC) - The Contractor shall take all reasonable and active steps to avoid increasing the risk of fire through their activities on Site. The Contractor shall ensure that the basic fire-fighting equipment is available on site. The Contractor shall supply the Site with adequate tested and approved fire fighting equipment. All “hot” work areas (e.g. welding, gas cutting or cutting of metal) must have fire extinguishers readily at hand. No open fires are allowed to be made anywhere on site or in the precinct. The disposal of any material by burning on site is prohibited. The Contractor shall be liable for all costs incurred by organisations sub-contracted to extinguish all fires started by any person(s) under their control. The Contractor shall be liable for all costs incurred to repair burnt areas. A Fire Protection, Response and Evacuation Plan is to be prepared by the Contractor. This plan is to be conveyed to all staff on the Site. This shall identify: - a Fire Officer for the Site (this is usually the H&S officer) - all potential fire hazards, - fire fighting equipment to be provided on site - procedure in case of a fire - a fire evacuation route and plan - emergency contact numbers - Key staff members will be trained to deal with the control of fire fighting equipment on site and to assist with evacuations as required. All staff is to be familiar with the position of fire control equipment on site and response and evacuation procedures. This should be covered in the Contractor's H&S inductions for all new site staff. In the case of a fire occurring on site, the following actions are to be taken immediately: - Contact Local Fire Department. - Warn neighbouring buildings of potential danger. - Take whatever practical measures are required to bring the fire under control, prior to the fire department arriving on site, without - The emergency procedure and evacuation plan including telephone numbers of emergency services, including the local fire fighting service, police and ambulance as well as contact details for site management shall be posted noticeably at the Site office. The Contractor's safety officer is to present emergency procedures during the mandatory Health and Safety Induction presented to all new site staff. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire. - The site shall have a supply of absorbent material readily available to absorb any emergency hydrocarbon (fuel/oil) spills, and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to absorb / deal with a minimum of 200 litres of hydrocarbon liquid spill. Treatment and remediation of spill areas shall be undertaken to the satisfaction of the Principal Agent and ECO. - In the case of a potentially hazardous chemical spill (hydrocarbon based or otherwise):		

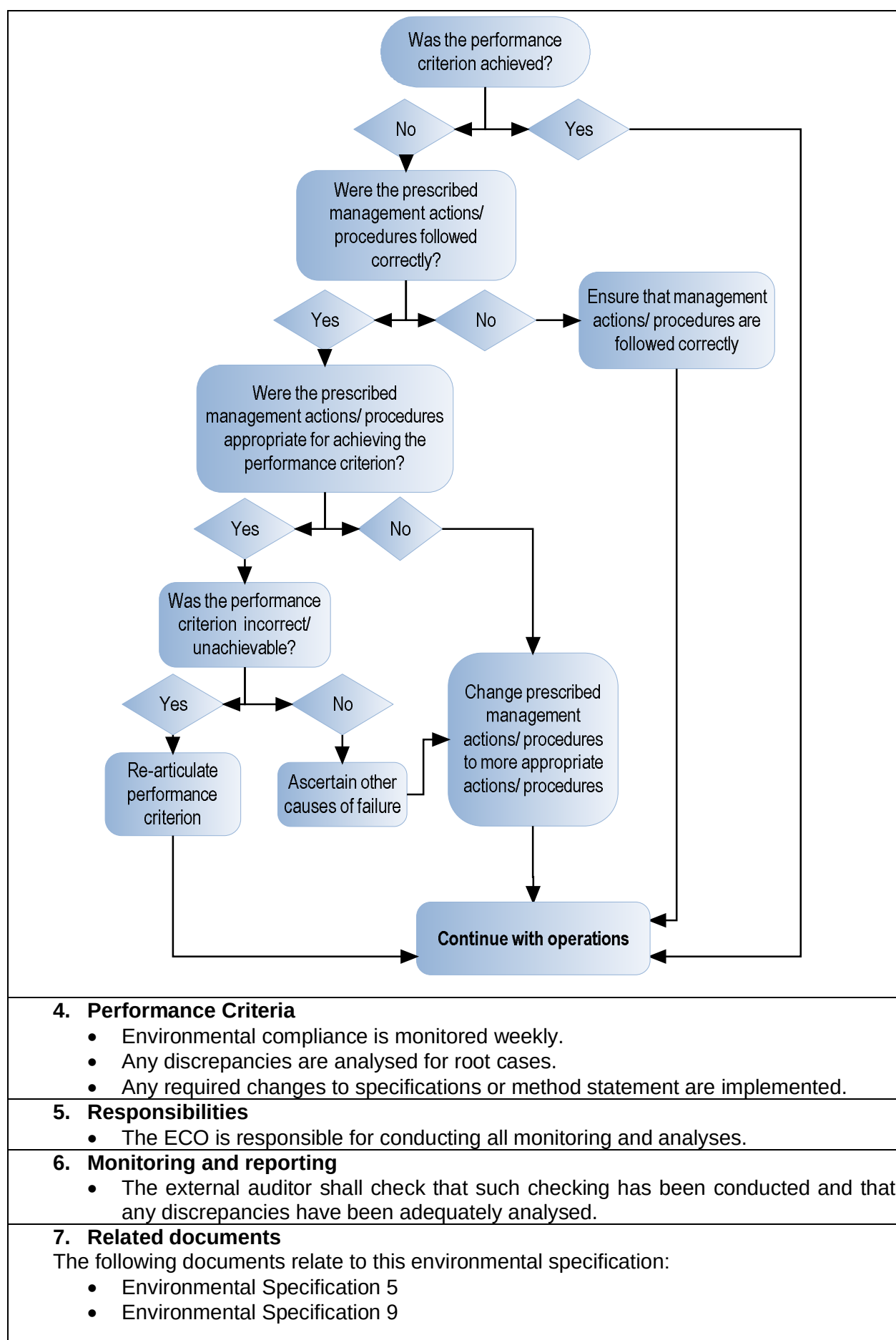
• The Principal Agent and ECO shall be contacted and shall further ensure that, • The source of the spillage shall be isolated. • The spillage shall be contained using sand berms, sandbags, pre-made booms, and sawdust or other absorbent materials. • Cordon off and ensure safety of the spillage area. • A specialist cleanup/remediation service provider shall be contracted if required. • Mop up/remediate the spillage site. • The source of localised flood damage caused by the Contractor's activities on site e.g. due to heavy rains or blockages in the natural water courses shall be addressed immediately.
4. Performance Criteria • Compliance with this specification shall be the execution of the above listed functions.
5. Responsibilities • Engineer shall review the emergency preparedness and response plan and report to the CoCT. • The external auditor shall verify that this function was performed.
6. Monitoring and reporting • The ECO shall monitor the emergency response drills according to the plan to determine whether environmental protection is adequate. • The external auditor shall checks that such drills have taken place and that the ECO has fulfilled the review function
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 5
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made.

Environmental Specification 16: Induction and Training			
Version No.	draft	Date of Approval	
1. Background Implementation of the cEMP can only be effective if all personnel are appropriately trained.			
2. Objectives To provide a checklist of training and induction requirements.			
3. Specifications The ECO shall check that the Contractor(s): - have developed training and induction program which covers aspects of general environmental management and best practice as well as the specifics of the cEMP; - implement the training and induction programmes; - ensure that no personnel are permitted to work on site without having first completed the induction training; - maintain a register of personnel trained; and, - provide refresher training after temporary closure during builder's holidays.			
4. Performance Criteria - All personnel, visitors and consultants working on site have attended an induction and training course; and, - The training register is up-to-date and accurate.			
5. Responsibilities - Contractor shall provide the training and maintain the training register. - The Contractor shall prohibit any personnel from working on site without having first completed the induction training. - The Contractor shall ensure that only trained personnel are permitted access to the site and any construction areas..			
6. Monitoring and reporting - The ECO shall monitor the activities on site to determine whether the induction training is adequate. If not, the program is to be revised and all personnel retrained. - The ECO shall report on training conducted in the monthly compliance reports and at weekly site meetings. - The external auditor shall review the register and conduct random checks of personnel on site to ensure that all have received induction training.			
7. Related documents The following documents relate to this environmental specification: - Environmental Specification 5 - Environmental Specification 6 - Environmental Specification 7 - Environmental Specification 8 - Environmental Specification 12 - Environmental Specification 13 - Environmental Specification 14 - Environmental Specification 15 - Environmental Specification 21 - Environmental Specification 22 - Environmental Specification 23			
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure by the Contractor to provide the requisite training detailed in this environmental specification without due reason shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the training has been			

provided.

- Failure by the Contractor to limit site access to trained personnel shall constitute a breach and may attract a penalty of between R500 to R2 000 per person found on site without specified training.

Environmental Specification 17: Monitoring checking and auditing			
Version No.	draft	Date of Approval	
1. Background The effectiveness of planned environmental protection measures can only be determined through implementation and an analysis of the outcomes of the implementation. For this reason monitoring, checking and auditing of the results if the implementation of these specifications and the cEMP as a whole are a critical part of the cEMP.			
2. Objectives • To provide for the monitoring, checking and auditing of the implementation of the environmental specifications; and, • To provide for improvement of environmental specifications and Method Statements if their performance is below specifications.			
3. Specifications The ECO shall: • monitor all operations on a weekly basis to determine if the prescribed environmental protection is achieved; • review audit reports to identify deficiencies in environmental management during construction; • employ the decision tree overleaf if performance does not meet specifications; • suggest amendments to environmental specifications or methods statements to the Engineer if required as a result of the analysis (or comment on a similar suggestion by the Contractor); and, • report any such action to CoCT, the Engineer and Contractor(s), at the site meetings and in the monthly compliance report.			



8. Breach

- Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.
- Failure by the ECO to conduct monitoring in accordance with this specification without due reason shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the training has been provided.

Environmental Specification 18: Records and record-keeping			
Version No.	draft	Date of Approval	
1. Background The ECO is the facilitator and monitor of environmental compliance. This record of compliance has to be available to any third party and especially to the external auditor. A coherent filing system is essential especially as this development involves public funds and all aspects of it may be subject to scrutiny.			
2. Objectives To provide a comprehensive and coherent procedure for record keeping by the ECO.			
3. Specifications - The ECO shall file and index the following (note this list is not limited to the items below): - Environmental Authorisation; - The most recent cEMP; - The most recent Method Statements; - Register of updates to the cEMP and Method Statements; - Traffic management plan; - Rehabilitation plan; - Landscape plan; - Reports on the incorporation of mitigation recommendations into the detailed design; - Weekly compliance monitoring checklists; - Photographic evidence detailing the site, and date and subject matter; - Copies of incident investigations; - Minutes of site meetings; - Monthly compliance reports; - External audit reports; - Temporary closure certificates; - Final environmental closure reports; - Training records; - Complaints register; and, - Any other correspondence. - The ECO shall hand the complete filing system to the operational staff before completing his/her contractual obligations. - The records must be kept for five years for audit purposes.			
4. Performance Criteria All the above documents are in place, in order and current.			
5. Responsibilities The ECO is responsible for the establishment and maintenance of the filing system.			
6. Monitoring and reporting The external auditor shall report on the filing system and report any noncompliance to CoCT for action.			
7. Related documents The following documents relate to this environmental specification: Environmental Specification 5			
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure by the ECO to maintain the filing system in accordance with this specification without due reason shall constitute a breach and may attract a penalty			

of between R500 to R2 000 per day until the system has been implemented or updated.

Environmental Specification 19: Reporting			
Version No.	draft	Date of Approval	
1. Background The ECO and CoCT both have reporting responsibilities in terms of the EA and this cEMP. It is important that the reporting schedule and content is maintained to demonstrate compliance.			
2. Objectives To provide a checklist of reporting requirements.			
3. Specifications The ECO shall: - Compile a report on compliance with the design phase specifications; - Complete temporary and final closure inspection reports; - Compile weekly monitoring checklists; and - Compile monthly compliance reports and submit them to the CoCT; The CoCT shall: - submit compliance reports to DEADP at the frequency specified in the EA; and. - submit external audit reports to DEADP at the frequency specified in the EA. The external auditor shall compile audit reports at the frequency specified in the EA.			
4. Performance Criteria Compliance with this specification shall be the execution of the above listed functions.			
5. Responsibilities As above			
6. Monitoring and reporting The external auditor shall monitor the execution of the above specifications and report any noncompliance to CoCT for action.			
7. Related documents The following documents relate to this environmental specification: - Environmental Specification 1 - Environmental Specification 5 - Environmental Specification 9 - Environmental Specification 17 - Environmental Specification 18			
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure by the ECO to report according of the above specification without due reason shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until the reports have been submitted.			

Environmental Specification 20: Enforcement			
Version No.	draft	Date of Approval	
1. Background The specifications detailed in this draft cEMP are intended to ensure that the negative impacts of the construction works are not realised on the environment. Failure to implement them can result in environmental damage which then also conflicts with the conditions of authorisation prohibiting such damage. Where this is a result of negligence or repetition of actions known to result in damage a punitive system will be the last resort to ensure compliance.			
2. Objectives To provide a mechanism to ensure compliance in the face of negligence or repetition of actions which endanger the environment.			
3. Specifications Where the Contractor causes any damage to the environment or repeatedly fails to comply with any of the environmental specifications contained within this cEMP, a penalty may be payable - The Contractor is deemed NOT to have complied with this Specification if: - there is evidence of repeated contravention of a specific Environmental Specification in the cEMP; - environmental damage results from negligence; - the Contractor fails to comply with corrective or other instructions issued by the Engineer or ECO within a specified time period; - the Contractor fails to respond to complaints from the public to the satisfaction of the ECO. - Penalties shall be issued per incident for the Contractor's responsibility at the discretion of the Engineer in consultation with the ECO using amounts specified in the environmental specifications as a guideline. Where there is a range in the value the final amount will be determined by the severity of the incident. For each subsequent similar offence committed by the same team or individual, the penalty shall be doubled in value to a maximum value of R20 000. - The amount of the penalty shall be determined by the Engineer, in consultation with the ECO. The Engineer shall inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract. - Where the penalty is levied against the Contractor, CoCT shall withhold this amount from the monies due to the Contractor. - Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any environmental law applicable to the environmental damage caused. - All monies collected through penalties shall be held by the CoCT and be accounted for. A summary page is to be included with the monthly payment certificates as a record of penalties issued to date. Penalty funds shall be allocated to the beneficiary selected by the CoCT and Engineer during the design phase. Payment of all penalties to this beneficiary must be confirmed by the ECO prior to environmental closure being granted for the project.			
4. Performance Criteria - Penalties are issued promptly for any infractions detailed above. - Penalties are paid promptly and a record of receipt of transfer of funds to the selected beneficiary.			
5. Responsibilities - The Engineer shall ensure that any issued penalties are paid. - The Contractor shall pay all penalties issued - The ECO shall be responsible for monitoring and reporting regarding compliance			

with these specifications.
6. Monitoring and reporting • The ECO shall detail all recommended and issued penalties in the monthly environmental compliance report • The Engineer shall account for all penalties issued and paid and present these as part of the site meeting minutes. • The external auditor shall review penalties levied and paid to the beneficiary.
7. Related documents The following documents relate to this environmental specification: Environmental Specification 1 To Environmental Specification 26
8. Breach Not applicable

Environmental Specification 21: Waste management			
Version No.	draft	Date of Approval	
1. Background The National Environmental Management: Waste Act (No 59 of 2008) and the CoCT By-law: Integrated Waste Management require that waste is approached in a hierarchical manner starting with waste minimisation through re-use, recycling and only a final resort disposal. This environmental specification provides guidance on how that will be achieved in this project. Examples of waste generated in the site camp: • Packaging • Food containers • Food waste • Human waste • Cleaning waste • Paper and spent stationery and office consumables such as toners cartridges • Waste from the camp buildings themselves during camp break-down • etc. Examples of waste generated during construction: • Packaging • Food waste • Human waste • Shuttering/shoring • Electrical waste • Chemical waste • Waste water • Cement and concrete waste • Spent paint tins and paint residues • Oils and greases from heavy plant • etc			
2. Objectives • To minimise the amount of water produced • Comply with waste management legislation in all facets of waste management • To manage waste in such a manner as to prevent <i>inter alia</i>: - o Spillage onto and contamination of soil, surface or ground water; - o Dispersal by wind or animals; - o Generation of nuisances such as odour or vermin; - o Cross contamination preventing potentially re-usable or recyclable materials from being re-used or recycled; - o Formation of leachates through the accumulations of rainwater in containers; and, - o Misidentification through incorrect or inadequate labelling.			
3. Specifications The Contractor(s) shall compile a Waste Management Plan for the approval of the Engineer with input from the ECO and Health & Safety Agent which details for both the site camp(s) & offices and all construction areas: • What wastes are anticipated to be generated; • How waste generation will be minimised through planning and preferential procurement; • How waste will be classified, labelled and stored;			

- How many skips/ and or bins will be provided and in which locations on site;
- How waste will be collected and stored to ensure that:
 - o cross-contamination;
 - o wind or rain dispersal;
 - o ingress of rain water;
 - o pollution of soil, ground water or any streams or watercourse is prevented.
- Which waste will be re-used or recycled and the avenues for such actions (including written agreements with impoverished settlements if shoring boards etc are to be made available for their use);
- What hazardous waste will be produced and how this will be labelled, stored and disposed of;
- Which waste will be disposed of and to which landfill using which mechanisms; and,
- The establishment and maintenance of the waste register.

The Contractor(s) shall maintain a waste register which shall detail:

- Nature and volumes of all wastes produced; and,
- Disposal routes and mechanism with receipts of delivery and/or safe disposal.

Minimum Requirements (Courtesy of Ecosense CC)

Waste shall be managed in the following order (as is required by the NEM Waste Act):

1. Waste Elimination: Eliminate waste generation through efficient procurement, reduction in wasteful corrections due to poorly supervised work etc.
2. Waste Reduction: Good storage and management of materials to avoid unnecessary breakage/contamination
3. Waste Re-use on site: Reclaiming of materials otherwise considered as waste e.g. whole bricks and shutter ply out of the rubble stockpile.
4. Waste Recycling/Recovery off-site (records required for verification).
5. Waste Disposal to a licensed landfill site (records required for verification) after separation into general versus hazardous waste categories.

The Waste Management Plan entails the following:

1. The contractor shall complete a Waste Register which details each waste anticipated to be produced during the project, anticipated quantities, the waste's classification (hazardous and SABS class or non hazardous), the disposal method and any special precautions or legislative requirements for each waste type. This shall be reviewed a minimum of every 6 months to remain up to date.
 2. Specific details as to the destination of each waste type including contact details.
 3. Details of the system of sorting employed on site including separating hazardous from non hazardous wastes, separating recyclable from no recyclable wastes and sorting out re-useable materials, and providing labelled bins for these different waste types.
 4. Sets up a Waste Manifest system which details the weight of all wastes leaving the facility, the date on which they left, the date on which they were received by the disposal/recycling/recovery facility and proof of correct disposal by the facility (safe disposal certificate for hazardous waste and receipts for other waste types).
- The contractor is to keep all working areas and the site in general in a neat and tidy condition at all times, including neat and safe stacking and storage of materials and equipment, and management of waste materials at appropriate intervals. Refer also to Section 25 ("Housekeeping on Construction Sites") of the Construction Regulations (18 July 2003) of the Occupational Health and Safety Act. The Contractor shall provide labourers to clean up refuse in the Contractor's camp and working areas daily. Litter and waste materials (excluding rubble and hazardous waste materials) shall be disposed of into bins. Bins shall be provided at all eating areas. The separation and recovery of recyclable materials is required and shall be detailed in the Contractor's Waste Management plan. The Contractor shall provide sufficient bins on Site to store the waste produced on a daily basis. Bins shall not be allowed to become overfull. The waste may be temporarily stored on Site in a central fenced waste area e.g. with ready fence panels or a waste skip with a shade cloth/netting roof cover where there is a risk of wind dispersal of litter across the site, and which the ECO has approved. All waste storage areas shall be maintained to prevent these from becoming a breeding ground for pests or otherwise posing a health nuisance. The Contractor shall remove refuse collected from Site at least once a month. Refuse must be disposed of at a licensed landfill site or reputable recycling depot. The Contractor shall ensure that waste litter is not deposited by employees anywhere on the site except in refuse bins.
 - Petroleum, chemical, harmful and hazardous waste is to be temporarily stored in a sealed drum/s in a specifically designated area in the site camp. This waste shall be disposed of at a licensed hazardous waste disposal site. Storage and disposal etc is also controlled through other relevant legislation, which must be complied with e.g. Hazardous Substances Act (No. 15 of 1973) and Occupational Health & Safety Act.
 - The Contractor shall provide labourers to clean up the Contractor's camp and working areas of rubble generated in the course

of construction work at least once a week. Clean* rubble shall be temporarily stockpiled in a waste skip or a central stockpile/s and shall be crushed on site for re-use or if this is not feasible removed from site to a licensed crusher or landfill site as soon as it constitutes a practical load for removal (maximum 10 m³) and before temporary closure of the site. No plastics, shrink-wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites. • Wherever possible and practical, waste materials generated by construction shall be recycled for example: ▫ Paper / cardboard (e.g. significant quantities are generated during the fit-out phase) ▫ Metals ▫ Glass ▫ Plastic (specific types only) ▫ Salvageable trees and other plant material transplanted elsewhere. ▫ Organic waste (e.g. cleared vegetation) to a green waste depot that produces compost ▫ Whole bricks and crushed rubble for base course (from rubble stockpile) • Labelled containers for recyclable materials must be provided separate to general waste bins in the site camp and taken to the relevant depot when full. This aspect must be detailed in the Contractor's Waste Management Plan and explained to the site staff during environmental awareness training sessions.	4. Performance Criteria Compliance with specification comprises: • Accurate registers as specified above; • No litter in the construction or site camp areas; • Correct labelling and storage of all waste; • No contamination of any environmental medium; • No leachates; • No vermin or other nuisances; • Proof of recycling or re-use; • Compliance with legislation regarding transportation and disposal of waste.
5. Responsibilities • The Engineer is responsible for ensuring that no Contractor(s) commence any activities on site unless they have an approved Waste Management Plan. • The ECO is responsible for reviewing the Waste Management Plans to determine that they accord with legislative requirements. • The ECO is responsible for monitoring adherence to Waste Management Plans. • The Contractors are responsible for complying with their Waste Management Plans. • The Contractors are responsible for responding to any instructions from the Engineer regarding waste management.	6. Monitoring and reporting • The ECO shall monitor compliance with the Waste Management Plan as part of the weekly and monthly reporting. • The external auditor shall review and report on the compliance with the waste management plan.
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 4 • Environmental Specification 5 • Environmental Specification 9 • Environmental Specification 12 • Environmental Specification 20	8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to comply with the waste management plan shall

constitute a breach and may attract a penalty of between R500 to R2 000 per day until compliance is achieved.

Environmental Specification 22: Site camp establishment and maintenance			
Version No.	draft	Date of Approval	
1. Background The construction of the WTP and associated pipeworks is likely to involve a main site camp located at the WTP site and additional site camps along the length of the pipelines at the various construction areas". Consideration of environmental protection measures is essential both in the establishment and maintenance of the site camp(s).			
2. Objectives The establishment of specifications for the establishment of site camp(s) and their maintenance so that environmental damage is avoided.			
3. Specifications Note: site camps and associated storage and work areas may only be established within the approved 27 m envelope along the pipeline length or within the approved WTP perimeter fence. Any deviation from this will require separate approval. The Contractor(s) shall develop and submit for approval a Method Statement for site camp(s) establishment and maintenance detailing: - Sensitive areas/ environments (such as watercourses) in the vicinity of the camp(s) and associated structures (such as access roads); - What activities could affect those environments; - How the environments will be protected by: - Siting of structures; - Construction of structures; and, - Management of structures and activities. - In addition the Method Statement shall provide details on <i>inter alia</i>: - How waste will be minimised in the construction of the site camp infrastructure; - Fuel storage, dispensing and resupply; - Vehicle and general machinery maintenance and repair; - Working hours, noise and lighting management; - Restriction of working areas to protect sensitive environments; - Movement of heavy plant; - Reference to the Waste Management Plan; - Materials handling including handling and storage of hazardous substances; - Cement and concrete mixing and disposal; - Dust management (note: use of potable water for management of dust from stockpiles is not permitted in the City of Cape Town); - Energy management; - Water consumption and management; - Induction and training; - Eating areas - Ablutions; - Access roads - Fire prevention and management; and, - General housekeeping and litter management. Note: the Contractor and ECO together may decide that a number of Method Statements is more appropriate in which each of the above aspects is dealt with in a separate document. This is still compliant under the condition that the elements of a Method Statement are included and each of the above items is dealt with as a minimum.			
Minimum Requirements (Courtesy of Envirosense CC) All access points and roads to the various construction areas must be approved by and maintained in a serviceable condition to the satisfaction of the ECO and CoCT. Contractors and staff shall park their vehicles in locations approved by the Site Agent and shall not cause congestion on private roads or damage to the environment. All parking shall take place within the 27 m construction envelope along the pipeline or within the perimeter of the WTP			

- A minimum of one toilet for every 15 contract personnel shall be provided within 100 m of construction activities which must be serviced at least twice per week. Toilets shall have lockable doors and shall be secured to prevent them falling or being blown over. Toilet paper shall be provided.
- Drinking and wash water shall be provided at all construction areas.
- Eating and drinking may only take place in designated areas. At least one such area shall be designated for each construction area.
- No undue traffic congestion through trucking of spoil off-site. Roads shall be kept free of significant mud/debris.
- No burning of cleared vegetation on site. Cleared vegetative material is not to be dumped anywhere other than an approved waste disposal site
- Dewatering activities do not result in erosion or pollution of on/off site environments. Dewatering systems shall make use of filtered extraction points to prevent silt uptake and extracted water shall be treated/released in such a manner as to avoid erosion on the site and prevent significant siltation or pollution of any natural drainage system and the receiving environment. Trenches and excavations are to be closed as soon as possible after services have been laid in them, to prevent them from posing safety hazards to people and traffic and to prevent rainwater erosion/ponding.
- Should significant erosion (e.g. through rain or wind) of temporarily stockpiled excavated material occur, the stockpiles must be secured/stabilised or covered with shade cloth or Geotech fabrics or similarly suitable material to prevent such erosion.
- All fuels/flammable substances are to be stored within a demarcated area in the Contractor's camp on site. The storage area and perimeter must be well away from stored combustible materials. The Contractor shall ensure that all liquid fuels (petrol and diesel) and other flammable substances are stored in containers with lids, which are kept firmly shut. All containers must be in such a condition as to be reasonably safe from damage and to prevent leakage there from. The rated capacity of a tank/container must be able to accommodate expansion of the product contained therein due to the rise in temperature during storage. Only empty and externally clean containers may be stored on the bare ground. Containers containing fuels as well as all empty and externally dirty containers shall be situated on a smooth and level impermeable surface (e.g. concrete floor) and must be contained within a bund wall. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be equal to 110% multiplied (x) by the total capacity of all the storage containers/tanks. The floor of the bund must be sloped towards an oil trap or sump to enable any spilled fuel to be removed. A hydrocarbon absorption / remediation product approved by the ECO may be installed in the bund to reduce the risk of pollution. The requirements for fuel storage and management as detailed in SANS 10089 part 1 and SANS 10131 must be implemented. All safety requirements for flammables stores including signage shall be implemented by the Contractor's Health and Safety Officer. Sufficient fire-fighting equipment/extinguishers must be provided in an easily accessible position and in close proximity to all areas used for the storage and / or handling of fuel and other flammable substances. The above statements and requirements must further incorporate the regulations and specifications of any laws including the By-law relating to Community Fire Safety Chapter 8 - download at <http://web1.capetown.gov.za/websearch/search/search.aspx?lib=acm/comsup/Weblib&docName=Bylaw>
- All vehicles and equipment must be maintained in a good condition in order to minimise the risk of leakage and possible contamination of the soil or natural drainage system by fuels, oils and hydraulic fluids. All vehicles / plant requiring servicing, or which are parked on site overnight and found to leak oils, as well as any static plant e.g. generators and concrete mixers leaking fuels and oils, are to make use of a drip tray placed strategically to avoid incidental spillage of oils and fuels onto the ground. Drip trays shall be inspected at least weekly (daily, if affected by rainwater) and appropriate mop up products used to remove spillages. In particular, drip trays shall be closely monitored during rain events to ensure that they do not overflow.
- Shutter oils are to be applied under controlled conditions to avoid accidental and incidental spillage. Proper brush or roller tools shall be provided for this application. Small or appropriately sized containers shall be provided for the application of decanted oil in order to minimize accidental spillage.
- A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and soiled mop-up products, oil changes, etc.) must be established.
- All fuel, oil or hydraulic fluid spills are to be reported to the ECO immediately and be treated according
- The Contractor shall prevent discharge of any waste water containing pollutants, such as cements, lime, chemicals and oils and fuels into any water sources e.g. into the natural drainage system, or onto any adjacent land. Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. A Method Statement shall be required for all wash areas where hydrocarbon, hazardous materials and pollutants are expected to be used. This includes, but is not limited to paint equipment and concrete batch plant cleaning.
- Cement powder is to be stored in a secure weatherproof location to avoid contamination of the environment. Cement silos shall be hoarded off with shade cloth to limit the spread of cement dust. Concrete batching is to be avoided in prepared future landscape areas and is prohibited on finished road/floor surfaces. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment: it is recommended that mortar boards and mixing trays be used at all significant mixing and supply points to prevent costly wastage of the materials and increased cleaning requirements and all runoff from batching areas shall be strictly controlled and kept localised. Ready mix trucks shall not clean out hoppers on site unless the concrete waste and wash water is directed to an impermeable sump created on site for this purpose. Avoid concrete spillage from chutes onto roads. All visible remains of excess concrete shall be physically removed to a licensed landfill site on completion of the plaster or concrete pour section and disposed of.
- Potable water may not be used for dust suppression of building material e.g. sand stockpiles or for the washing down of roads and paving. Wastage of water shall be avoided at all times. Only proper hoses and fittings in good repair shall be used on site. Wherever possible, pistol grip fittings should be used on the end of hoses. All taps shall remain properly closed when not in immediate use and all broken pipes / fittings shall be isolated immediately and repaired within 24 hours.
- The pollution of surface or ground water shall be prevented. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water from excavations, construction water, water carrying soil particles or

waste products etc. Water sampling and analysis may be required if the Principal Agent or ECO have reason to believe that an activity on site may have resulted in harmful effluent, or if natural drainage system is believed to be contaminated by the Development.

- During construction the Contractor shall protect areas susceptible to erosion and water logging by installing necessary temporary dewatering systems and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring slopes, stockpiles or areas off site.
- Water extracted from excavations on site shall be free of significant suspended silts/pollutants (e.g. through the use of a filtered dewatering system and if necessary settling sumps) prior to being directed into the natural environment. Any litter/foreign material are to be removed from any drainage lines on site regularly so that function is maintained at all times.
- Fuel and oil spills anywhere on site are to be treated immediately with an appropriate mop-up or bio-remedial products as directed by manufacturers to prevent contamination of runoff.
- No cement, concrete, mortar, plaster etc. wastes or washings are to be disposed of anywhere on the Site or into the water courses. No paints, untreated paint wash water or any other chemicals shall be disposed of anywhere except at a licensed landfill site and must not be allowed to contaminate the natural water course system. No dumping of materials or waste to take place within or near natural water courses.
- The Contractor shall take appropriate measures to minimise the generation of dust as a result of construction works, operations and activities to the satisfaction of the ECO and the Principal Agent. Potentially erosive stockpiles shall be located in wind sheltered areas wherever possible or covered or stabilised appropriately. The use of potable water for dust suppression on stockpiles must be avoided. Road surfaces shall be kept free of mud to avoid later dust generation from such roads once the mud has dried. Excavation, handling and transport of erodible materials shall be avoided under high wind conditions (excess of 45km/hr) when a visible dust plume is present. A wheel washer may need to be installed in order to minimise spread of mud and debris from truck tyres as they leave site. This shall be considered per an approved environmental method statement.
- All hazardous substances, as scheduled by the Hazardous Substances Act (No. 15 of 1973), shall be strictly handled, stored and disposed of as per the manufacturer's specifications. Material Safety Data Sheets (MSDS) for all hazardous materials used on site shall be available on the Contractor's environmental file for reference e.g. in first aid cases, to guide personal protective equipment use, to guide spill clean-ups etc. No hazardous substances may be disposed of on the site, to general landfill or into a sewer or natural drainage system. These shall be directed to a hazardous waste disposal site e.g. Vissershok and the contractor shall obtain safe disposal receipts as proof of safe disposal. No paint products and chemical additives and cleaners such as thinners and turpentine may be disposed of on Site or into a sewer or natural drainage system. Brush / roller wash facilities shall be established to the satisfaction of the ECO and hazardous disposal receipts shall be kept on file at the site office. A Method Statement, approved by the Principal Agent and ECO, will be required.
- If an animal is threatened by construction activities e.g. excavation or a nesting bird, such animal is to be relocated under the direction of the ECO
- Working hours are restricted to the following times 07h00 to 17h00 Mondays to Fridays. The use of significant noise generating equipment such as compressors, pneumatic breakers, power tools, piling rigs, mechanical plant and the like as well as the pouring of concrete is restricted to 08h00 to 17h00 Mondays to Fridays. If any construction work must be undertaken outside of the stipulated time frames, then the contractor shall motivate such to the Engineer and this shall be presented to the Community Liaison Forum in writing 48 hours prior to the work being undertaken. Noise, dust and vibrations shall be carefully controlled outside of the normal working hours. Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music shall be allowed on site. In addition, vehicles' exhaust system silencers shall be correctly maintained and vehicles must not be used unnecessarily. Noise levels exceeding 85dB shall only be permitted where approved by the Principal Agent or during an emergency situation. Lighting shall not be unreasonably intrusive to occupants of neighbouring buildings.
- The safety of the public, residents and site staff during the works is of paramount importance. The work site is to be secured and access to the work sites by unauthorised persons is to be prevented by the Contractor, as far as is reasonably practical. The Contractor has to ensure traffic safety at all times and has to implement safety measures for this purpose. The Developer and Contractor is to take cognisance of the requirements of the Occupational Health and Safety Act No. 85 of 1993 and its relevant regulations, in particular the Construction Regulations dated July 2003. With the possible exception of any security staff that may be required to stay overnight, no personnel will be permitted to live on site. Any security lighting provided by the Contractor is to be placed in such a way as to not cause a nuisance to residents/users of the area at night and traffic on adjacent roads.

4. Performance Criteria

- The site camp(s) are established and managed according to approved Method Statements.
- Any contraventions of the Method Statements are remedied without delay.
- The Method Statements are amended if found to be inadequate.

5. Responsibilities

- The Contractor(s) is responsible for developing a site camp establishment and maintenance Method Statement prior to establishing the camp
- The ECO is responsible for reviewing the Method Statement in collaboration with the Health & Safety Agent.
- The Engineer is responsible for approving or requiring amendments to the Method

Statement as appropriate. • The Engineer is responsible for ensuring that the site camp is not established before the Method Statement is approved. • The Contractor is responsible for ensuring that all staff adhere to the approved site camp Method Statement.
6. Monitoring and reporting • The ECO is responsible for monitoring compliance with the Method Statement and reporting any non-compliance initially to the Contractor(s) and then the Engineer for action • The Engineer is responsible for ensuring that the Contractor complies with any instructions issued by the ECO with regard to the Method Statement. • The external auditor is responsible for reviewing compliance with this specification and the Method Statement.
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 3 • Environmental Specification 4 • Environmental Specification 5 • Environmental Specification 6 • Environmental Specification 7 • Environmental Specification 21
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor to comply with the site establishment and maintenance management plan shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until compliance is achieved.

Environmental Specification 23: Construction activities			
Version No.	draft	Date of Approval	
1. Background Due to the linear nature of this development it is likely that construction activities will be taking place at a number of different locations remote from the main site camp). It is therefore important that a Method Statement shall be developed and implemented to control activities in remote locations.			
2. Objectives The establishment of specifications for construction activities along the pipeline route, access road, and within the perimeter of the reservoir and WTP so that environmental damage is avoided.			
3. Specifications The Contractor(s) shall compile and submit a Construction Activities Method Statement which addresses the mitigation measures from the EIR in the cell below and details (but is not limited to) the following - Remote management of the construction activities; - Use of local labour; - Labour accommodation; - Housekeeping; - Waste management and litter control; - Drinking water; - Water management; - Materials handling; - Fuel storage and dispensing; - Vehicle and general machinery maintenance and repair; - No-go and sensitive areas; - Cement and concrete works; - River and watercourse crossing; - Notification of road closures; - Compliance with the rehabilitation plan; - Compliance with the traffic management plan; - Topsoil management; - Dust control; - Working hours, noise control and lighting; - Management of any archaeological remains; - Fire prevention and management (including fire breaks if necessary); and, - Monitoring and record keeping. Note: it is likely that each Contractor will develop site-specific Method Statements. This is still compliant under the condition that the elements of a Method Statement are included and each of the above items is dealt with as a minimum.			
Summary of recommended mitigation measures from the Second Revised Draft Environmental Impact Report compiled by Chand Environmental Consultants November 2011 - Road closures, movement of abnormal load vehicles, land acquisitions and other activities that would affect general public will be communicated via the Community Liaison Forum and local newspapers. - Construction shall: - Be planned in collaboration with a restoration ecologist to ensure that activities do not occur during construction which will limit post-construction rehabilitation. - Take place in the dry season to minimise impacts of blasting and bulk earth moving. - Limit stream flow disruption. Temporary diversions to be designed to flush sediment accumulations. Crossings to occur in late summer or when the streams are dry. Bank erosion must be prevented. All diversions to be removed once construction has been completed. Post-construction rehabilitation to be signed-off by the restoration ecologist. - Soil disturbance shall be kept to a minimum. - Removal of vegetation shall be kept to a minimum			

- Exposed soil shall be protected from erosion.
- Construction areas shall be restored to the natural slope and geomorphology through rehabilitation.
- Exposed soil shall be revegetated as soon as construction has ceased.
- Post-construction rehabilitation to be signed-off by the restoration ecologist.
- Rare and endangered plants are to be fostered.
 - Ecologically sensitive areas shall be demarcated and maintained as no-go zones.
 - All invasive aliens to be removed within 100 m either side of the pipeline where indigenous vegetation or riparian areas are affected.
 - A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring.
 - A nursery is to be established to care for the rescued plants.
 - The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed.
 - Post-construction rehabilitation to be signed-off by the restoration ecologist.
- Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation.
 - Topsoil stockpiles to be protected against wind and rain dispersal.
 - Any topsoil run-off to be trapped and re-stockpiled.
 - No stockpile run-off may be permitted to enter any watercourse.
- Watercourses shall be protected from contamination.
 - All building materials should be stored away (at least 100 m) from aquatic ecosystems or outside 100 yr floodline, but within the 27 m construction footprint and the areas bunded appropriately such that there will be no runoff to watercourses.
 - If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse.
 - Vehicle and plant washing shall take place at least 50 m from watercourses the wash bay shall be constructed in such a way that waste water is contained within bunds and preventing from contaminating soil or any adjacent water bodies and any effluent water contained and treated prior to discharge to the watercourse.
 - No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses.
- Measures to reduce dust production and dispersal shall be included in a method statement submitted by the contractor. Use of potable water for dust suppression is not permitted.
- The burial/cemetery site on the Farm Simonsvlei alongside the Klapmuts Road is a no-go area and shall be demarcated as such.
- Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these shall be reported to the South African Heritage Resources Agency and not be disturbed or removed without official approval.
- In order to protect the County Fair Farm, the following measures shall be implemented:
 - Immediately notify County Fair of any damage to its existing water pipeline or any cessation or reduction in its water supply to 'Protea' and 'Linwood'. In the event of any repairs to a breakage in the pipeline being required, such repair shall be effected on the same day but in the event of a breakage in the pipeline occurring in the late afternoon, such repairs shall be effected by 09h00 on the next day.
 - A buffer "no-go" zone must be established 100m from the County Fair Farms' perimeter fence.
 - All construction activity including transport of machinery, materials and people will be outside of the 100 metre buffer zone from the perimeter fence of the County Fair's property ;
 - All equipment will be in sound working order so as to avoid diesel and oil spillage (which may contaminate groundwater) and machinery breakdown. In the event of a breakdown and/or spillage, all reasonable steps will be taken to remove the equipment from the area for repair and to clean up any spillage so as to prevent any seepage into the groundwater.
 - Any incidents of ground water or soil pollution must be reported to the County Fair Farms so that they can monitor the steps being taken to prevent groundwater contamination;
 - No foodstuff is to be brought into the buffer zone. Tea and lunch breaks must be held outside of the buffer zone. In particular, no food cooking over fires or gas stoves are to be allowed in the buffer zone at all;
 - No equipment, pipes, fittings or stockpiled material may be stored in the buffer zone, be it temporary or otherwise. All such material and equipment is to be stored away from our client's property and the buffer zone until such time that it will be used in the construction or placement thereof;
 - No construction personnel or machinery are to be in the buffer zone outside of working hours; and
 - Noise levels are to be kept to a minimum.

Minimum Requirements (Courtesy of Ecosense CC)

- All access points and roads to the various construction areas must be approved by and maintained in a serviceable condition to the satisfaction of the ECO and CoCT. Contractors and staff shall park their vehicles in locations approved by the Site Agent and shall not cause congestion on private roads or damage to the environment. All parking shall take place within the 27 m construction envelope along the pipeline or within the perimeter of the WTP
- A minimum of one toilet for every 15 contract personnel shall be provided within 100 m of construction activities which must be serviced at least twice per week. Toilets shall have lockable doors and shall be secured to prevent them falling or being blown over. Toilet paper shall be provided.
- Drinking and wash water shall be provided at all construction areas.
- Eating and drinking may only take place in designated areas. At least one such area shall be designated for each construction area.
- No undue traffic congestion through trucking of spoil off-site. Roads shall be kept free of significant mud/debris.

- No burning of cleared vegetation on site. Cleared vegetative material is not to be dumped anywhere other than an approved waste disposal site
- Dewatering activities do not result in erosion or pollution of on/off site environments. Dewatering systems shall make use of filtered extraction points to prevent silt uptake and extracted water shall be treated/released in such a manner as to avoid erosion on the site and prevent significant siltation or pollution of any natural drainage system and the receiving environment. Trenches and excavations are to be closed as soon as possible after services have been laid in them, to prevent them from posing safety hazards to people and traffic and to prevent rainwater erosion/ponding.
- Should significant erosion (e.g. through rain or wind) of temporarily stockpiled excavated material occur, the stockpiles must be secured/stabilised or covered with shade cloth or Geotech fabrics or similarly suitable material to prevent such erosion.
- All fuels/flammable substances are to be stored within a demarcated area in the Contractor's camp on site. The storage area and perimeter must be well away from stored combustible materials. The Contractor shall ensure that all liquid fuels (petrol and diesel) and other flammable substances are stored in containers with lids, which are kept firmly shut. All containers must be in such a condition as to be reasonably safe from damage and to prevent leakage there from. The rated capacity of a tank/container must be able to accommodate expansion of the product contained therein due to the rise in temperature during storage. Only empty and externally clean containers may be stored on the bare ground. Containers containing fuels as well as all empty and externally dirty containers shall be situated on a smooth and level impermeable surface (e.g. concrete floor) and must be contained within a bund wall. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be equal to 110% multiplied (x) by the total capacity of all the storage containers/tanks. The floor of the bund must be sloped towards an oil trap or sump to enable any spilled fuel to be removed. A hydrocarbon absorption / remediation product approved by the ECO may be installed in the bund to reduce the risk of pollution. The requirements for fuel storage and management as detailed in SANS 10089 part 1 and SANS 10131 must be implemented. All safety requirements for flammables stores including signage shall be implemented by the Contractor's Health and Safety Officer. Sufficient fire-fighting equipment/extinguishers must be provided in an easily accessible position and in close proximity to all areas used for the storage and / or handling of fuel and other flammable substances. The above statements and requirements must further incorporate the regulations and specifications of any laws including the By-law relating to Community Fire Safety Chapter 8 - download at <http://web1.capetown.gov.za/websearch/search/search.aspx?lib=acm/comsup/Weblib&docName=Bylaw>
- All vehicles and equipment must be maintained in a good condition in order to minimise the risk of leakage and possible contamination of the soil or natural drainage system by fuels, oils and hydraulic fluids. All vehicles / plant requiring servicing, or which are parked on site overnight and found to leak oils, as well as any static plant e.g. generators and concrete mixers leaking fuels and oils, are to make use of a drip tray placed strategically to avoid incidental spillage of oils and fuels onto the ground. Drip trays shall be inspected at least weekly (daily, if affected by rainwater) and appropriate mop up products used to remove spillages. In particular, drip trays shall be closely monitored during rain events to ensure that they do not overflow.
- Shutter oils are to be applied under controlled conditions to avoid accidental and incidental spillage. Proper brush or roller tools shall be provided for this application. Small or appropriately sized containers shall be provided for the application of decanted oil in order to minimize accidental spillage.
- A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and soiled mop-up products, oil changes, etc.) must be established.
- All fuel, oil or hydraulic fluid spills are to be reported to the ECO immediately and be treated according
- The Contractor shall prevent discharge of any waste water containing pollutants, such as cements, lime, chemicals and oils and fuels into any water sources e.g. into the natural drainage system, or onto any adjacent land. Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. A Method Statement shall be required for all wash areas where hydrocarbon, hazardous materials and pollutants are expected to be used. This includes, but is not limited to paint equipment and concrete batch plant cleaning.
- Cement powder is to be stored in a secure weatherproof location to avoid contamination of the environment. Cement silos shall be hoarded off with shade cloth to limit the spread of cement dust. Concrete batching is to be avoided in prepared future landscape areas and is prohibited on finished road/floor surfaces. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment: it is recommended that mortar boards and mixing trays be used at all significant mixing and supply points to prevent costly wastage of the materials and increased cleaning requirements and all runoff from batching areas shall be strictly controlled and kept localised. Ready mix trucks shall not clean out hoppers on site unless the concrete waste and wash water is directed to an impermeable sump created on site for this purpose. Avoid concrete spillage from chutes onto roads. All visible remains of excess concrete shall be physically removed to a licensed landfill site on completion of the plaster or concrete pour section and disposed of.
- Potable water may not be used for dust suppression of building material e.g. sand stockpiles or for the washing down of roads and paving. Wastage of water shall be avoided at all times. Only proper hoses and fittings in good repair shall be used on site. Wherever possible, pistol grip fittings should be used on the end of hoses. All taps shall remain properly closed when not in immediate use and all broken pipes / fittings shall be isolated immediately and repaired within 24 hours.
- The pollution of surface or ground water shall be prevented. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water from excavations, construction water, water carrying soil particles or waste products etc. Water sampling and analysis may be required if the Principal Agent or ECO have reason to believe that an activity on site may have resulted in harmful effluent, or if natural drainage system is believed to be contaminated by the Development.
- During construction the Contractor shall protect areas susceptible to erosion and water logging by installing necessary temporary dewatering systems and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring slopes, stockpiles or areas off site.

- Water extracted from excavations on site shall be free of significant suspended silts/pollutants (e.g. through the use of a filtered dewatering system and if necessary settling sumps) prior to being directed into the natural environment. Any litter/foreign material are to be removed from any drainage lines on site regularly so that function is maintained at all times.
- Fuel and oil spills anywhere on site are to be treated immediately with an appropriate mop-up or bio-remedial products as directed by manufacturers to prevent contamination of runoff.
- No cement, concrete, mortar, plaster etc. wastes or washings are to be disposed of anywhere on the Site or into the water courses. No paints, untreated paint wash water or any other chemicals shall be disposed of anywhere except at a licensed landfill site and must not be allowed to contaminate the natural water course system. No dumping of materials or waste to take place within or near natural water courses.
- The Contractor shall take appropriate measures to minimise the generation of dust as a result of construction works, operations and activities to the satisfaction of the ECO and the Principal Agent. Potentially erosive stockpiles shall be located in wind sheltered areas wherever possible or covered or stabilised appropriately. The use of potable water for dust suppression on stockpiles must be avoided. Road surfaces shall be kept free of mud to avoid later dust generation from such roads once the mud has dried. Excavation, handling and transport of erodible materials shall be avoided under high wind conditions (excess of 45km/hr) when a visible dust plume is present. A wheel washer may need to be installed in order to minimise spread of mud and debris from truck tyres as they leave site. This shall be considered per an approved environmental method statement.
- All hazardous substances, as scheduled by the Hazardous Substances Act (No. 15 of 1973), shall be strictly handled, stored and disposed of as per the manufacturer's specifications. Material Safety Data Sheets (MSDS) for all hazardous materials used on site shall be available on the Contractor's environmental file for reference e.g. in first aid cases, to guide personal protective equipment use, to guide spill clean-ups etc. No hazardous substances may be disposed of on the site, to general landfill or into a sewer or natural drainage system. These shall be directed to a hazardous waste disposal site e.g. Vissershok and the contractor shall obtain safe disposal receipts as proof of safe disposal. No paint products and chemical additives and cleaners such as thinners and turpentine may be disposed of on Site or into a sewer or natural drainage system. Brush / roller wash facilities shall be established to the satisfaction of the ECO and hazardous disposal receipts shall be kept on file at the site office. A Method Statement, approved by the Principal Agent and ECO, will be required.
- If an animal is threatened by construction activities e.g. excavation or a nesting bird, such animal is to be relocated under the direction of the ECO
- Working hours are restricted to the following times 07h00 to 17h00 Mondays to Fridays. The use of significant noise generating equipment such as compressors, pneumatic breakers, power tools, piling rigs, mechanical plant and the like as well as the pouring of concrete is restricted to 08h00 to 17h00 Mondays to Fridays. If any construction work must be undertaken outside of the stipulated time frames, then the contractor shall motivate such to the Engineer and this shall be presented to the Community Liaison Forum in writing 48 hours prior to the work being undertaken. Noise, dust and vibrations shall be carefully controlled outside of the normal working hours. Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music shall be allowed on site. In addition, vehicles' exhaust system silencers shall be correctly maintained and vehicles must not be used unnecessarily. Noise levels exceeding 85dB shall only be permitted where approved by the Principal Agent or during an emergency situation. Lighting shall not be unreasonably intrusive to occupants of neighbouring buildings.
- The safety of the public, residents and site staff during the works is of paramount importance. The work site is to be secured and access to the work sites by unauthorised persons is to be prevented by the Contractor, as far as is reasonably practical. The Contractor has to ensure traffic safety at all times and has to implement safety measures for this purpose. The Developer and Contractor is to take cognisance of the requirements of the Occupational Health and Safety Act No. 85 of 1993 and its relevant regulations, in particular the Construction Regulations dated July 2003. With the possible exception of any security staff that may be required to stay overnight, no personnel will be permitted to live on site. Any security lighting provided by the Contractor is to be placed in such a way as to not cause a nuisance to residents/users of the area at night and traffic on adjacent roads.

Summary of recommended mitigation measures from the freshwater and biodiversity assessments conducted in 2022 and 2023:

- 2022 Freshwater Assessment Mitigations
 - o Where the pipe comes close to (< 30m) a wetland or watercourse, the specifications for the pipe trenches should aim to minimise the footprint of construction (e.g. the shallower the pipe, the narrower the disturbed area).
 - o Sensitive ecosystems must be demarcated prior to any construction activities, so that these can be avoided, unless construction is taking place within the boundaries of a wetland or watercourse.
 - o Removal of indigenous vegetation should be kept to a minimum, and, where possible, impacted areas rehabilitated after construction.
 - o Sensitive ecosystems should be demarcated prior to any construction activities, so that these can be avoided, wherever possible.
 - o Special care should be taken around storm and heavy rain events. Construction sites should be inspected for erosion damage at these times.
 - o All building materials must be stored away (at least 15m) from all aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction.
 - o Consideration should be given at the design phase to remedial shaping of banks and

slopes to their near-natural slope, geomorphological and bed characteristics and re-vegetated after clean-up.

- o Banks and slopes should be re-vegetated after construction is completed.
- o If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural aquatic ecosystems.
- o Care should be taken to not disturb flora and fauna, and construction lights (if needed) must be directed away from sensitive areas. Fencing must allow free movement of fauna.
- o Disruption of flow should be kept to a minimum, but where necessary, temporary diversion measures should allow flushing of the system to prevent build-up of material. Diversion techniques should take measures to limit erosion from temporary channels into watercourses or wetlands.
- o No obstructions to flow shall remain in the watercourses or wetlands after construction is completed.
- o Temporary diversion channels must be rehabilitated.
- o Washing of vehicles and machinery should take place well away (50m) from aquatic ecosystems. Machinery prone to oil or fuel leakage must be located at least 50m away from any aquatic ecosystem, and the area adequately bunded in order to contain leakages.
- o Water pumps and cement mixers shall have drip trays to contain oil and fuel leaks – these must be cleaned regularly.
- o Concrete batching must be done well away from (50m minimum) from all sensitive environments.
- o All machinery should be regularly checked for leaks.
- o Suitable toilet and wash facilities must be provided to avoid the use of sensitive areas for these activities. These service areas must be maintained, and toilets emptied on at least a weekly basis.
- o In situ soils must preferably be used for rehabilitation of construction sites.
- o Where in situ soils are insufficient, topsoils used after construction must be bought from reliable sources, and must be free of alien seeds or grass runners.
- o Constant monitoring of the construction sites by the Site Engineer and ECO must occur, and all alien plant species removed from or destroyed on the site.
- 2023 Biodiversity Assessment Requirements:
 - o Relocation of the Endangered plant species recorded in the Very High sensitivity is not the first choice, as the adult plants are very unlikely to survive, but an attempt should be made to take seed (in April/May) and cuttings (April/May), and an effort must be to translocate all the live plants (April/May) of *Athanasia capitata* from within the approved development footprint to nearby similar but secure habitat. As the Medium and Very High sensitivity habitat may support various other plant Species of Conservation Concern (SoCC) the city of Cape Town (CoCT) Environmental Management Branch staff should undertake Search and Rescue in the approved development footprints on at least two occasions in the appropriate seasons (July – late September) prior to any earthmoving on site.
 - o During construction an ECO must ensure that no animals are trapped in the construction and pipeline trenches, and remove any that are. These should be checked every morning before work starts. Trenches should be infilled as soon as possible.

4. Responsibilities

- The Contractors is responsible for developing a construction activities Method Statement prior to establishing the camp.
- The ECO is responsible for reviewing the Method Statement in collaboration with the Health & Safety Agent.
- The Engineer is responsible for approving or requiring amendments to the Method Statement as appropriate.
- The Engineer is responsible for ensuring that construction activities do not commence before the Method Statement is approved.
- The Contractor is responsible for ensuring that all staff adhere to the approved construction activities Method Statement

5. Monitoring and reporting

- The ECO is responsible for monitoring compliance with the Method Statement and reporting any non-compliance initially to the Contractor(s) and then the Engineer for action.
- The Engineer is responsible for ensuring that the Contractor complies with any instructions issued by the ECO with regard to the Method Statement.
- The external auditor shall review compliance with this environmental specification and the details of the construction activities Method Statement.

6. Related documents

The following documents relate to this environmental specification:

- Environmental Specification 5
- Environmental Specification 6
- Environmental Specification 7
- Environmental Specification 8
- Environmental Specification 21
- Environmental Specification 22

7. Breach

- Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below.
- Failure by the Contractor to comply with the construction activities management plan shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until compliance is achieved.

Environmental Specification 24: Temporary site closure			
Version No.	draft	Date of Approval	
1. Background If construction activities take place during holidays, it is essential that environmental protection measures are in place while the majority of staff members are absent.			
2. Objectives To ensure that the risk of environmental damage is minimised during temporary closure.			
3. Specifications Prior to the temporary closure, the Contractor shall ensure: - Emergency and Management telephone numbers to be available and displayed; - Dust mitigation in place; - Stockpiles stabilized; - Material stockpiles secured; - Fuels / hazardous substances stores secured and cleaned; - Materials stores secured; - Chemical toilets empty and secured; - Refuse bins empty and secured and rubble removed; - No-go area fencing in place; - Drip trays empty & secure (where possible); - Streambank and erosion protection measures are secure. The ECO monitor the above activities and shall issue a temporary closure certificate verifying that all the above measures are in place.			
4. Performance Criteria Compliance.			
5. Responsibilities - The Contractor shall ensure that all measures required for temporary closure are in place. - The ECO shall monitor and report on measures taken for temporary site closure. - The Engineer shall ensure that the Contractor does not leave the site until the ECO has signed off on the temporary closure.			
6. Monitoring and reporting - The ECO shall monitor compliance with the above specification. - The Contractor shall ensure that the site and all construction areas are monitored regularly during the temporary closure to identify and respond to any environmental risks or incidents. - The external auditor shall review compliance with this specification.			
7. Related documents The following documents relate to this environmental specification: - Environmental Specification 4 - Environmental Specification 5 - Environmental Specification 21 - Environmental Specification 22 - Environmental Specification 23			
8. Breach - Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. - Failure by the Contractor to comply with the above specification or to respond to recommendations by the ECO shall constitute a breach and may attract a penalty of between R500 to R2 000 per day until compliance is achieved. - Environmental damage resulting from inadequate measures taken during			

temporary closure by the Contractor(s) shall constitute a breach and may attract a penalty of between R500 to R2 000 per incident.

Environmental Specification 25: Site Closure			
Version No.	draft	Date of Approval	
1. Background The construction of the WTP and pipelines will take place in various phases in various locations. There will therefore, be numerous “construction areas” Once the Contractor has confirmed that the works have been completed in a specific construction area, all construction materials must be removed so that rehabilitation can be completed. The issue of a closure inspection report means that the ECO is satisfied that all aspects of environmental management as detailed the cEMP and related documents are complete. The construction phase can, however, only be deemed to be completed when landscaping and rehabilitation are complete. It is therefore likely that closure inspections will be undertaken for various components of the construction phase and certificates issued for each component. These components will be determined in consultation with the Engineer.			
2. Objectives To ensure that all construction activities are complete and in accordance with environmental specifications.			
3. Specifications The ECO shall issues two certificates for every area of work: Construction closure certificate: - All construction materials have been removed from site; - All waste has been removed from site; - Any contaminated soil has been removed; - The topsoil has been returned to its former position in accordance with the rehabilitation plan; - Any temporary stream or watercourse diversions have been removed and the stream banks restored; and, - Any erosion has been repaired. Rehabilitation or landscaping closure certificate: - Rehabilitation or landscaping has been completed as per the plans developed in Environmental Specification 6 and Environmental Specification 7. The ECO shall only issue a completion inspection report if ALL the above elements for the specific closure report have been completed and if there is not residual repair or remedial work to be conducted.			
4. Performance Criteria Compliance with this specification shall result in a completion inspection report being signed off by the ECO if all the above specifications have been complied with			
5. Responsibilities - The Contractor(s) is responsible for ensuring that all construction materials and waste have been removed from site and that the area has been cleaned and prepared for the rehabilitation plan as specified in that plan. - The restoration ecologist or landscape architect are responsible for completing their respective plans. - The ECO is responsible for checking compliance with this specification. - The Engineer is responsible for ensuring that the Contractor complies with this specification. - The Engineer shall withhold the final payment of the Contractor's fees until such time as a closure inspection report has been signed off by the ECO.			

6. Monitoring and reporting • The ECO shall check the compliance with this specification • The external auditor shall check that the closure inspection report has been completed and signed off
7. Related documents The following documents relate to this environmental specification: • Environmental Specification 4 • Environmental Specification 5 • Environmental Specification 6 • Environmental Specification 7 • Environmental Specification 18 • Environmental Specification 21 • Environmental Specification 22 • Environmental Specification 23
8. Breach • Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the Contractor(s) to comply with the above specification or to respond to recommendations by the ECO shall constitute a breach and final payment of fees may be withheld until compliance is achieved.

Environmental Specification 26: Handover to operational staff			
Version No.	draft	Date of Approval	
1. Background Compliance with the cEMP and environmental specifications is a legal requirement. Proof of such compliance is required therefore essential, especially if public funds are used. It is therefore important that the ECO hands over the relevant documentation to the staff member appointed to be responsible for environmental management at the Muldersvlei WTP and Reservoir during the operational phase in a suitable ordered fashion.			
2. Objectives To ensure that records of compliance are readily accessible to operational staff and external auditors after construction has ceased and the duties of the ECO have ended.			
3. Specifications The ECO shall collate and in an indexed filing system supply the operational staff with: - Environmental Authorisation; - Record of notification of I&APs of approval; - Report on incorporation of recommendations into the detailed design; - Record of notification of DEADP of the commencement of construction activities; - Record of DEADP approval of the cEMP and any subsequent amendments; - Minutes of the Community Liaison Forum; - The most recent cEMP; - The most recent Method Statements; - Register of updates to the cEMP and Method Statements; - Traffic management plan; - Rehabilitation plan; - Landscape plan; - Weekly compliance monitoring checklists; - Photographic evidence detailing the site, and date and subject matter; - Incident investigations; - Minutes of site meetings; - Monthly compliance reports; - External audit reports; - Temporary closure certificates; - Final environmental closure reports; - Training records; - Complaints register; - Any other correspondence; - Records of penalties paid and received by the beneficiaries; and, - Revised oEMP. The operational staff member at Muldersvlei WTP and Reservoir receiving the documentation shall sign receipt of the document. The ECO shall provide the CoCT with a copy of the receipt as proof of compliance.			
4. Performance Criteria The ECO shall be deemed to have completely discharged his/her responsibilities when the above specification has been complied with in full.			
5. Responsibilities - The CoCT shall ensure that the ECO has handed over all documentation specified above to the operational staff before final payment of the ECO's fees - The CoCT shall ensure that the operational staff file and preserve the documentation for five years before it may be destroyed			
6. Monitoring and reporting The external auditor or the operational phase or the construction shall ensure that			

this specification has been complied with in full.	
7. Related documents	
The following documents relate to this environmental specification:	
• Environmental Specification 2 • Environmental Specification 18 • Environmental Specification 19	
8. Breach	
• Any breaches shall be reported to the responsible party and attempts to gain resolution made. Only in the event of no resolution being reached within reasonable time frames, shall the penalty system be imposed as below. • Failure by the ECO to comply with the above specification or to deliver an organised set of files to the operational staff shall constitute a breach and final payment of fees may be withheld until compliance is achieved. Failure by CoCT to take action against the ECO to ensure compliance shall require action on the part of DEADP in accordance with co-operative governance but still upholding the conditions of authorisation.	

Annexure 1: Summary of mitigation measures from the EIR

Please note that the items below are extracted verbatim from the EIR for reference. Not all of them have been included in the above specifications for various reasons. Note: Some of the recommendations recorded below are not possible or not legally permissible. For this reason they have not been included in the specifications above. They are presented here as a record of their inclusion in the EIR only.

Summary of mitigations and recommendations for pipelines and access road

Discipline	Design Phase	Construction Phase	Operational Phase
Stakeholder engagement and facilitation	- A Community Liaison Forum shall be established prior to construction commencing. - A single Community Liaison Forum shall provide an information sharing function for both the pipeline construction and the construction of the WTP and associated infrastructure. - The Terms of Engagement and responsibilities shall be documented and approved by the applicant. - The Terms of Engagement shall cover two phases and the different activities attendant on the two phases: the construction phase and the operational phase.	- The Community Liaison Forum will negotiate the construction roll-out with affected landowners prior to construction commencing. - Road closures, movement of abnormal load vehicles, land acquisitions and other activities that would affect general public will be communicated via the Community Liaison Forum and local newspapers. - The Forum shall: - Be an information-sharing portal - Serve as a monitoring organisation - Serve as a portal for stakeholder feedback and response.	The Community Liaison Forum shall cease construction phase activities once construction and rehabilitation has been completed along the length of the pipeline.
Biophysical (terrestrial and freshwater ecology) impact management	- The pipeline design shall be: - Designed to minimise vertical and horizontal footprint (as shallow and narrow as possible). - Aligned to avoid wetlands and rivers - especially for sites listed to be of moderate to high conservation importance. Where this is impossible artificial stabilisation using structures such as gabions to be kept to a minimum. - Aligned to avoid crossing roads or railway lines or make use of	- Construction shall: - Be planned in collaboration with a restoration ecologist to ensure that activities do not occur during construction which will limit post-construction rehabilitation. - Take place in the dry season to minimise impacts of blasting and bulk earth moving. - Limit stream flow disruption. Temporary diversions to be designed to flush sediment accumulations. Crossings to occur in late summer or when the streams are dry. Bank erosion must be prevented. All diversions to be removed once construction has been completed. Post-construction rehabilitation to be signed-off by the restoration ecologist. - Soil disturbance shall be kept to a minimum. - Removal of vegetation shall be kept to a minimum - Exposed soil shall be protected from erosion. - Construction areas shall be restored to the natural slope and geomorphology through rehabilitation.	- The Operational Management Plan should highlight regular intervals during which inspections should be undertaken to monitor invasive alien plant establishment. Further to that a removal plan should be compiled. 2022 Freshwater Assessment Mitigations - The potential interception and transfer of subsurface water by the drainage- and bedding material under and around inclined pipes should be inhibited with cut-off barriers perpendicular to the longitudinal profile of the trench (for example, 0.3m thick bentonite). The

Discipline	Design Phase	Construction Phase	Operational Phase
	existing crossings. • Ensure that the bedding medium does not form a preferential drainage line. • Commented upon by the freshwater ecologist prior to finalisation. • A post construction rehabilitation plan shall be developed in collaboration with a restoration ecologist and approved prior to the commencement of construction. This plan must highlight and minimise any construction activities which could limit rehabilitation success. Such activities must be avoided where possible.	• Exposed soil shall be revegetated as soon as construction has ceased. • Post-construction rehabilitation to be signed-off by the restoration ecologist. • Rare and endangered plants are to be fostered. • Ecologically sensitive areas shall be demarcated and maintained as no-go zones. • All invasive aliens to be removed within 100 m either side of the pipeline where indigenous vegetation or riparian areas are affected . • A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring. • A nursery is to be established to care for the rescued plants. • The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed. • Post-construction rehabilitation to be signed-off by the restoration ecologist. • Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation. • Topsoil stockpiles to be protected against wind and rain dispersal. • Any topsoil run-off to be trapped and re-stockpiled. • No stockpile run-off may be permitted to enter any watercourse. • Watercourses shall be protected from contamination. • All building materials should be stored away (at least 50 m) from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff to watercourses. • If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse. • Vehicle and plant washing shall take place at least 50 m from watercourses and any effluent water contained and treated prior to discharge to the watercourse. • No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses. • 2022 Freshwater Assessment Mitigations • Where the pipe comes close to (< 30m) a wetland or watercourse, the specifications for the pipe trenches should aim to minimise the footprint of construction (e.g. the shallower the pipe, the narrower the disturbed area). • Sensitive ecosystems must be demarcated prior to any construction activities, so that these can be avoided, unless construction is taking place within the boundaries of a wetland or watercourse. • Removal of indigenous vegetation should be kept to a minimum, and refilled trenches must be rehabilitated after construction. Refer to Section 8.9 for rehabilitation plan and guidelines (Note: Areas under cultivation where the Wynland pipeline is removed can be returned to cultivation). • Where the access road will be re-aligned through the valley-bottom wetland in lower Aquatic Ecosystem 3, the old road footprint (current access road to County Fair) must be rehabilitated, to the guidelines provided. A total of 1636m² of wetland and	barriers should be spaced at 24m intervals and extend a minimum of 0.5m past the sides of the trench profile, and up to rock level or a minimum of 0.5m deeper than the trench bottom (whichever comes first). • At all road crossings over aquatic ecosystem 3, the natural surface flow of water should be accommodated in several pipes or wide culverts, in order ensure that flow is not concentrated downstream of the crossings. • The impacted footprint of the pipeline and road should be kept to a minimum in close (< 30m) proximity to all wetlands and watercourses, e.g. by reducing the depth to which the pipes are laid, where possible. • Mowing or clearing of the pipeline or road servitudes of vegetation must be kept to a minimum. 2023 Biodiversity Assessment Requirements: • The applicant (CoCT Bulk Water) must provide all necessary funding for all the required mitigation (including ongoing site management) and must transfer management responsibility and all necessary funding for the 5.5ha conservation area (See Figure 5) to the CoCT Environmental Management Branch, within three months of any project approval. • The 1ha of currently cultivated or fallow area north of the road that has been expropriated must be rehabilitated to local indigenous Renosterveld vegetation as soon as possible, and should form part of the main drainage line conservation area.

Discipline	Design Phase	Construction Phase	Operational Phase
		700m² of riparian habitat will be lost, and 1119m² gained. Additional rehabilitation of the wetland (such as shaping of the erosion gullies in the wetland) and watercourse (such as stabilising erosion and re-planting with indigenous plant species) will achieve the balance required, such that there will be no residual loss. • The specifications for the relocated pipe trenches should aim to minimise the footprint of construction (e.g. the shallower the pipe, the narrower the disturbed area) where the pipe comes close to (< 30m) a wetland or watercourse, and sensitive ecosystems should be demarcated prior to any construction activities, so that these can be avoided, wherever possible. • Special care should be taken around storm and heavy rain events. The construction sites should be inspected for erosion damage at these times. • Consideration should be given at the design phase to remedial shaping of banks to their near-natural slope, geomorphological and bed characteristics and re-vegetated after clean-up. • Banks and slopes should be re-vegetated after construction is completed. A detailed planting plan should be developed, in consultation with a landscaper and ecologist. • If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural aquatic ecosystem. • • Disruption of flow should be kept to a minimum, but where necessary, temporary diversion measures should allow flushing of the system to prevent build-up of material. • Diversion techniques should take measures to limit erosion from temporary channels into watercourses or wetlands. • No obstructions to flow shall remain in the watercourses or wetlands after construction is completed. • Temporary diversion channels must be rehabilitated. • All building materials must be stored away (at least 15m) from all aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction. • Materials should be stored in piles that do not exceed 1.5m in height and should be protected from the wind, to prevent spread of fine materials across the site. • Sensitive areas that are impacted by the dumping or storage of materials must be ripped and re-planted after construction is complete. • The pipeline contractor should work the relocated Wynland pipeline route in sections, backfilling as they go, which will reduce the width of disturbed area – i.e. it is not as necessary to spread the spoil wide, if it can spread along a greater length. • Washing of vehicles and machinery should take place well away (50m) from aquatic ecosystems. • Machinery prone to oil or fuel leakage must be located at least 50m away from any aquatic ecosystem, and the area adequately bunded in order to contain leakages. • Water pumps and cement mixers shall have drip trays to contain oil and fuel leaks –	

Discipline	Design Phase	Construction Phase	Operational Phase
		these must be cleaned regularly. • Concrete batching must be done well away from (50m minimum) from all sensitive environments. • All machinery should be regularly checked for leaks. • Suitable toilet and wash facilities must be provided to avoid the use of sensitive areas for these activities. These service areas must be maintained, and toilets emptied on at least a weekly basis. • If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem. • Pathways and temporary access roads must be routed around the wetlands and should cross drainage channels as seldom as possible. • Sensitive areas must clearly be demarcated and fenced off (using temporary fencing and danger tape) before any construction work or site preparation begins. These are no-go areas during the construction process. • Affected areas must be ripped and re-planted after construction, according to the specifications set out in the CEMPr, and to the satisfaction of the ECO. • The construction sites and pathways must avoid sensitive areas. If lights are used, these must be directed away from all sensitive areas. • The sensitive areas (i.e. the edges of the buffers around the wetlands, watercourses) not affected by construction must clearly be demarcated and fenced off (using temporary fencing and danger tape) before any construction work or site preparation begins. These are no-go areas during the construction process, except where work is occurring. • In situ soils must preferably be used for rehabilitation of construction sites. • Where in situ soils are insufficient, top soils used after construction must be bought from reliable sources, and must be free of alien seeds or grass runners. • Constant monitoring of the construction sites by the Site Engineer and ECO must occur, and all alien plant species removed from or destroyed on the site. • 2023 Biodiversity Assessment Requirements: • Relocation of the Endangered plant species recorded in the Very High sensitivity is not the first choice, as the adult plants are very unlikely to survive, but an attempt should be made to take seed (in April/May) and cuttings (April/May), and an effort must be to translocate all the live plants (April/May) of <i>Athanasia capitata</i> from within the approved development footprint to nearby similar but secure habitat. As the Medium and Very High sensitivity habitat may support various other plant Species of Conservation Concern (SoCC) the city of Cape Town (CoCT) Environmental Management Branch staff should undertake Search and Rescue in the approved development footprints on at least two occasions in the appropriate seasons (July – late September) prior to any earthmoving on site. • During construction an ECO must ensure that no animals are trapped in the construction and pipeline trenches, and remove any that are. These should be checked every morning before work starts. Trenches should be infilled as soon as	

Discipline	Design Phase	Construction Phase	Operational Phase
		possible.	
Agricultural impact management	Compensation for expropriated land and lost production shall be finalised prior to construction.	Measures to reduce dust production and dispersal shall be included in a method statement submitted by the contractor.	
Heritage	- The pipeline route should: - Be above the valley floor . - Be separated from public scenic road edges by vineyards or other relevant planted agricultural land. - Avoid running alongside scenic drive edges. - Avoid crossing tree-lined main approach avenues. - Be set back a minimum 5 m from tree canopy drip lines where running parallel with, and adjacent to, belts of trees. - Be separated from private roads by planted tree. - Be set back a minimum 10 m from the edge of a river or watercourse - Be laid below watercourse and stream beds. - Run close to and preferably on the southern side of the (disused) railway embankment running along the valley. - Follow existing vineyard and other agricultural boundaries wherever possible, particularly where farm service roads are already in existence. - Avoid bisecting or encroaching on vineyards. - Avoid the use of obtrusive service structures.		
Archaeological		- The burial/cemetery site on the Farm Simonsvlei alongside the Klapmuts Road is a no-go area and shall be demarcated as such. - Should any unmarked human remains be disturbed, exposed or uncovered during	

Discipline	Design Phase	Construction Phase	Operational Phase
		excavations and earthworks for the proposed project, these shall be reported to the South African Heritage Resources Agency and not be disturbed or removed without official approval.	

Summary of mitigations and recommendations for the reservoir and WTP

Discipline	Design Phase	Construction Phase	Operational Phase
Stakeholder engagement and facilitation	- A Community Liaison Forum shall be established prior to construction commencing. - A single Community Liaison Forum shall provide an information sharing function for both the pipeline construction and the construction of the WTP and associated infrastructure. - The Terms of Engagement and responsibilities shall be documented and approved by the applicant. - The Terms of Engagement shall cover two phases and the different activities attendant on the two phases: the construction phase and the operational phase.	- The Community Liaison Forum will negotiate the construction roll-out with affected landowners prior to construction commencing. - Road closures, movement of abnormal load vehicles, land acquisitions and other activities that would affect general public will be communicated via the Community Liaison Forum and local newspapers. - The Forum shall: - Be an information-sharing portal - Serve as a monitoring organisation - Serve as a portal for stakeholder feedback and response.	- The Community Liaison Forum shall change function and become a liaison forum for the operational phase. The Forum shall: - Be an information sharing portal - Serve as a monitoring organisation - Serve as a portal for stakeholder feedback and response.
Biophysical (terrestrial and freshwater ecology)	- The WTP and associated infrastructure design shall: - Minimise the footprint. - Move the proposed access road 30m to the east to avoid the Renosterveld remnant.	- Construction shall: - Be planned in collaboration with a restoration ecologist to ensure that activities do not occur during construction which will limit post-construction rehabilitation. - Take place in the dry season to minimise impacts of blasting and bulk earth moving. - Limit stream flow disruption. Temporary diversions to be designed to flush sediment accumulations. Crossings to occur in late summer or when the streams are dry. Bank erosion must be prevented. All diversions to be removed once construction has been completed. Post-construction rehabilitation to be signed-off by the restoration ecologist. - Soil disturbance shall be kept to a minimum. - Removal of vegetation shall be kept to a minimum. - Exposed soil shall be protected from erosion. - Construction areas shall be restored to the natural slope and geomorphology through rehabilitation. - Exposed soil shall be revegetated as soon as construction has ceased. - Post-construction rehabilitation to be signed-off by the restoration ecologist.	- The freshwater ecology shall be preserved by: - Conducting continuous effluent quality testing. - Discharging treated effluent only when it meets requirements of the DWA General Authorisation 399 (March 2004). - Conducting annual monitoring of affected freshwater ecosystems – this should include testing for nutrient levels (at least orthophosphates and nitrates, and chlorophyll-a (as algal biomass). - Irrigating effluent away from sensitive environments, especially watercourses and wetlands. - Implementing a scheduled maintenance program for the treatment package plant. 2022 Freshwater Assessment Mitigations - The geomorphological characteristics (shape, gradient, slopes) of the impacted ecosystems must be re-instated after construction – this will reduce the likelihood of increased erosion or sedimentation. - If it is necessary to stabilise the watercourse or wetland bed or banks with gabions or rip rap, these should be kept to a minimum, and should be done in

Discipline	Design Phase	Construction Phase	Operational Phase
		- Rare and endangered plants are to be fostered. - Ecologically sensitive areas shall be demarcated and maintained as no-go zones. - All invasive aliens to be removed within 100 m either side of the pipeline where indigenous vegetation or riparian areas are affected. - A restoration ecologist shall be contracted to conduct a search and rescue of rare or endangered plants along the route of the pipeline in late winter/ spring (at least twenty plants of the rare <i>Athanasia capitata</i> associated with Area BA4 would have to be relocated). - A nursery is to be established to care for the rescued plants. - The rescued plants shall be replanted under the supervision of a restoration ecologist once construction has been completed. - Post-construction rehabilitation to be signed-off by the restoration ecologist. - Topsoil to be removed and stockpiled for replacement during post-construction rehabilitation. - Topsoil stockpiles to be protected against wind and rain dispersal. - Any topsoil run-off to be trapped and re-stockpiled. - No stockpile run-off may be permitted to enter any watercourse. - Watercourses shall be protected from contamination: - All building materials should be stored away (at least 50 m) from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff to watercourses. - If construction areas are to be pumped of water (e.g. after rains), this water shall be routed via a settlement area and not directly to a watercourse. - Vehicle and plant washing shall take place at least 50 m from watercourses and any effluent water contained and treated prior to discharge to the watercourse. - No run-off from construction areas may be permitted to enter any watercourses unchecked. Any chemical or fuel spills shall be contained and cleaned immediately to prevent contamination of water courses. 2022 Freshwater Assessment Mitigations - Disruption of flow should be kept to a minimum, but where necessary, temporary diversion measures should allow flushing of the system to prevent build-up of material. - Diversion techniques should take measures to limit erosion from	an ecologically sensitive manner. For example, gabions could be top-soiled to allow for the establishment of vegetation, which would also serve the purpose of reducing erosion. - Mowing should not be more frequently than annually. - Vegetation within the pipeline servitudes should be allowed to recover (in some cases, re-planted), within the constraints of ongoing maintenance of the pipeline. - Ongoing monitoring of the pipeline and WTP site and associated infrastructure should be implemented (part of the ongoing EMP) in order to ensure that exotic plant species are not introduced or become established due to the disturbance.

Discipline	Design Phase	Construction Phase	Operational Phase
		temporary channels into watercourses or wetlands. • No obstructions to flow shall remain in the watercourses or wetlands after construction is completed. • Temporary diversion channels must be rehabilitated. • All building materials must be stored away (at least 15m) from all aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction. • Materials should be stored in piles that do not exceed 1.5m in height and should be protected from the wind, to prevent spread of fine materials across the site. • Sensitive areas that are impacted by the dumping or storage of materials must be ripped and re-planted after construction is complete. • Washing of vehicles and machinery should take place well away (50m) from aquatic ecosystems. • Machinery prone to oil or fuel leakage must be located at least 50m away from any aquatic ecosystem, and the area adequately bunded in order to contain leakages. • Water pumps and cement mixers shall have drip trays to contain oil and fuel leaks – these must be cleaned regularly. • Concrete batching must be done well away from (50m minimum) from all sensitive environments. • All machinery should be regularly checked for leaks. • Suitable toilet and wash facilities must be provided to avoid the use of sensitive areas for these activities. These service areas must be maintained, and toilets emptied on at least a weekly basis. • If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem. • Pathways and temporary access roads must be routed around the wetlands and should cross drainage channels as seldom as possible. • Sensitive areas must clearly be demarcated and fenced off (using temporary fencing and danger tape) before any construction work or site preparation begins. These are no-go areas during the construction process. • Affected areas must be ripped and re-planted after construction, according to the specifications set out in the CEMPr, and to the satisfaction of the ECO.	

Discipline	Design Phase	Construction Phase	Operational Phase
		- The construction sites and pathways must avoid sensitive areas. If lights are used, these must be directed away from all sensitive areas. - The sensitive areas (i.e. the edges of the buffers around the wetlands, watercourses) not affected by construction must clearly be demarcated and fenced off (using temporary fencing and danger tape) before any construction work or site preparation begins. These are no-go areas during the construction process, except where work is occurring. - In situ soils must preferably be used for rehabilitation of construction sites. - Where in situ soils are insufficient, top soils used after construction must be bought from reliable sources, and must be free of alien seeds or grass runners. - Constant monitoring of the construction sites by the Site Engineer and ECO must occur, and all alien plant species removed from or destroyed on the site.	
Agricultural impact management	Compensation for expropriated land and lost production shall be finalised prior to construction.	Measures to reduce dust production and dispersal shall be included in a method statement submitted by the contractor.	
Visual	- The visual impact of the WTP infrastructure shall be mitigated by: - Blending and varying colours and textures to fit in with the existing environment. - Grading earth embankments to the proposed reservoir into the natural contours. - Landscaping the WTP premises to blend with the surrounding environment. - Ensuring that only essential security lighting is used and that it faces away from the perimeter. - Employing sustainable design elements such as: - Using renewable and natural materials and elements where possible, as well as recycled and reconstituted materials.		

Discipline	Design Phase	Construction Phase	Operational Phase
	- Using locally produced, as opposed to imported materials. - Planning construction and finishing to limit repainting/re-finishing intervals; and replacement and repair costs.		
Heritage		Local labour to be used wherever practical.	
Archaeological		- The burial/cemetery site on the Farm Simonsvlei alongside the Klapmuts Road is a no-go area and shall be demarcated as such. - Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these shall be reported to the South African Heritage Resources Agency and not be disturbed or removed without official approval.	

Additional mitigation measures to be implemented (quoted verbatim from EIR)

Construction Phase Impacts

The following general construction related impacts were identified in the EIR. These impacts will have a low significance as they will be temporary in nature, will occur at a local extent and will be managed to acceptable levels through the implementation of an EMP:

Construction Campsite Impacts

Impacts associated with an increased number of workers on the site such as the generation of waste and sewage on site which has the potential to cause soil and water pollution will be mitigated with standard EMP specifications. Awareness raising and training of workers to comply with on-site rules relating to solid waste disposal, use of toilets etc. will be undertaken.

Impact Associated with Concrete Works

Concrete works have the potential for contamination. Therefore, careful measures would have to be introduced to prevent contamination of surrounding areas. Such measures could include cut-off channels and temporary ponds. It would also be a requirement that all wastewater resulting from batching of concrete, runoff emanating from batching areas, and the cleaning of equipment and flushing of mixers shall be disposed of via the wastewater management system.

Noise

Noise associated with standard construction activities such as the transportation of building materials and equipment, and the construction of the bulk water infrastructure will occur. The EMP would make specific provisions regarding the limiting of noise output levels. Given that the sites are fairly remote from large receptor groups, this temporary impact should be of even less consequence. However to ensure that noise impacts to the surrounding farming community are kept to reasonable limits, this aspect will be monitored.

Dust

Since a large part of the construction activities and the transportation of construction materials and plant would take place in close proximity to vineyards, orchards and residential and commercial buildings, particular care would have to be taken in respect of dust control, especially in the summer months. Dust suppression measures will be included in the EMP.

Stormwater Impacts

Stormwater runoff from the construction site, temporary access routes and upstream areas draining onto the construction site would have to be carefully controlled to minimise erosion, sedimentation and contamination of adjacent land and watercourses. Measures to minimise such impacts could include the construction of temporary ponds on-site to detain runoff, cut-off trenches and the implementation of silt traps. The protection of topsoil which is temporarily stockpiled is of particular importance within the agricultural areas.

Accidental Spillage of Chemicals/Fuels on Site

The EMP will include measures for the safe storage, handling and disposal of chemicals and fuels on site.

Blasting

Should blasting activities need to be undertaken, strict controls in this regard according to standard practice will be adhered to.

Impact on private property access

Temporary access routes across private properties would be negotiated with landowners during the detail design stage, but it would be endeavoured to limit the number of access points as far as practically possible in order to minimise the impact on the affected landowners. It is foreseen that full-time access to certain parts of affected properties might not be possible as a result of the construction activities. However, temporary or alternative access routes would be negotiated with each landowner to ensure that critical access routes are not cut off without the consent of the landowner.

Interruption of existing services

A large number of existing services, i.e. irrigation, Telkom and electricity lines, would be affected as a result of the construction activities. Some of these services are critical to the operation and safety of farms, residences, etc. It would be endeavoured to identify all services affected before construction commences by means of electronic detection devices and/or hand excavation in conjunction with the affected landowners. Further to this, the timing and the extent of the disruption to services as well as the provision of temporary services, where required, would be negotiated with the affected landowners in conjunction with the relevant authorities, e.g. Telkom.

Traffic Impacts/Interruptions

Where pipelines need to cross-existing roads and highways, interruptions to traffic flow can be anticipated.

(a) Impact on National Roads

The proposed pipeline routes cross the N1 in a number of locations and connections need to be made to the Wemmershoek pipeline, which is located in the median of the N1, in the Muldersvlei area. The N1 is under the control of the South African National Road Agency Ltd (SANRAL). The SANRAL has indicated that open trench excavation across the N1 is not allowed and therefore pipe jacking would have to be utilised. However, where connections need to be made to the existing Wemmershoek pipeline, it is expected that some encroachment onto the roadway is unavoidable.

(b) Impact on Provincial Roads

Apart from the N1, all of the other pipeline crossings across major access roads would be across roads under the jurisdiction of the Roads Infrastructure Branch of the Provincial Department of Transport and Public Works. This Department has indicated that through-traffic must be provided as far as possible on all paved roads. One-way traffic is, however, allowed on gravel roads.

(c) Impact on Railway lines

All railway lines would have to be crossed by means of pipe jacking, unless permission is obtained from Spoornet at the detail design stage to use open cut excavation in the case of disused railway lines.

- Traffic accommodation measures would need to be formulated during the detail design stage of the project and in consultation with traffic law enforcement. This should form part of a traffic management plan to be included for this phase of the development.
- The requirements of SANRAL, the Department of Transport and Public Works and Spoornet must be satisfied.
- Appropriate signage will need to be erected to warn road users where traffic interruptions are to take place and speed control measures will need to be enforced where appropriate.

Increased traffic on farm roads

There will be more traffic on farm roads associated with the construction activities, however, the implementation of speed control measures and other safety controls such as flag men on site will mitigate impacts to acceptable levels.

Influx of work seekers on site

A clear recruitment strategy will need to be implemented with a recruitment office based off-site, e.g. in Klapmuts, to avoid this impact.

Labour shedding to the WTP and reservoir

Landowners have expressed the concern that permanent staff on their farms may decide to seek employment at the WTP and reservoir. The concern is that the farm may be required to house people who are no longer in its service and provide additional housing for new workers it will have to employ as replacements. In terms of the ESTA, tenured workers no longer in service may not be evicted from the property. This concern will need to be addressed by affected property owners in collaboration with the CCT.

Local employment opportunities

The project would present the opportunity for the creation of employment opportunities. These opportunities could be beneficial to local communities such as Klapmuts, provided preference is given to the local community. A total of roughly 1 180 person years of labour (i.e. 1 180 jobs of one year duration each) would be required for the establishment phase, implying a relatively high intensity impact over the establishment phase at the local level. Impacts for the local area would be of a moderate to high positive significance during construction, regardless of which site is chosen.

Mitigation

Source as many workers from the local area, such as Klapmuts, as possible. Targets should preferably be set for how much local labour should be used, based on the needs of the proponent and the availability of skills. Contractors that tender for work should also be required to meet targets for how many locals are given employment.

Version 1: October 2009

Section One: To be completed by the person reporting the incident

Name		Designation	
Contact number		Physical location of incident	

Was there damage/ contamination of any of the following? (Tick the appropriate box)

Potable water supply		Storm water		Ground water	
Air		Soil		Roadways	

XV

Has the damage/ contamination been completely remediated?	
If not, what residual damage remains (detail the residual damage).	
If residual damage remains- what is the reason and what is planned with respect to the environmental damage. CoCT must counter sign this form in this event before it can be closed. (see below)	
Upon investigation, what was found to be the cause of the incident? (Detail)	
Is this a repeat of a similar incident?	
What is the reason that planned changes did not prevent a recurrence of the incident?	

What is to be changed to ensure that the incident will not be repeated? (Detail)	
Section Two: To be completed by the ECO	
Does the incident comprise a contravention of legislation?	
What action has been taken?	
In the opinion of the ECO is the remediation action sufficient?	
If not, what further actions must be taken? (detail)	
Have all the required and appropriate actions been taken to the satisfaction of the ECO?	
Have all parties signed the incident form?	

Date

Contractor

Date

ECO

Date

CoCT (if required)