ENVIRONMENTAL MANAGEMENT PLAN

FOR THE

PROPOSED MURURANI DROUGHT RELIEF PROJECT

KAVANGO WEST REGION

JULY 2023

Date

July 2023

Prepared by:

NamWater, Private Bag 13389, Windhoek, Namibia

Contact Person: J. Kamburona

Tel: +264-6171 2105

Email: KamburonaJ@namwater.com.na

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BS	British Standards
CoC	Code of Conduct
DEA	Department of Environmental Affairs
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act 7 of 2007
EMP	Environmental Management Plan
HDPE	High-Density Polyethylene
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Parties
km	kilometer
kV	kilovolt
kVA	kilo (Volt X Amps)
PPE	Personal Protective Equipment
MAWF	Ministry of Agriculture, Water, and Forestry
m	meter
mm	millimeter
MEFT	Ministry of Environment and Tourism
mwh	Megawatt Hour
NAMWATER	Namibia Water Corporation Ltd
STI's	Sexually Transmitted Infections
TB	Tuberculosis

GLOSSARY OF TERMS

Concrete Batching - mixing and production of concrete.

Contractor: an agent of company procured by NamWater to undertake construction developments.

Environmental management Plan: A document drafted to manage environmental impacts during construction, operation and decommissioning phases.

Interested and affected parties (I&AP): Persons or group of people, organization, institution that are directly or indirectly affected by the proposed development.

Environmental Impact Assessment (EIA): The continuous method of assessing adverse effects of development on the environment.

Monitoring: Inspection of construction activities on the social and environmental spheres.

Water Supply Scheme (WSS): A collection of NamWater transportation infrastructure aimed at providing potable water to specific communities or industrial areas.

1. INTRODUCTION

NamWater intends to construct a bulk water supply pipeline, and a powerline in order to increase water supply to Mururani Settlement. The project aims to augment water supply to the Mururani Settlement by connecting the new boreholes.

This Environmental Management Plan (EMP) has been compiled for the management of potential environmental impacts during the construction, operation, and decommissioning phases of the proposed Mururani Drought Relief Project. The best practice is proposed for the generic issues of construction management and supervision as well as the ongoing management and operation of the Mururani/Rundu Gate Water Supply Scheme.

In terms of the Environmental Assessment Policy of 1994 and the Environmental Management (Act No 7 of 2007) (EMA) and its regulations, the activities required for the construction of the proposed project require authorization from the Directorate of Environmental Affairs at the Ministry of Environment, Forestry and Tourism (MEFT: DEA).

This EMP provides:

- Strategies and plans to manage environmental impacts identified through the application of best practices to avoid, reduce or mitigate potential adverse impacts to minimal of insignificant levels.
- Measures that could enhance positive impacts.
- Information required to ensure adherence to legal requirements.
- Strategies to maintain good community relationships.
- A method for auditing and monitoring implementation and operation of recommended measures, thereby ensure compliance with the EMP.
- Assignment of responsibilities with regard to measures to be implemented.

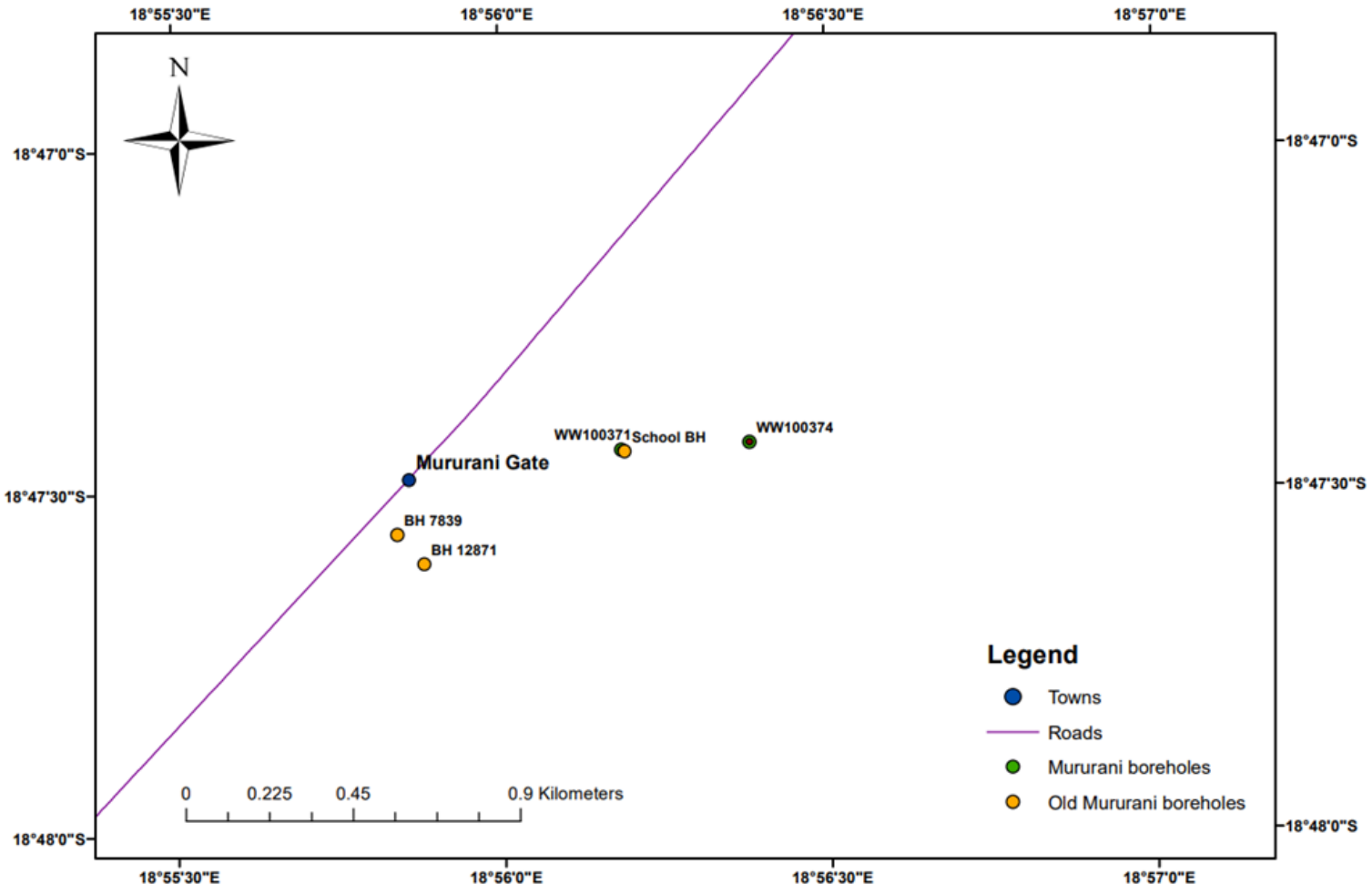


Figure 1: Mururani Location Map

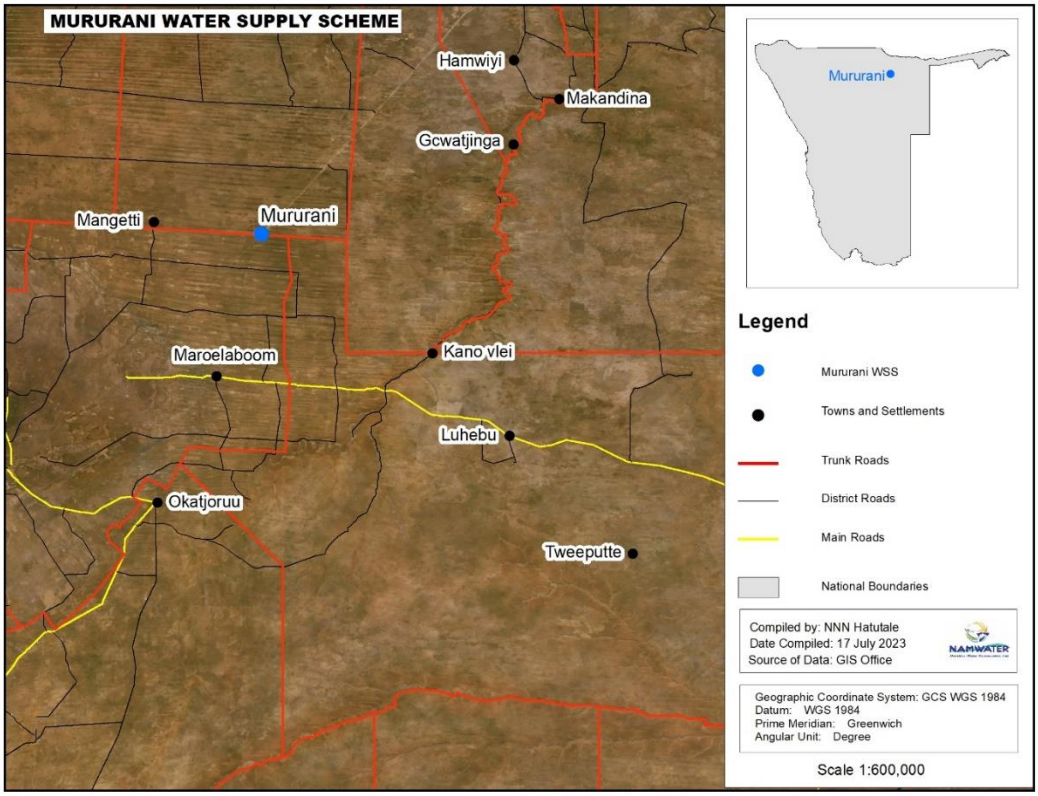


Figure 2: Mururani locality

2. DESCRIPTION OF THE EXISTING MURURANI WATER SUPPLY SCHEME

The Mururani scheme consists of:

- Two production boreholes from where water is pumped through 80 mm diameter FC pipes into an elevated reservoir. The two production boreholes are installed with submersible pumps, and they are housed in two brick buildings with a concrete roof slab for protection.
- A two 80 mm NB diameter FC pipelines, totalling 300 m in length, convey water from the borehole installations to the elevated reservoir. The maximum capacities of the pipelines have been estimated to be 18 m^3/h.
- A pressed steel elevated reservoir, with a nominal capacity of 100 m^3 (6x5x2 panels) is mounted on a 15 m high steel tank stand.
- The type and make of the submersible pumps installed could not be determined, but it was indicated by the scheme operator that the pump in borehole 7839 can deliver 5.9 m^3/h 100 mWH, while the pump in borehole WW12871 can delivers 5.5 m^3/h at 100 mWH. Electrical power to the borehole pumps is supplied from two 50 kVA standby generators, one for each pump.

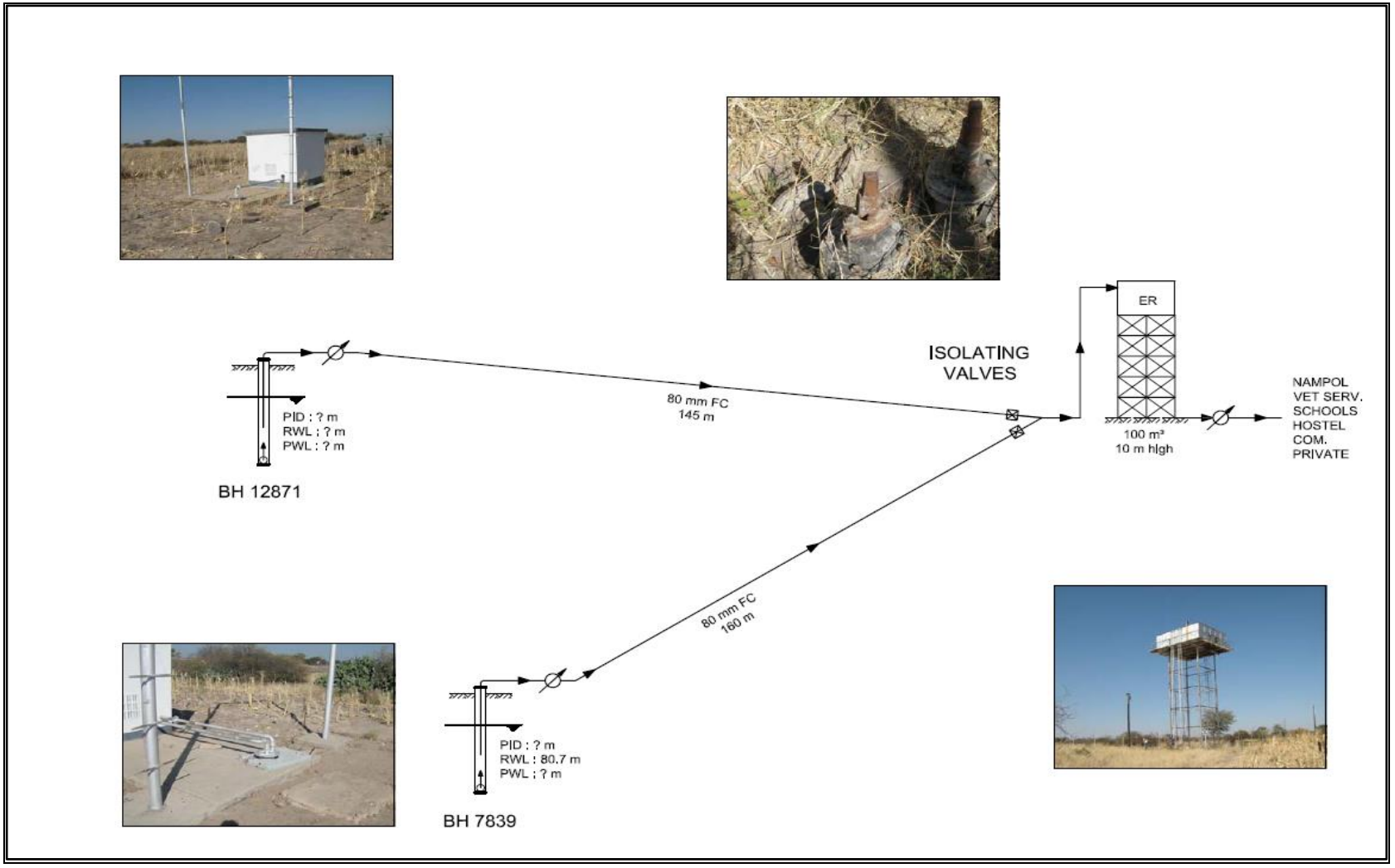


Figure 3: Existing Infrastructure

3. PROPOSED PROJECT DEVELOPMENT

NamWater intends to construct a bulk water supply pipeline, and a powerline in order to increase water supply to Mururani Settlement. The project aims to augment water supply to the Mururani Settlement by connecting the new boreholes.

The settlement is facing water shortages due to inadequate supply from current production boreholes because of an increasing water demand. The capacity of existing boreholes is inadequate to meet the demand and the schemes need augmenting with additional water resources. It is against this background that additional two production boreholes were drilled with an aim to meet the current demand and improve the water supply security at Mururani settlement.

3.1 Scope of Work

The proposal works is aimed at addressing the need and desirability of the project. The proposed works entail the following:

- The proposed development involves the connection, equipping, and powering of two drilled boreholes.
- The construction of a ±1.3 km belowground pipelines (Figure 6). The pipeline will connect the two drilled boreholes to the elevated reservoir in Mururani.
- The construction of a 25kVA, 400V AC 3 phase power line to power the pumps at the new boreholes. The power line will be connected to the nearest NamPower supply point.

3.1.1 Installation and commissioning of existing boreholes

The two existing boreholes WW100371 and WW100374 were drilled but not installed. It is believed that once these two boreholes are installed and commissioned, their added capacities will be enough to cater for the future.

Figure 4: Drilled boreholes WW100371 and WW100374

3.2 Construction of the new pipeline

A new pipeline will be constructed to connect the new boreholes WW100371 and WW100374 to the elevated reservoir in Mururani. As such, different alternatives were identified during the project planning stage and assessed during the EIA study and recommendations were made for the most suitable alternatives as described below.

3.2.1 Alternative pipeline routes

As depicted in Figure 6 below, two pipeline routes (red and blue) are being considered:

1. Pipe Route 1 (in red) – has a total length of about 1 290 m (1.3 km) and passes through the Veterinary Cordon Fence (Red line).
2. Pipe Route 2 (in blue) – has a total length of about 1 350 m (1.35 km) and goes around the Veterinary Cordon Fence (Red Line) to the Elevated Water Tank.

The preferred pipeline route is **Route 1** as the route has minimum obstruction and is shorter with 500 m.

3.2.2 Pipeline development options

i. Above ground vs below ground pipeline

The two alternative options were assessed whether to construct the proposed pipelines above or below ground. The pipeline replacement from boreholes WW100371 and WW100374, to the elevated reservoir will be buried at the depth of approximately 0.6 m, next to the existing pipeline.

ii. Pipeline material

The preferred pipe material for the below ground pipeline is High Density Polyethylene (HDPE). The pipes will be a 110 PN12.5 HDPE.

3.3 Proposed Power Line

A 25kVA, 400Vac 3 phase power supply point will be connected to the existing NamPower grid. Power will be articulated to the borehole by overhead power lines. Please see **Figure 5** below indicating a typical 11kV line. Power line support structures (wooden poles) will be spaced approximately 100-120 m apart and will be 9 m above ground surface.

A servitude with a width of 30 m will be registered for the power line. The proposed 11kV power line to the borehole will cover approximately the same length i.e., 1.3 km as the pipeline. The proposed power line route is subject to change based on the final route to be submitted by NamPower.

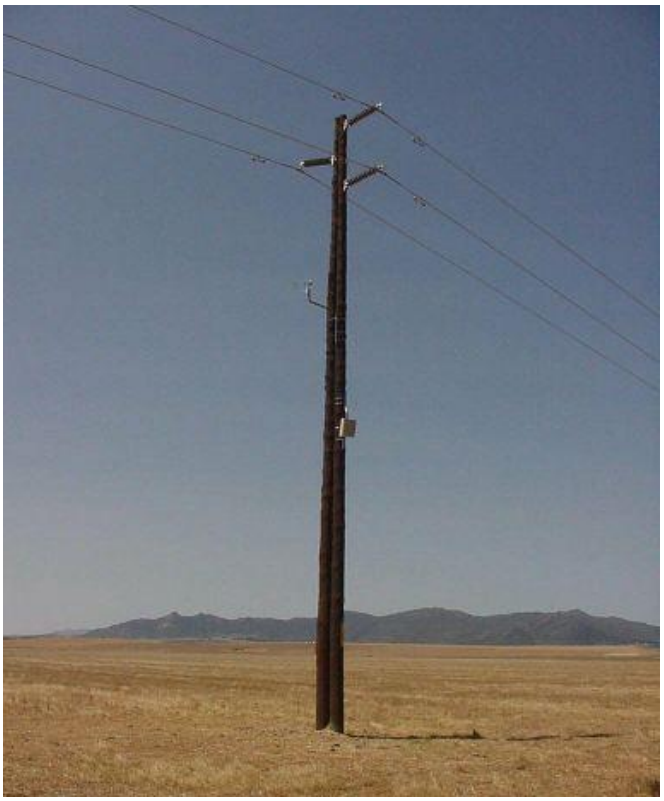


Figure 5: Typical 11kV power line

3.4 Resource Requirements

3.4.1 Source of construction materials

The required HDPE pipeline materials will be imported from neighbouring countries, whereas most of the construction materials i.e., sand, cement, gravel, stone, etc. will be sourced locally.

3.4.2 Electricity consumption and requirements

A 25kVA, 400V AC 3 phase power supply points will be applied for via NamPower to power the pumps at the new boreholes. Details of the power line route are presented in Section 3.3 above.

3.4.3 Workforce requirement during construction

The exact number of temporary jobs to be created during the construction phase is not yet known, however, a project of this nature is expected to create between 40-50 temporary job opportunities. Secondary job opportunities will also be created in the town through supply and delivery of construction materials.

3.4.4 Workforce requirements during operation

The Mururani/Rundu Gate Scheme is currently operated by an Operator based in Mururani, who oversees metering, pumps, and water treatment. The Operator reports to the scheme superintended based in Rundu and is provided with technical assistance from the NamWater officials based in Rundu.

Figure 6: Proposed Pipeline Route

4. ENVIRONMENTAL MANAGEMENT PLAN

A copy of the EMP should be kept at the site office and the Resident Engineer (RE) should also have a copy as well. An EMP is a dynamic document that is regularly updated as required, it relates to the local natural and socio-environment. The EMP is tailor-made for particular conditions and proposed development. The EMP is valid for all contractors and subcontractors. It is a project-specific plan developed to ensure appropriate environmental management is carried out. The EMP provides for the establishment of a grievance procedure as indicated in Annexure 1. The grievance registration form is also illustrated in Annexure 1.

Monthly audits will be done during the construction phase and more regularly if EMP compliance is not satisfactory. Operational and maintenance audits will be done annually and more frequently if compliance is poor.

EMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated EMP aims and objectives. For an effective EMP, continuous monitoring and auditing is required, and continual improvement of the EMP ensures corrective action is provided.

The project activities are grouped according to the different construction, operation, maintenance and decommissioning stages. Most of the potential impacts can be reduced to insignificant levels through good housekeeping.

The EMP will be ***form part of all Tender and Contract documentation to ensure that the Contractor is aware of his/her obligations and is able to price the implementation of these requirements accordingly***. Failure to comply with these requirements could result in penalties or otherwise the Contractor will be held accountable for any damages arising from irresponsible behaviour or non-compliance with the requirements. This ensures that identified environmental issues receive adequate attention during the planning, construction, and decommissioning phase.

4.1 RESPONSIBLE PARTIES

4.1.1 NamWater

NamWater is responsible for

- Ensuring that the objectives of the EMP are given effect by including it in all contract documentation.
- Ensuring that all environmental impacts are managed in accordance with the EMP.
- Ensuring that all monitoring and compliance auditing occurs in line with the EMP.
- Ensuring that the environment is rehabilitated as far as practical to its natural state or existing land use practices.
- Any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of activities both in and outside the site boundaries.

4.1.2 Contractor

The Contractor is responsible for:

- Appointing a qualified independent ECO.
- Ensuring that the objectives of the EMP are given effect by including it in all contract documentation.
- Ensuring that all environmental impacts are managed in accordance with the EMP.
- Ensuring that all monitoring and compliance auditing occurs in line with the EMP.
- Ensuring that the environment is rehabilitated as far as practical to its natural state or existing land use practices.
- Any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of activities both in and outside the site boundaries.
- Drafting and submission of a monthly environmental monitoring report.

With regard to the above, the Contractor shall conduct his/her activities so as to cause the least possible disturbance to the existing amenities, whether natural or man-made, in accordance with all the current statutory requirements. Special care shall be taken by the Contractor to prevent irreversible damage to the environment. The Contractor shall take adequate steps to educate all members of his/her workforce as well as his/her supervisory staff on the relevant environmental laws and protection requirements. The Contractor shall supplement these steps with prominently displayed notices and signs in strategic locations to remind personnel of environmental obligations.

The Contractor shall construct and/ or implement all the necessary environmental protection measures in each area before any construction work may proceed. The Engineer/ ECO may suspend the Works at any time should the Contractor, in the Engineer/ Eco's opinion, fail to

implement, operate or maintain any of the environmental protection measures adequately. The costs of such suspension shall be to the Contractor's account.

4.1.3 ECO

A suitably qualified independent ECO shall be appointed by the Contractor to undertake the following tasks:

- Liaison with Contractor, Interested and Affected Parties (I&APs); and Engineer regarding environmental matters.
- Monitoring of all of the Contractor's activities for compliance with the various environmental requirements at regular intervals.
- Routine environmental auditing and reporting of the Contractor's performance against the EMP.
- Reporting of environmental incidents and routine reporting of environmental issues associated with construction activities to NamWater, the Contractor and any relevant environmental authority.
- Identifying environmental non-conformances and initiating measures to remedy such issues, including the institution of fines against the Contractor.

4.2 ENVIRONMENTAL AWARENESS

4.2.1 Environmental, health and safety induction course

The Contractor is responsible for informing employees and Sub-Contractors of their environmental obligations in terms of the EMP and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractor shall ensure that all his employees, and those of his Sub-Contractors, attend an environmental, health and safety induction course. This course shall be structured to ensure that attendees:

- Acquire a basic understanding of the key environmental features on the site and its immediate environs.
- Become familiar with the environmental controls contained in the EMP.
- Are made aware of all protected areas and that the trapping, poisoning, and/ or shooting of animals is strictly forbidden. No domestic pets are allowed on site.
- Are informed that natural features (e.g., rock formations) are not defaced or marked for survey or other purposes unless agreed beforehand with the engineer. Furthermore, natural water sources (e.g., streams) are not allowed to be used for

the purposes of swimming, personal washing, and the washing of machinery or clothes.

- Are made aware of the need to conserve water and minimise waste.
- Receive pertinent, written instructions regarding compliance with the relevant environmental management requirements (viz. typical environmental "do's" and "don'ts").
- Are made aware of any other environmental matters as deemed necessary by the Engineer/ ECO.
- Are made aware of the importance of preserving archaeological sites.
- Receive detailed training in site health and safety requirements, emergency responses and site evacuation procedures in terms of the Contractor's health and safety plan.
- Are made aware of NamWater's Code of Conduct.
- Are aware that a copy of the EMP is readily available on site and that all site staff are aware of the location and have access to the document.
- Are aware of the requirements of any approved Method Statements that have bearing on their activities, and where necessary, any specialised training required to ensure compliance with the approved Method Statements has been provided.
- Are informed that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) will be placed at prominent locations throughout the site.

The environmental, health, and safety induction course should be conducted by the ECO and Contractor's Health and Safety officer, who shall provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented. All new staff coming onto site after the commencement of construction activities must also attend the environmental, health and safety induction course, and refresher courses should be undertaken on a quarterly basis. A detailed record of all training sessions, including a list of attendees must be compiled by the Contractor and submitted to the Project Manager on a regular basis.

The initial environmental, health, and safety induction course shall be held within 14 days from the site mobilisation date, and subsequent courses shall be arranged for all new employees arriving after the initial training course, also within 14 days of their arrival.

The Contractor shall provide a suitable venue with necessary facilities and ensure that all employees attend the environmental, health and safety induction course. The course shall be

held in the morning during normal working hours. No more than 30 people shall attend each course and the Contractor shall allow for sufficient sessions to train all personnel. The Contractor shall provide proof of attendance by all of his employees in the form of a signed attendance register.

4.2.2 Toolbox talks

Environmental, health and safety issues specific to each area of the works, shall form part of the daily toolbox talks in each area. These can be short 10 – 15 minute discussions on the environmental sensitivities of the general area and/ or the specific sections that would be worked on, on that day. The foreman responsible will provide feedback to his/her staff on their day-to-day environmental performance and address issues requiring attention and specific actions required. A synopsis of the topics discussed at each area shall be recorded on a register and submitted to the ECO on regular (typically weekly) basis. Environmental matters shall be dealt with in toolbox talks on a regular basis (typically at least once a week).

4.2.3 Safety of the public

The Contractor shall take all reasonable measures to ensure the safety of people in the surrounding area. Where the public could be exposed to danger by any of the Works or site activities, the Contractor shall provide flagmen, barriers, and/ or warning signs in English, all to the approval of the Engineer/ ECO.

All unattended open excavations shall be adequately demarcated (fencing shall consist of orange mesh). Adequate protective measures must be implemented to prevent unauthorised access to the working area. No firearms shall be permitted on site.

The Contractor shall implement appropriate measures to limit any adverse social impacts associated with the accommodation of a construction workforce on the local communities. The following mitigation and management measures are prescribed in this regard:

- Measures to combat HIV/ AIDS and other social ills:
  - NamWater should ensure the health of its employees and their dependants by adopting rigorous health programmes, which should, at a minimum, include programmes to combat HIV/ AIDS and tuberculosis (TB).
  - The Contractor should make HIV/ AIDS and Sexually Transmitted Infections (STI) Awareness and Prevention programmes a condition of contract for all suppliers and Sub-Contractors.
  - The Contractor should provide an adequate supply of free condoms to all workers.
  - A voluntary counselling and testing programme should be introduced during the construction phase and continued during operations.

- Access at the construction site and camp should be controlled to prevent sex workers from either visiting and/ or loitering at or near these locations.

o Measures to prevent crime:
  - Construction workers shall be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags in order to gain access to the construction site.
  - All construction workers shall at all times wear the required Personal Protective Equipment (PPE).
  - The Contractor should establish clear rules and regulations for access to the construction site and offices to control loitering. Consultation should occur with the local Namibian police branch to establish standard operating procedures for the control and/ or removal of loiterers.

o Measures to reduce traffic related incidents:
  - Ensure that road junctions have good sightlines.
  - Transport the materials in the least number of trips as possible, whilst being careful of overloading vehicles.
  - Limit speed both on and off the site.
  - Adhere to the speed limit.
  - Implement traffic control measures where necessary.

4.2.4 Human resource and opportunities management

Job creation, inward migration of workers and accommodation of a workforce within a small community has the potential to result in significant social impacts. NamWater and the Contractor must approach human resource management in a careful, cooperative, and considered fashion so as to enhance the positive impacts, whilst minimising negative impacts associated with construction projects.

Given the location of the Mururani Village, the Mururani community should be given special consideration in terms of the benefits arising from the project. In order to enhance the benefits of employment creation for these communities, it is recommended that the following measures be implemented:

- The Contractor shall establish a formal and organised recruitment process.
- The Contract shall be encouraged to employ local labour (i.e., from Mururani) where possible.
- The Contractor shall be encouraged to recruit Namibian labourers.

- Recruiting by the Contractor must be conducted through a central office and no on-site hiring should be allowed.
- The Contractor shall inform job seekers that they are hired for a contract period only.
- The Contractor shall be encouraged to source construction materials locally as far as possible.
- The Contractor shall be encouraged to make use of local sub-contractors.

4.2.5 Working Times

The Contractor shall restrict construction activities to the hours of 06h30 - 18h00 during summer and 07h00 - 17h30 during winter on Mondays to Saturdays and no work will be permitted on Sundays or public holidays.

4.3 METHOD STATEMENTS

Any Method Statements required by the Resident Engineer/ ECO or called for by the Project Specification shall be produced within such reasonable time as specified by the Engineer/ ECO or as stipulated in the Project Specification. Please refer to **Appendix B** for a generic example of a method statement. The Contractor shall not commence the activity until the Method Statement has been approved, except in the case of emergency activities. The Contractor shall allow the Resident Engineer/ ECO a one-week period for the review and approval of the Method Statement. Such approval shall not be unreasonably withheld.

The Resident Engineer/ ECO may require changes to a Method Statement if the proposal does not comply with the Specification or if, in the reasonable opinion of the Resident Engineer/ ECO, the proposal may result in, or carries a greater risk of, damage to the environment in excess of that which can be tolerated.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract or any other law except where this is specifically stated in the method statement.

Method Statements that shall be provided by the Contractor 14 days prior to the mobilisation on site include:

1. Mobilisation plan, covering:
    a. The location and layout of all offices, storage containers, gates and fences, fuel storage areas and protection bunds, material lay-down areas, ablution facilities,

carpentry areas, hazardous chemical storage facilities, wash bays, workshops and works service and maintenance areas, oil separators and grease traps, storm-water layout, first aid facilities, recess, training, eating and meeting areas, central waste storage areas, access/ haul roads and any other facilities associated with the Contractor's yard.

b. Security and access control to the site.
c. The design and location of all waste storage facilities, in particular the central waste storage area.
d. The central waste storage area shall include separate, weatherproof, water-tight vessels/ skips for the disposal of hazardous waste and contaminated soil recovered during spills and for general waste respectively.
e. The system of collection and disposal of wastes, including the name and location of the point of final disposal, to an appropriate landfill site.
f. Initiatives for the control and recovery of litter on and around the Site and Contractor's yard.
g. Fuels and fuel spills: Methods of refuelling vehicles and details of methods for fuel spills and clean-up operations.
h. Sedimentation and Erosion Control: Sedimentation and erosion control of bulk earthworks and the management of sediment into rivers.
i. Stormwater management: Provisions to manage stormwater during the construction phase.
j. Method of undertaking blasting.

2. Operational and rehabilitation plan, covering:
    a. Procedure for grubbing of the works and handling, stockpiling and disposal of the debris arising from the excavation operations.
    b. Measures to be used to protect the topsoil stockpiles against contamination or erosion.
    c. Measures used to protect cleared areas from erosion, windblown dust and suspended solid contaminated runoff.
    d. Method to be used for backfilling, shaping, spacing and shape of erosion protection berms and the redistribution of stockpiled topsoil (care to be taken that topsoil is not over diluted with sub-soil).
    e. Control of alien invasive species. It is encouraged that concurrent rehabilitation practices are used where possible.

4.4 ENVIRONMENTAL CONSIDERATIONS PERTAINING TO SITE LAYOUT

4.4.1 Employee eating and recess areas

The Contractor shall identify a suitable area, which is shaded and away from construction noise and dust, where employees can eat and take work recesses in relative comfort. The eating areas shall be provided with scavenger proof rubbish bins which are to be emptied into the central waste storage vessel/ skip daily. Potable water and other sanitary conveniences shall also be located within reasonable range of the designated eating area. The Contractor shall prevent his employees from eating or recessing anywhere else but in the designated eating area.

4.4.2 Security Guards

Security guards that would look after construction equipment, materials and plant at night time shall not be allowed to leave the construction yard. They must be provided with an office to shield them from the weather. They shall be bound by the conditions contained in this EMP. Security guards must therefore be made aware of the conditions of the EMP, especially with relation to no-go areas, fires on site (refer to chapter 4.4.10.7), health and safety and protection of fauna and flora (refer to section 4.5).

4.4.3 Ablution facilities

Temporary/ portable toilets shall be supplied by the Contractor for the workers at a minimum ratio of 1 toilet per 15 workers and be within walking distance of the work area. The toilets shall be placed at appropriate locations to the approval of the Engineer/ ECO. The toilets shall be located along the pipeline route as construction takes place, but not closer than 50m to water resources (e.g. vegetated drainage lines). Toilets shall not be located in depressed areas where they may be subject to flooding. Toilets shall be kept in a good state of repair and shall be serviced at intervals sufficient to ensure that they are kept in clean and sanitary condition. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. Discharge of waste from toilets into the environment is prohibited. Each toilet shall be stocked with toilet paper at all times. All toilets shall be secured to the ground to ensure that they do not overturn during high winds or for any other reason.

Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited, other than at the facilities provided.

4.4.4 Site division and site demarcation

The Contractor shall restrict all his activities, materials, equipment and personnel to the designated Site (as must be indicated on the mobilisation plan – refer to section 4.3). “No-go” areas shall be demarcated using either danger tape or orange mesh. All areas outside of the demarcated site shall be deemed as “no-go” areas for all construction personnel and equipment.

The Contractor shall ensure that the clearance of vegetation (if required) is restricted only to that required to facilitate the execution of the works. Non-conformances related to over-clearance of vegetation shall be regarded as a serious offence and dealt with to the full extent of these specifications. A preventative approach to rehabilitation is emphasised, site clearance shall occur in a planned manner, over- or accidental clearance will be prevented.

The Contractor shall peg the route for the proposed pipeline before commencing with any clearing operations. These demarcations shall be used by the clearing teams as a guide to control and prevent accidental over clearance of vegetation. No clearing of vegetation will commence until the alignment is finalised and commencement authorised by the ECO/ Engineer.

4.4.5 Access, traffic and haul roads

The Contractor shall be held responsible for the control of all project related traffic, including that of his suppliers, in ensuring that vehicles associated with the project remain on designated routes and within the designated working times. Construction traffic shall be controlled to ensure minimal disruption to normal road users. All existing access roads that may be affected during construction shall be kept open and in a good state of repair, where this is not possible, unobstructed and safe alternative access routes through the Works must be provided under the guidance of the ECO.

The following mitigation measures are further proposed to limit the impact of traffic in the area:

- Access roads shall be widened to the minimum width required and should not exceed 5m;
- New roads shall not be constructed if the quality of existing roads deteriorates. Existing roads shall be repaired and maintained for the duration of the construction phase and beyond;

- Road construction methods should ensure good road surfaces to preclude vehicles driving off road to find smoother surfaces with less corrugations or potholes;
- The area to be cleared for road construction shall be as small as possible;
- Road surface shall be regularly assessed and upgraded where appropriate;
- No off-road driving shall be allowed except within the pipeline construction corridor (i.e., 15m) as to not degrade adjacent areas;
- No operator will operate any equipment when he is under the influence of alcohol;
- Make sure all vehicles are roadworthy. Repair faulty brakes, exhausts etc. immediately (preferably offsite, if not offsite the ground surface must be protected by impermeable material and/ or drip trays);
- Ensure that road junctions have good sightlines;
- Transport the materials in the least amount of trips as possible;
- Limit speed both on and off the site;
- Adhere to the speed limit;
- Implement traffic control measures where necessary.
- Good driving and adherence to safety rules shall be adhered to at all times;
- Drivers must keep their headlights on when driving on gravel roads;
- Drivers must have the correct licence and training for the vehicles they are driving; and
- The following minimum standards for access roads should be followed:
    - Enter and exit roadways and construction areas should be demarcated at the entrances;
    - Erect signage to warn motorists about construction activities and heavy vehicle movement where appropriate;
    - Use 3-point turns and not U-turns and confine turning to the road; and
    - Prevent shortcuts between roads.

No new parking bay, haul or access road or passage of any sort shall be opened or be caused to be opened without the prior consent of the Engineer/ ECO. Establishing new borrow pits are strictly prohibited. Any contraventions of this clause shall result in penalisation.

4.4.6 Solid waste management

The Contractor shall provide sufficient number of scavenger proof rubbish bins with secured lids. Rubbish bins shall always be placed in pairs, to ensure that one is always present while the other is being emptied. As a minimum, rubbish bins shall be located at every point of entry/ exit to the site, any building, work area, ablutions facility or recess area. Areas where rubbish

is likely to be generated in higher quantities shall be equipped with additional rubbish bins according to the activities occurring there and the volume of waste being generated. Areas requiring additional rubbish bin will include for example:

- Training and meeting facilities;
- Workshops;
- Stores;
- Canteens and eating areas;
- Materials laydown areas;
- Any work areas where outfitting (electrical, plumbing, mechanical) of structures is occurring (as required);
- Any mobile teams carrying out work away from the main site infrastructure, for example pipe or electrical installation teams, road building and maintenance teams, etc., shall carry a rubbish bin with them at all time and return all waste collected to the central storage area at the end of a day's work; and
- Any other area where an accumulation of litter and rubbish is noted or as instructed by the ECO.

No waste materials, including domestic, organic or construction wastes shall be burnt, dumped or buried on the Site. Bins shall be emptied daily or as required. The waste may be stored temporarily on site in a central waste area that is weather and scavenger proof, as approved by the Engineer/ ECO. The Contractor shall, at his own cost, make available the time and resources required in recovering any litter or other wastes that have accumulated or have been dispersed as a result of his activities on the Site. The ECO shall monitor this strictly and institute strict penalties in the event of non-compliances.

The central waste storage vessel/ skip shall be emptied weekly or as necessary. All solid waste shall be disposed of at the closest registered waste disposal site. A copy of the waste disposal certificates shall be submitted to the Engineer/ ECO for record purposes.

4.4.7 Fuel and oil

The Contractor shall ensure that all liquid fuels are stored in tanks or mobile bowsers with lids that are kept firmly shut. The tanks or mobile bowsers must be in good working order (i.e. not leaking). The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel storage areas. The tanks or bowsers shall be situated on a smooth impermeable surface (concrete slab or 250 micron plastic sheeting covered with at least 50 mm of sand) with an earth bund. The impermeable lining shall extend to the crest of the bund. The volume of the

bunded area shall be 130% the volume of the combined tank volumes stored therein. Provision shall be made for refuelling at the fuel storage area, by protecting the soil with an impermeable surface (similar to that used for the storage area itself). The tanks and/ or bowsers shall be inspected daily for any leaks. If they are leaking, either the leaks must be fixed immediately or the bowser/ tanks must be replaced.

The Contractor shall prevent unauthorised access to the fuel storage area. No smoking shall be permitted in the vicinity of the fuel storage area. The Contractor shall ensure that there are adequate fire-fighting provisions located at the fuel storage area.

Should a mobile fuel bowser be used, all refuelling shall occur with appropriate measures in place to prevent spillages; these may include the use of drip trays, funnels, non-drip dispensing nozzles, and any other similar device. Regardless of the preventative measures in place, all mobile fuel bowsers shall carry a spill-kit that is adequately sized to contain at least a 200 litre spill, at all times.

4.4.8 Equipment maintenance and storage

All vehicles and equipment shall be kept in good working order and shall be operated by designated and competent operators. Leaking or damaged equipment shall be repaired immediately or removed from the Site. Where emergency, *in situ,* maintenance operations are required the Contractor shall ensure that the soil or vegetation does not become contaminated. Drip trays shall be provided in construction areas for stationary and parked plant as well as for the emergency servicing of vehicles. Drip trays shall be inspected and emptied daily, or as required. The contents of the drip trays shall be disposed of at an appropriately authorised facility and proof thereof shall be submitted to the Engineer/ ECO.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only during which the use of detergents for washing shall be restricted to low phosphate and nitrate containing, low foaming type detergents. Washing of equipment will only be allowed in a wash bay, at the site camp, approved by the Engineer/ ECO.

The Contractor shall ensure that oil and lubricant containers are stored in an area where the ground has been protected. The containers shall be inspected regularly to ensure that no leakage occurs. When oil/ lubricants are dispensed, the proper dispensing equipment shall be used, and the storage container shall not be tipped in order to dispense the oil/ lubricant. The dispensing mechanism of the oil/ lubricant storage container shall be stored in a waterproof

container when not in use. The Contractor shall take all reasonable precautions to prevent accidental and incidental spillage during the use of oils.

In the event of oil/ lubricant or other hazardous spill, the source of the spillage shall be isolated, and the spillage contained. The Contractor shall clean up the spill by removing the contaminated soil to the hazardous waste vessel/ skip and the application of absorbent material to the affected area. Treatment and remediation of the spill area shall be undertaken to the reasonable satisfaction of the Engineer/ ECO.

4.4.9 Stockpiling and stockpile areas

Plant (i.e., machinery) and materials shall be stored within the demarcated construction camp or batching areas. Where this is not feasible, the Engineer/ ECO will identify additional sites for stockpiling within the Working Area. Where possible, stockpiled materials shall be stored off the ground on scaffolding and care shall be taken to minimise disturbance to the vegetation and topsoil.

Soil, sand, and gravel stockpiles shall be convex in shape and shall be located so as to cause minimal disturbance. Stockpiles shall be so placed as to occupy the minimum width compatible with the natural angle of repose of the material, and measures shall be taken to prevent the material from being spread over too wide a surface. The Contractor shall ensure that all stockpiles do not result in the damming of water or run off, or are themselves washed away. Stockpiles shall be placed to not obstruct or pollute any storm water or drainage paths.

4.4.10 Materials

4.4.10.1 Materials handling, use and storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions, including “no-go” areas and designated haul routes.

All material shall be stored within the designated Site boundaries and all material stockpiles shall be located no less than 20m from any water resource. The Contractor shall ensure that all material lay-down areas, workshops and stores, including temporary lay-down areas within the Works, are kept in a neat and orderly fashion on a daily interval, and to the satisfaction of the Engineer/ ECO. The Contractor shall set aside the time and resources required to remedy any contraventions of this clause at his own expense.

Materials shall be appropriately secured and covered to ensure safe passage between destinations. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

4.4.10.2 Hazardous substances

Hazardous chemical substances used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation. Potentially hazardous substances shall be stored, handled and disposed of as prescribed by the Engineer/ ECO.

The Contractor shall provide a separate weather-proof, impervious vessel/ skip at the central waste storage area for the temporary storage of hazardous, potentially hazardous and contaminated materials. Waste from this vessel/ skip shall be disposed of at a landfill site that is registered to receive such waste. A copy of the Certificate of Disposal issued by the landfill shall be submitted to the Engineer/ ECO after every deposit.

4.4.10.3 Cement and concrete batching

The batching of concrete shall take place on a smooth, impermeable surface (plastic) and shall be enclosed with a bund and sloped toward a sump to contain any spillages. Concrete batching shall take place at least 20 m away from any water resource, e.g., vegetated drainage lines, to avoid contaminated water and/ or sediment entering the resource. All waste water resulting from batching of concrete shall be contained and disposed of appropriately and shall not be discharged into the environment unless treated to acceptable standard, as determined by the Engineer/ ECO. Where concrete trucks are used, the Contractor shall ensure that dumping of the drum-wash does not occur directly onto the ground. If needed, facilities for the handling of the concrete contaminated wash-water shall be established to the satisfaction of the Engineer/ ECO. Any spillages of concrete or concrete-truck-drum-wash-water shall be cleaned-up immediately and disposed of through the solid waste disposal system.

The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the pour and disposed of as part of the solid waste disposal system. Empty cement bags shall be collected continuously and stored in temporary weatherproof containers, where they are

protected from dispersion by wind and shall be disposed of regularly via the solid waste disposal system.

4.4.10.4 Dust

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activity, to the satisfaction of the Engineer/ ECO. Dust suppression measures shall be agreed upon in consultation with the Engineer/ ECO. Appropriate dust control measures include the following:

- Construction vehicles shall only use designated roads;
- Dust carrying materials shall be secured and properly covered on transportation vehicles before they leave the site; and
- During high wind conditions the contractor must make the decision to cease works until the wind has calmed down.

4.4.10.5 Noise

The Contractor shall limit noise levels by implementing the following:

- Install and maintain silencers on machinery;
- Appropriate directional and intensity settings are to be maintained on all hooters and sirens;
- No amplified sound shall be allowed on Site other than in Emergency situations; and
- Drivers and operators are to be instructed to not use their hooters unless absolutely required (i.e. operators of machinery should not use hooters for the purposes of general communication, which is typically seen on construction sites).

4.4.10.6 Trenching (only where applicable)

Trenches where envisaged shall be demarcated appropriately, using orange mesh, and securely and regularly monitored during operations to ensure that pedestrian (and vehicular) access to these areas is strictly prohibited. Where appropriate, sign boards, alerting pedestrians and road users to the potential dangers presented by the construction activities, shall be erected. The Contractor shall ensure that the time a trench is left exposed is kept to a minimum, and that open trenches are inspected on a daily basis for animals which may have fallen or become trapped. Animals found trapped shall be rescued and released into the wild. If poisonous animals/ reptiles such as snakes are found, a snake handler must be contacted to rescue the snake/ animal. A local snake handler must be identified before works start and his contact details shall be readily available.

4.4.10.7 Fire control

Fires are only permitted in designated areas and shall not be left unattended. These areas must first be discussed and approved by the Mururani Village officials. If such areas are approved by the Mururani Village officials, cooking places shall be located at a safe distance from fuel/ hazardous materials storage area and vehicle parking areas. All grass and bushes shall be removed around fireplaces. Fire extinguishers shall be readily available in the construction camp. Any fires that occur outside of designated areas shall be reported to the Engineer/ ECO immediately. Employees shall be made aware that the collection and removal of firewood is prohibited, except where indicated by the contractor as clearing takes place. The Contractor shall either provide firewood or to limit the use thereof; provide gas or fuel-efficient stoves. Smoking shall not be permitted in those areas where there is a fire hazard. Burning of waste for disposal purposes is not permitted.

The Contractor shall be responsible for ensuring that immediate and appropriate actions are taken in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Contractor shall ensure that there is at least one fire extinguisher at the entrance to the site and at the recess area. A fire extinguisher shall be present whenever undertaking any form of hot work, i.e., welding, gas cutting, angle grinding, etc. All transport, earth moving equipment, and materials handling equipment on the Site shall be fitted with fire extinguishers. All fire extinguishers shall be serviced at the specified intervals and all other fire-fighting equipment shall be maintained in a good state of repair.

4.4.10.8 Emergency procedures

The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with leaks and spills, which shall include notifying the Engineer/ ECO. The Contractor shall ensure that the necessary materials and equipment for dealing with leaks and spills are available on Site at all times. Treatment and remediation of spills shall be done to the satisfaction of the Engineer/ ECO.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The affected areas shall be cordoned off and secured. The Contractor shall ensure that there is always sufficient supply of absorbent material on Site to absorb/ breakdown or encapsulate at least a 200ℓ liquid hydrocarbon spill. Any soil contaminated by such a spill must be removed and disposed of at an appropriately registered waste site.

Emergency equipment including spill kits and fire extinguishers shall be positioned at accessible locations near to areas or facilities where such emergencies may arise.

4.4.10.9 Erosion, water quality, and storm water control

The Contractor shall take all reasonable steps to prevent or remediate damage to the environment resulting from the Works in the form of erosion and sedimentation. The Contractor shall immediately remedy any situation that is or has the potential to result in soil erosion, water pollution and sedimentation from the works as a result of storm water flows. A preventative approach must be adopted whereby the extent of clearance and disturbance is limited to those areas required to complete the Works (i.e. a working corridor of 15 m). If required, the Contractor shall establish necessary storm water control mechanisms in agreement with the engineer, to effectively control the movement of water onto, through and off the construction site.

The Contractor shall establish, in agreement with the Engineer/ ECO, a suitable mechanism, where necessary, for containment and treatment of contaminated water emanating from the Works or associated activities, i.e. settlement or sedimentation ponds/ oil separators. Should dewatering of the pipe trench be required, then a method statement detailing how this will be done shall be compiled and submitted for the Engineer/ ECO's approval, before commencement. Consideration for erosion at discharge points is to be effectively dealt with. A plan must be submitted and approved by the ECO/ Engineer. The Plan for the control of large volumes of water associated with pipe pressure testing must be undertaken in a manner that does not pose a risk of soil erosion on slopes.

4.4.10.10 Topsoil Management

Topsoil stockpiles shall be convex and should not exceed 2 m in height. The mounds shall be formed such that no ponding of water occurs on the surface of the stockpile. Topsoil stockpiles along the pipeline trench will always occur on the upslope side of the trench, all subsoil will be stockpiled on the down-slope side of the trench.

Topsoil must not in any way be rendered unsuitable for further use and precautions shall be taken to prevent unnecessary handling and compaction. In particular, topsoil shall not be subject to a compaction force greater than 1 500 kg/m² and shall not be pushed by a bulldozer for more than 50 m. Trucks and other heavy equipment may not be driven over the stockpiles.

Unless otherwise specified, topsoil shall be taken from not deeper than 300 mm from the

surface. If the Contractor fails to conserve topsoil as instructed, he shall obtain suitable substitute material from other sources, without any additional payment.

In the event that only a Biological Soil Crust is found and no re-usable topsoil, the soil shall be stabilised by following the trimming and reshaping of the area by soaking it with water. This causes the mineral salts to rise to the surface and to solidify with the evaporation of the water, and so stabilising the soil surface against aeolian erosion and setting the scene for the reformation of a biological soil crust.

4.5 PROTECTION OF NATURAL FEATURES AND HERITAGE RESOURCES

4.5.1 Protection of freshwater ecosystems

The Contractor shall ensure that the impact on the riparian zone of any river systems is kept to a minimum. Heavy construction vehicles shall be kept out of the seasonal and ephemeral stream channels and the movement of construction vehicles shall be limited where possible to the existing roads. Contaminated runoff from the construction site shall be prevented from entering the river as far as possible. Where pipelines cross streams, they shall do so in a manner that does not impede or divert the flow in the channels. Riparian areas disturbed shall be rehabilitated, by the removal of alien vegetation were found and the re-vegetation of these disturbed zones with suitable indigenous vegetation. Also refer to chapter **Error! Reference source not found.** below for the removal of alien vegetation associated with pipe leakages.

The following mitigation measures are proposed for the protection of riparian areas:

- Heavy construction vehicles should be kept out of the seasonal and ephemeral stream channels and the movement of construction vehicles shall be limited where possible to the existing roads;
- Where pipelines cross streams, they shall do so in a manner that does not impede or divert the flow in the channels;
- Contaminated runoff from the construction site shall be prevented from entering the river as far as possible;
- Avoid development in and destruction of the drainage lines throughout the area;
- All materials on the construction site shall be properly stored;
- Disposal of waste from the sites should be properly managed as per the waste management system (refer to chapter 4.4.6); and
- Construction workers should be given ablution facilities at the construction sites that are located at least 50 m away from the river system, fastened to the ground and regularly serviced (refer to chapter 4.4.2).

4.5.2 Protection of natural systems

The Contractor shall ensure that the disturbance of vegetation and faunal communities and their habitats is kept to a minimum. The following mitigation and management measures are prescribed in this regard:

- A track discipline limited to existing tracks with maximum speed limits (e.g., 30km/h) shall be implemented;
- Off road driving shall not be allowed in areas prone to scarring (e.g., gypsum/ gravel plains). Nocturnal driving should also be avoided as this result in the killing of slow-moving fauna, e.g. various reptiles and other nocturnal species;
- The use of lights during nocturnal activities shall be limited;
- Overnight activities shall be prevented as far as possible and must be discussed with the Mururani Village officials;
- The setting of snares (poaching), illegal collecting of veld foods (e.g. chameleons), indiscriminate killing of perceived dangerous species (e.g. snakes), and the collection of wood would not be allowed;
- A suitable and appropriate refuse removal policy during the construction phase shall be implemented as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios, e.g. Black-backed Jackal and Pied Crows;
- The removal and damage of flora (especially endemic species and protected species e.g. (Forestry Ordinance No. 37 of 1952)), shall not be allowed;
- No domestic animals shall be allowed on site;
- A policy of capture and removal of fauna (e.g. slow moving species such as chameleon and snakes) encountered serendipitously within the construction areas shall be implemented. Such fauna should be removed to other areas of similar habitat in the area (also refer to chapter 4.4.10.6);
- All sumps are to be inspected daily for any trapped animals. Sumps shall be covered every night;
- Educate/ inform contractors on dangerous and protected species to avoid and the consequences of illegal collection of such species. Liaise with MEFT to provide this service as the area falls within the Mururani Village;
- A botanist/ ecologist shall identify protected and unique species; endemic species and protected species (Forestry Ordinance No. 37 of 1952) before the commencement of development activities in areas where these occur. These areas must be avoided;

- Planting of potentially alien invasive plant species for ornamental purposes as part of the landscaping at the various developments – e.g., pump station shall not be allowed. Alien species often “escape” and become invasive causing further ecological damage; and
- Implement a policy of “no tolerance” towards the existing invasive alien plant species in the area. This should include the removal and destruction of these species throughout the proposed development areas, especially associated with current leakages. Such activity would be beneficial to the overall ecology of the area (Cunningham, 2014).

4.5.3 Protection of archaeological sites

All earthworks equipment operators shall be informed to cease operating immediately if any artefact is unearthed and to report the finding immediately to the Engineer/ ECO and NamWater, who in turn shall notify the National Heritage Council. The Contractor shall take reasonable measures to protect any such find against further damage until its value can be properly assessed. In the event of such finds, the project management or contractors should adopt the “chance finds” procedure set out by the National Heritage Council. Work in the immediate vicinity of such a find shall also be discontinued until the Engineer/ ECO, and the National Heritage Council issues a clearance to recommence.

4.6 REHABILITATION

The Contractor shall, on completion of the Contract, ensure that all materials, temporary structures, temporary fences, plant, equipment and waste are completely removed from the Site. The area shall be inspected by the ECO for any form of damage, e.g. oil spills. If such areas are identified the Contractor shall be instructed to clean the area and rehabilitate to the satisfaction of the ECO.

Rehabilitation operations and re-vegetation of all disturbed areas shall commence as soon as possible and even run concurrently with construction activities where appropriate and practical.

For the purposes of this EMP, the landscaping and rehabilitation of disturbed areas shall entail the clearing, shaping, trimming, and scarification of the area, replacement of stockpiled topsoil where relevant, topped by randomly distributed stone and gravel surface.

4.6.1 Timing of landscaping and rehabilitation

The Contractor shall programme for the landscaping and rehabilitation of disturbed areas to occur as soon as practically possible following the cessation of the work in a specific area. In this regard, the Contractor's Works Programme shall clearly indicate how rehabilitation will be executed per phase, upon the completion of the works within a specific area. Once an area has undergone rehabilitation it shall be deemed a "no-go" area and protected accordingly against further or repetitive disturbance. The aforementioned needs to be accounted for in the work programme.

4.6.1.1 Shaping and trimming

All slopes which do not form part of the Permanent Works shall be graded so that no slope exceeds a maximum gradient of 1:3 or as otherwise directed by the Engineer. Contour drains may be provided to control erosion where required by the Engineer. Excavation and fills shall be formed in such a manner that the final profile shall appear as a natural extension to the adjacent, undisturbed ground profiles. Trimming shall consist of bringing the existing or previously shaped ground to a smoothly flowing surface with the final levels generally following the original surface and tying in with adjacent undisturbed areas as directed by the Engineer/ ECO.

4.6.1.2 Replacement of soil, stone and gravel

Replacement of soil, stone and gravel removed during site clearance shall be replaced in a random pattern or similar to that seen in adjacent, undisturbed areas, subject to the approval of the Engineer/ ECO. All excess overburden stones/ rocks shall be removed offsite. These rocks shall not be allowed to be stockpiled along the alignment. NamWater shall discuss the possibility of depositing these excess overburden rocks at one of the nearby quarries with the owners, if not possible the waste will be dumped at an appropriate waste dump site.

4.6.1.3 Alien vegetation

Alien vegetation on site, especially associated with leakages, shall be removed and destroyed. This must be done in consultation with an Ecologist to ensure that only alien vegetation are removed and destroyed in the correct manner.

4.7 COMPLIANCE AND PENALTIES

4.7.1 Compliance

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried

out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the works.

It is thus required that the Contractor shall comply with the environmental requirements on an on-going basis and any failure on his part to do so will entitle the Engineer/ ECO to certify the imposition of a penalty, as detailed below, if such non-compliance is not corrected within a period of one week of notification thereof.

4.7.2 Penalties

Penalties will be issued for certain transgressions. Penalties may be issued per incident at the discretion of the Engineer/ ECO. Such penalties will be issued in addition to any remedial cost incurred as a result of the non-compliance with this Specification. The Engineer/ ECO will inform the Contractor of the contravention and the amount of the penalty and shall be entitled to deduct the amount from the monies due under the Contract.

Penalties for the activities detailed below, will be imposed by the Engineer/ ECO on the Contractor and/ or his Sub-Contractors.

a)	Any employees, vehicles, or things related to the Contractor's operations operating outside the designated boundaries or a "no-go" area.	N$ 5,000
b)	Persistent and un-repaired oil leaks from machinery.	N$ 2,000
c)	Persistent failure to monitor and empty drip trays timeously.	N$ 2,000
d)	The use of inappropriate methods for refuelling, resulting in spillages.	N$ 2,000
e)	Litter on site associated with construction activities.	N$ 2,000
f)	Deliberate lighting of illegal fires on site.	N$ 2,000
g)	Any employee eating meals on site, outside of the defined eating area.	N$ 2,000
h)	Employees not making use of the site ablution facilities.	N$ 2,000
j)	Failure to empty waste bins on a regular basis.	N$ 200
k)	Unauthorised removal of vegetation.	N$ 500
l)	Hunting, trapping and collection of animals (per unit taken).	N$ 15,000
m)	Failure to implement specified noise controls.	N$ 2,000
n)	A spillage, pollution, fire or any damage to the environment resulting from negligence on the part of the Contractor.	N$ 5,000
o)	Damage to vegetation or ground arising from equipment leaving designated haul or access routes.	N$ 5,000

p)	Failure to submit and, or proceeding with work without having or deviating from an approved method statement, for those tasks requiring a method statements in terms of the EMP.	N$ 5,000

For each subsequent similar offence, the penalty shall be doubled in value to a maximum value of N$ 20,000. The Resident Engineer/ ECO shall be the judge as to what constitutes a transgression in terms of this clause.

4.8 MEASUREMENT AND PAYMENT

4.8.1 Basic principles

Except as specified below or in the Project specifications or as Scheduled, no separate measurement and payment will be made to cover the cost of complying with the provisions of this EMP and such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting his tender.

4.8.2 Scheduled items

All requirements of the environmental management specification

All work not measured elsewhere, associated with complying with any requirement of the environmental management Specification shall be as a measured sum. The tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the work as specified, described in the Schedule of Quantities or shown on the drawing(s).

Method statements: Additional work

No separate measurement or payment will be made for the provision of Method Statements but, where the Engineer/ ECO requires a change on the basis of his opinion that the proposal may result in, or carries a greater than warranted risk of damage to the work required, provided it could not reasonably have been foreseen by an experienced Contractor.

Work “required by the project specification”

Where a clause in this Specification includes a requirement as “required by the Project Specification”, measurement and payment for compliance with that requirement shall be in accordance with the relevant measurement and payment clause of the Project Specification

5. CONSTRUCTION PHASE MANAGEMENT ACTIONS

5.1 Scope

The general principles contained within this section of the EMP shall apply to all construction related activities. All construction activities shall observe all relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment. Best practice shall apply where this EMP does not describe the management measures for a construction activity. The ECO must be consulted should there be no management measures in this EMP for a specific construction activity or where there is uncertainty as to how the measures in this EMP should be implemented. In such an instance the ECO must determine the Best Available Technique(s) to avoid and/ or minimise potential impacts that an activity might have as per available best practice guidelines.

5.2 Planning And Design

The Design Engineers must take cognisance of the outcomes and recommendations of the EMP. NamWater, and the Engineer must ensure that this EMP is included in the briefing document to the Contractor (to be appointed). The Engineer must advise the Contractor to familiarise himself with the EMP and ensure that adequate resources are made available to implement the requirements of the EMP.

5.2.1 Specific Recommendations to be Incorporated into the Planning Phase

The following specific recommendations must be considered in the detailed planning of the proposed project:

5.2.2 Land Use

NamWater shall discuss servitude rights with the Mururani Village Council before the commencement of works.

5.2.3 Turning Circles

The need for turning circles is not expected. However, should they be required, they should be sized as per **Error! Reference source not found.**.

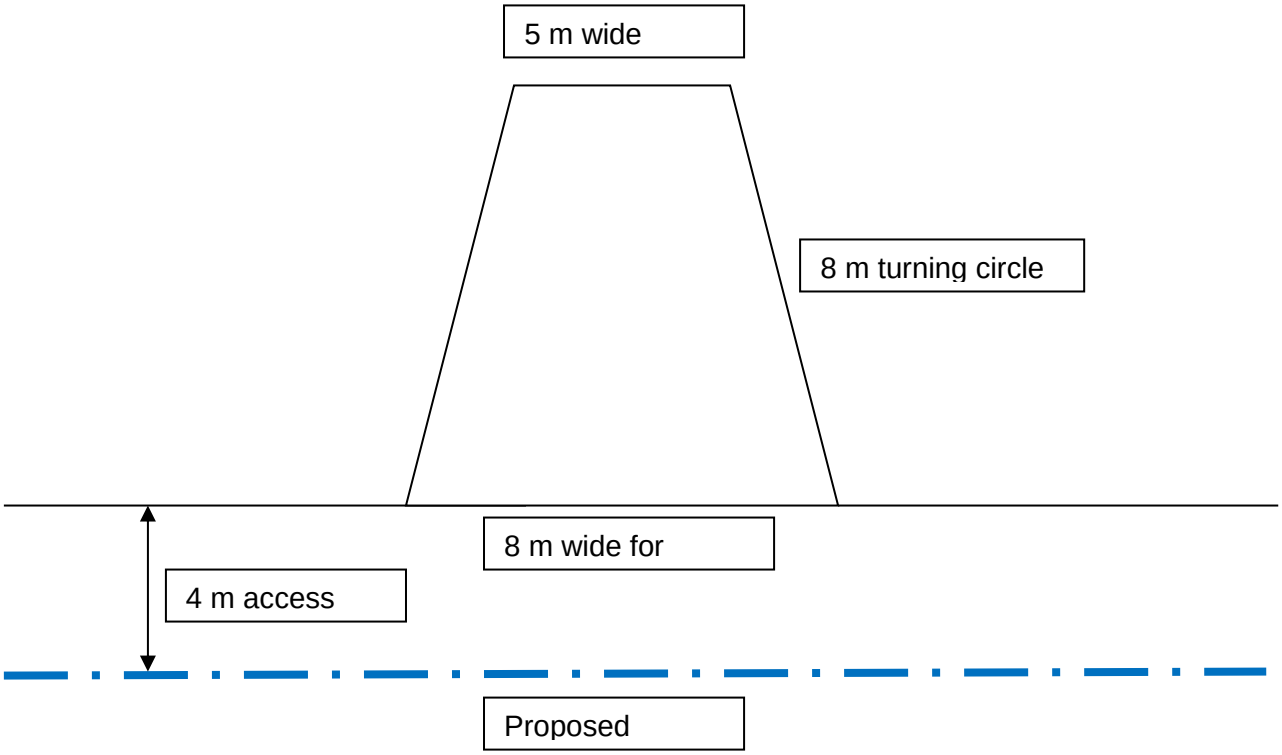


Figure 7: Turning Circles

5.3 Management Actions

This section relates to the management and mitigation measures required to ensure that the construction activities related to the Mururani Drought Relief Project are operated in a manner that demonstrates responsible, precautionary environmental management.

Table 1: Construction Phase Management Actions

Objectives	Risk Sources	Management Action	Monitoring
a. Minimize the disturbance of vegetation and faunal communities and their habitats during the construction of the proposed pipeline and powerline.	Disturbance of vegetation and faunal communities and their habitats.	▪ Identify and demarcate the extent of the construction or accommodation site and associated work areas using danger tape with steel droppers. ▪ Identify animal species, populations and nest to be relocated. Relocate to areas with no associated risks. Such operations should be planned well in advance. ▪ Protect identified plants using danger tape and steel droppers. ▪ Keep disturbance of vegetation and fauna to a minimum. The area to be disturbed should be as small as possible.	Visual inspection to ensure that construction activities are done within the demarcated area. Frequency: Daily, especially during the first phase of construction, as this is the time when most disturbances to the vegetation and fauna and their habitats are most likely occur. Responsible Person: ECO and Resident Engineer.

Objectives	Risk Sources	Management Action	Monitoring
b. Prevent unnecessary removal of trees/plants of importance.	Unnecessary removal of trees/plants of importance.	▪ Do not remove any vegetation unless it is absolutely necessary. Make sure that bulldozer, grader and excavator operators are informed. ▪ The clearing of plants or natural features for the proposed construction should be managed to avoid further damage to vegetation cover. ▪ The use of herbicides and pesticides is prohibited.	Visual inspection/checks to prevent, as well as to ensure the unnecessary removal of trees/plants. Frequency: Daily Responsible Person: ECO
c. Minimize the loss of rare/endangered fauna and flora species.	Loss of rare / endangered fauna or flora species.	▪ Avoid small mammal/reptile and bird nesting where possible. Do not hurt, kill or unnecessarily disturb birds or animals. ▪ Maintain plant demarcations in position until the construction works cease.	Checks to ensure that construction is limited to the demarcated area. Visual checks to ensure that no unnecessary movement occurs in breeding and habitats of these species. Frequency: Daily Responsible Person: ECO
d. Prevent the poaching of flora and fauna.	Poaching of fauna and flora.	▪ Employees who poached fauna and/or flora will be handed to the authorities for prosecution.	Visual inspection. Frequency: Weekly visual checks.

Objectives	Risk Sources	Management Action	Monitoring
		▪ Employees who set traps will be handed to the authorities for prosecution. No wild animals under any circumstance are hunted illegally, handled, removed or be interfered with. ▪ The Contractor will be held liable for the replacement of any plant or animal that is removed or damaged due to the Contractor's negligence or mismanagement. ▪ Regular checks of the surrounding environment must be undertaken to ensure no traps or snares have been set. Any snares or traps found on or adjacent to the site must be disposed of. ▪ Employees should not collect any fruits or seeds with permission from appropriate persons.	Responsible Person: ECO and Resident Engineer.
e. Minimise the creation and use of tracks outside existing roads.	Creation of tracks outside existing roads.	▪ The Contractor shall be held responsible for all project related traffic. ▪ Use existing roads. ▪ Construction traffic shall be controlled to ensure minimal disruption to other road users.	Visual checks to ensure that no off-road driving exists. Frequency: Weekly Responsible Person: ECO and Resident Engineer.

Objectives	Risk Sources	Management Action	Monitoring
		▪ Do not construct new roads when the quality of existing roads deteriorates. Where possible, repair or upgrade existing roads. ▪ Areas to be cleared for road construction should be as small as possible. ▪ Road construction methods should ensure good road surfaces to preclude vehicles driving off-road to find smoother surfaces with less corrugation or potholes. ▪ Ensure that adequate vehicle turning areas are allowed for. ▪ Enforce speed limits at all times. Unless otherwise specified, the speed limit on construction roads is 50km/h. ▪ Runoff from roads must be managed to avoid erosion and pollution problems. ▪ Roads not required for further use shall be rehabilitated immediately. ▪ Enter and exit roadways and construction areas at demarcated entrances. ▪ Erect signage to warn motorists about construction activities and heavy vehicle movement where appropriate.	

Objectives	Risk Sources	Management Action	Monitoring
		▪ Use 3-point turns and no U-turns. Confine turning to the road. ▪ Prevent shortcuts between roads.	
f. Minimise the damage and destruction of important palaeontological and archaeological sites during construction.	Disturbance to sites of palaeontological and archaeological importance.	▪ Do not disrupt any archaeological or palaeontological sites. Inform NEM (N.P. du Plessis at cell no 081 127 9040) who will take the necessary action. ▪ All workers will be educated about the importance of preserving archaeological sites. ▪ Educate specific workers about tell-tale signs of archaeological sites and the action to be taken if one is identified.	Monitoring can and should involve field induction of key construction personnel so that they will be able to recognize the important palaeontological and archaeological sites themselves Frequency: Monthly Person Responsible: Key Construction Personnel.
g. Borrow pits should only be established if its really necessary and careful excavation should be	Establishment of borrow pits.	▪ No borrow pits should be established.	Checks to ensure that no borrow pits are established. Frequency: Monthly Responsible Person: ECO and Resident Engineer

Objectives	Risk Sources	Management Action	Monitoring
considered to Minimise impact.			
h. Minimise the number of heavy vehicles on the road.	Increased number of heavy vehicles on the road.	▪ Heavy vehicles should be limited to the numbers necessary.	Checks to ensure that there is a minimal heavy vehicles on the road. Frequency: Weekly Responsible Person: Resident Engineer
i. Minimise and prevent the activities that accelerate erosion during construction.	Erosion.	▪ Runoff on steep inclines should be diverted to prevent the formation of erosion gullies. ▪ Vegetative cover is the most efficient and economical means of controlling soil erosion. ▪ Berms should be constructed at selected intervals on long sloping areas to prevent erosion. Diversion berms should be reshaped as necessary to divert runoff. ▪ When equipment crossings are necessary, diversions may be wider with flatter side slopes to minimise erosion. ▪ Berms should be constructed with compacted soil, have a minimum top width of 60 cm and a minimum height of 30	Visual inspection to ensure that activities that accelerate soil erosion are minimised and if possible prevented at all cost. Frequency: Daily Responsible Person: ECO and Resident Engineer

Objectives	Risk Sources	Management Action	Monitoring
		cm, and should allow for 10% settlement. It should have side slopes with a gradient of at least 2:1. ▪ Runoff should be guided to a point where it will not cause damage. Scour by the discharge of runoff should be prevented.	
j. Minimise and prevent the collection and removal of firewood during construction.	Collection of firewood.	▪ No vegetative matter may be removed for firewood. ▪ The collection and removal of firewood are not allowed. Is it not the same as the previous recommendation? ▪ Fire extinguishers should be readily available at designated locations. ▪ Cooking places shall be located at a safe distance from fuel / hazardous material storage area and vehicle parking bays. ▪ The Contractor shall either provide firewood or limit the use thereof by providing gas or fuel-efficient stoves.	Checks to ensure that there's no removal and collection of firewood by the employees. Frequency: Weekly Responsible Person: ECO.
k. Dust control	Generation of dust	▪ The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activity.	Visual inspection to ensure that activities that generate dust are minimised and if possible prevented.

Objectives	Risk Sources	Management Action	Monitoring
		▪ Construction vehicles to use only designated roads and to adhere to speed regulations. ▪ Consider temporary ceasing of work during high wind conditions.	Frequency: Daily Responsible Person: ECO and Resident Engineer
l. Noise	Generation of noise	▪ Install and maintain silencers on trucks and machinery. ▪ Repair faulty brakes. ▪ Operators should not use hooters for the purposes of general communication.	Visual inspection to ensure that activities that generate noise are minimised and if possible prevented. Frequency: Daily Responsible Person: ECO and Resident Engineer
m. Driving	Increased risk for accidents	▪ No operator will operate any equipment when he is under the influence of any narcotics. ▪ Adhere to safety rules. ▪ Always keep your headlights on. ▪ Drivers must have the correct licence for the vehicle they are driving.	Visual inspection to ensure that activities that generate noise are minimised and if possible prevented. Frequency: Daily Responsible Person: NEM and Resident Engineer

Objectives	Risk Sources	Management Action	Monitoring
n. Concrete Batching	Solid waste accumulation, pollution	▪ Concrete batching shall take place on a smooth impermeable surface enclosed with a bund. ▪ Batching shall take place at least 20m away from any water source to avoid contamination. ▪ All wastewater resulting from batching of concrete shall be contained and disposed of appropriately and shall not be discharged into the environment. ▪ Any spillages of concrete shall be cleaned –up immediately and disposed of through the solid waste disposal system. ▪ Empty cement bags shall be collected continuously and stored in containers until disposal at appropriate disposal sites. ▪ Bulk cement storage should be at the main construction camp.	Checks to ensure that concrete batching is properly done. Frequency: Daily and as required. Responsible Person: ECO and Resident Engineer
o. Site establishment		▪ No establishment within 100 meters from any watercourse. ▪ At existing disturbed areas ▪ Away from prominent roads to minimise visual impact. ▪ All vehicles to be parked at a dedicated parking area.	

Objectives	Risk Sources	Management Action	Monitoring
		▪ The construction camp should be fenced.	
p. Trenching		▪ Contractors urged to ensure all open trenches are backfilled. ▪ Backfill to same contours or slightly higher to allow for settlement.	
q. Blasting	Blasting can cause noise, dust, and vibration, and can cause injury to employees.	▪ Vehicles carrying explosives should be appropriately marked with warning signs. ▪ Explosives should be stored in dry and well-secured areas. ▪ Contractor shall hire the best experienced qualified persons for blasting actions. ▪ Employees are not allowed to handle any explosives unless he/she has been trained to handle explosives.	

Table 2: Workshops, vehicles and equipment management

Objectives	Potential Impact	Management Action	Mitigation Action
a. Appropriate storage of machinery, vehicles, and materials.	Inappropriate storage of machinery, vehicles, and materials may result in possible damage /disturbance of nearby undisturbed environments.	▪ Store machinery, vehicles, and materials only in demarcated areas; ▪ Do not leave machinery and equipment standing around if not in use; ▪ Do not store machinery, vehicles or materials in undisturbed or rehabilitating areas	Regular inspection to ensure that machinery, vehicles, and equipment are stored in designated areas. Frequency: Daily. Responsible Person: ECO and Resident Engineer.
b. Minimize the leakage of fuels and lubricants from vehicles and equipment.	The use of vehicles and equipment that may leak fuel and lubricants.	▪ Only service machinery and vehicles in designated areas. ▪ Regularly check your vehicle for fuel and oil leaks. ▪ Maintain vehicles and equipment in good conditions through regular and thorough servicing. ▪ Inform the Foreman of leaking vehicles and machinery so that he can schedule repairs. ▪ Only refuel on the bund created for that purpose. ▪ Immediately clean any accidental fuel and oil spills – do not hose spills into the natural environment.	Visual inspection to ensure that vehicles and equipment are in excellent condition and also to ensure that there is no leakage of fuels and lubricants. Frequency: Daily. Responsible Person: ECO and Resident Engineer.

Objectives	Potential Impact	Management Action	Mitigation Action
		▪ Dispose of contaminated soil as hazardous waste in the correct location on site. ▪ If a mobile fuel bowser is used, then all refuelling shall occur with appropriate measures in place to prevent spillages (drip trays, funnels, non-dripping dispensing nozzles, etc.) ▪ All mobile fuel browsers shall carry a spill kit that is adequately sized to contain at least a 200-litre spill. ▪ Train staff in the correct procedure/technique to transfer fuels. ▪ Make sure all vehicles are roadworthy. Repair faulty brakes, exhausts, etc. immediately. ▪ Fire extinguishers shall be present whenever undertaking any form of hot work, i.e., welding, gas cutting, angle grinding, etc.	

Table 3: Waste Management

Objectives	Potential Impact	Management Action	Mitigation Action
a. To prevent the improper disposal of waste	Pollution	▪ Enforce a waste management programme. ▪ All waste will be removed to an appropriate waste dump. ▪ No waste should be buried. ▪ General Waste: Includes wastepaper, plastic, cardboard, harmless organic (e.g., vegetables) and domestic waste. ▪ Hazardous Substances includes sewerage, fuels, lubrication oils, hydraulic and brake fluid, solvents, paints, anticorrosive, insecticides, and pesticides, chemicals, acids, etc. It should be disposed of at designated hazardous disposal sites. ▪ Contaminated soil should be stored in drums and taken to the nearest appropriate waste dumpsite. ▪ Do not change the oil on the uncovered ground. Drip trays will be used to catch the oil when vehicles are repaired in the field. ▪ Used oil and hydraulic fluids will not be discarded on the soil or buried. It will be removed from the site and taken back to an appropriate dump site.	A visual check to ensure wastes is managed according to the waste management plan. Frequency: Weekly. Person Responsible: ECO and Resident Engineer.

Objectives	Potential Impact	Management Action	Mitigation Action
		▪ In the event of a hazardous spill: - Immediately implement actions to stop or reduce the spill. - Contain the spill. - Arrange implementation of the necessary clean-up procedures. - Collect contaminated soil, water, and other materials and dispose of it at an appropriate waste dumpsite. ▪ Used solvents and grease should be stored in drums or other suitable containers. It should be sealed and recycled or disposed at an appropriate disposal site. ▪ Hazardous waste should not be burnt. ▪ Bunding, concrete slabs and/or other protective measures should be installed where hazardous materials are handled. ▪ Ensure that the staff are informed and have information pertaining to the management of spills or ingestion.	
b. To avoid potential chemical	Pollution	▪ Designated areas for the storage of potentially hazardous material will be lined with concrete and secured. The	Visual checks to ensure chemical/hazardous

Objectives	Potential Impact	Management Action	Mitigation Action
/hazardous substance pollution		bunded area will be of adequate capacity to contain 1.5 times the volume of the hazardous material to be stored in the bunded area.	substances are stored appropriately. Frequency: Monthly. Responsible Person: ECO and Resident Engineer.
c. Prevent diesel and oil spills during operation and maintenance and ensure adequate cleanup.	Concrete, diesel and oil spills and inadequate clean-up.	▪ Clean up concrete, fuel and oil spills immediately. ▪ Clean small oil or fuel spills with an approved/appropriate absorbent material. ▪ Contain oil or fuel spills in water using an approved oil absorbent fibre. ▪ In cases where oil spills cannot be cleaned up immediately, monitor seepage into deeper soils and groundwater. ▪ Do not bury polluted soil, but rather dispose it at an appropriate dumpsite. ▪ Provide bunding at fuel storage and transfer sites. The bunding should be big enough to contain 110% of the volume of the tank. Where a bund wall encloses a group of tanks, the bund wall must be able to contain 110% of the volume of the largest tank in the group. Tanks must stand	Checks to prevent and minimise oil and diesel spills and to ensure adequate clean up should spills occur. Frequency: Daily throughout the operation period. Responsible Person: ECO and Resident Engineer.

Objectives	Potential Impact	Management Action	Mitigation Action
		on a concrete slab, or otherwise have a sealed, base in order to prevent the leakage of contaminants into the soil.	
d. Waste Management	Littering (Litter such as paper, plastic, etc. can be blown away into the surrounding environment).	▪ No littering will be allowed. The construction, operation and maintenance areas will be kept free of waste at all times. All construction sites will be cleaned on a daily basis before leaving the site. ▪ Provide sufficient waste bins at worksites. Make sure that all waste is removed from the worksites. ▪ Bins should be placed in pairs to ensure that one is always present while the other is being emptied. ▪ Areas likely to generate higher quantities of waste shall be equipped with additional bins. ▪ Refuse bins must be stable, i.e., cannot be tipped by animals, and have scavenger and baboon proof lids. ▪ Make sure that the bins are covered so that plastic bags, paper, etc. are not blown away.	Checks to ensure that litter is disposed of correctly in bins provided. Frequency: Daily, at the end of the workday. Responsible Person: ECO and Resident Engineer.

Objectives	Potential Impact	Management Action	Mitigation Action
		▪ Make sure that the bins are regularly emptied and the waste taken to an appropriate waste dumpsite. ▪ The central waste storage vessel shall be emptied weekly or as necessary.	

Table 4: Health and safety management

Objectives	Potential Impact	Management Action	Mitigation Action
a. Minimise the risk of HIV infection and the increase of STI's.	Risk of HIV infection.	▪ Provide an AIDS awareness programme for all the staff.	Verify that an awareness and education programme on the risks of HIV/AIDS and recommended preventative measures have been conducted. Frequency: Monthly Responsible Person: ECO and Resident Engineer.
b. Minimize the occurrence of injuries.	Injuries.	▪ The contractor is obliged to provide PPE to their employees.	Checks to ensure that correct procedures are followed and that protective clothing are

Objectives	Potential Impact	Management Action	Mitigation Action
		▪ Make sure that all staff are equipped and know how to use safety and protective gear. This includes hard hats, goggles, hearing protectors, dusk masks, steel-toed shoes, etc. ▪ Keep a comprehensive first aid kit at the scheme offices and at construction sites. ▪ Establish an emergency rescue system for evacuation of seriously injured people. ▪ Emergency procedures for accidents should be communicated to all employees. ▪ Dangerous areas must be clearly marked and access to these areas controlled or restricted. ▪ Good driving and adherence to safety rules will result in a minimum number of road and workplace accidents. ▪ Fire extinguishers must be available at all refueling sites. Staff should be trained to handle such equipment. ▪ Nobody is allowed to dispose of a burning or smoldering object in an area where it may cause the ignition of a fire.	worn at all times during construction. Visual checks to ensure that machinery and equipment used during construction are in good working condition. Frequency: Check weekly. Responsible Person: ECO and Resident Engineer.

Objectives	Potential Impact	Management Action	Mitigation Action
		▪ Hazardous substances must be kept in adequately protected areas to avoid soil, air or water pollution. ▪ Work areas, such as these for the construction of equipment, must be on concrete slabs. ▪ Explosives should be stored according to the prescribed regulations.	

6. OPERATION AND MAINTENANCE PHASE MANAGEMENT ACTIONS

6.1 Introduction

This section relates to the management and mitigation measures required to ensure that the operation of the bulk water supply network and the maintenance of the infrastructure is operated in a manner that demonstrates responsible, precautionary environmental management.

The EMP will address specific areas of concern in terms of the long-term environmental management of the affected environment and is intended to serve as a guide to the on-going management of the water supply scheme site as well as the affected environment. The EMP will therefore aim to provide NamWater with the necessary tools to ensure that the potential impacts on the natural environment of the site during the operation of the water supply scheme are minimised. Moreover, it will aim to ensure that the infrastructure is operated and maintained according to Best Practice, in an environmentally sensitive and sustainable manner, and that the operation of the infrastructure does not result in reasonably avoidable environmental impacts.

6.2 Maintenance Procedures

The optimal operation and effective maintenance of all the scheme components is important in protecting the environment and ensuring that resources are not wasted and environmental incidents arising out of equipment or infrastructure failures, are avoided. Operation and Maintenance Manuals are available for the Mururani/Rundu Gate Water Supply Scheme. The manuals provide a detailed guidance on the operation of all machinery and associated systems as well as related maintenance procedures, including maintenance schedules. Implementation of this manuals by NamWater will facilitate the proactive management of potential risks and thus result in impacts on the receiving environment being averted.

The maintenance procedures set out in the manuals, provides specific guidance in terms of the monitoring and maintenance of the scheme components. These procedures will specify the equipment item and specific component of each piece of equipment requiring checking, the scope and nature of the check that is to be carried out including detailed instructions related to the specific check, and the programme for conducting each check.

6.3 Management Actions

Table 5: Operation and Maintenance Phase Management

Management Objectives	Potential Impact	Management Actions	Responsibility
a. Minimize the loss of rare/endangered fauna and flora species.	Loss of rare / endangered fauna or flora species.	▪ Avoid small mammal / reptile and bird nesting where possible. Do not hurt, kill or unnecessarily disturb birds or animals.	Ensure scheme operations and maintenance is limited to the area next to the pipeline and powerline corridors. Visual checks to ensure that no disturbance occur outside the pipelines corridor. Frequency: Monthly. Responsible Person: Scheme Superintendent.
b. Prevent unnecessary removal of trees/plants of importance.	Unnecessary removal of trees/plants of importance.	▪ Do not remove any vegetation unless it is absolutely necessary. Make sure that operation and maintenance team is well informed. ▪ Do not disturb, deface, destroy or remove plants or natural features, whether fenced or not.	Visual inspection/checks to prevent, as well as to ensure the unnecessary removal of trees/plants. Frequency: Monthly.

Management Objectives	Potential Impact	Management Actions	Responsibility
			Responsible Person: Scheme Superintendent.
c. Minimize the loss of rare/endangered fauna and flora species.	Loss of rare / endangered fauna or flora species.	▪ Avoid small mammal / reptile and bird nesting where possible. Do not hurt, kill or unnecessarily disturb birds or animals.	Ensure scheme operations and maintenance is limited to the area next to the pipeline and powerline corridors. Visual checks to ensure that no unnecessary disturbance occur outside project scope. Frequency: Monthly. Responsible Person: **Scheme Superintendent**.
d. Prevent the poaching of flora and fauna.	Poaching of fauna and flora.	▪ Employees who poach fauna and/or flora will be handed to the authorities for prosecution. ▪ Regular checks of the surrounding environment must be undertaken to ensure no traps or snares have been set. Any snares or traps found on or adjacent to the site must be disposed of.	Visual inspection. Frequency: Weekly visual checks. Responsible Person: **Scheme Superintendent.**

Management Objectives	Potential Impact	Management Actions	Responsibility
e. Minimise the creation and use of tracks outside existing roads.	Creation of tracks outside existing roads.	▪ Use existing roads. ▪ Traffic shall be controlled to ensure minimal disruption to other road users. ▪ Do not construct new roads when the quality of existing roads deteriorates. Where possible, repair or upgrade existing roads. ▪ Ensure that adequate vehicle turning areas are allowed for. ▪ Enforce speed limits at all times. Unless otherwise specified, the speed limit on access roads is 50km/h. ▪ Runoff from roads must be managed to avoid erosion and pollution problems. ▪ Roads not required for further use shall be rehabilitated immediately. ▪ Use 3-point turns and not U-turns. Confine turning to the road. ▪ Prevent shortcuts between roads.	Visual checks to ensure that no off-road driving exists. Frequency: Weekly. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
f. Minimise the damage and destruction of important palaeontological and archaeological sites.	Disturbance to sites of palaeontological and archaeological importance.	▪ Do not disrupt any archaeological or palaeontological sites. Inform NEM (J Kamburona at cell no 081 1441528) who will take the necessary action. ▪ All workers will be educated about the importance of preserving archaeological sites. ▪ Educate specific workers about tell-tale signs of archaeological sites and the action to be taken if one is identified	Monitoring can and should involve field induction of key scheme personnel so that they will be able to recognize the important palaeontological and archaeological sites themselves. Frequency: Monthly. Person Responsible: **Scheme Superintendent**.
g. Minimise the number of heavy vehicles on the road.	Increased number of heavy vehicles on the road.	▪ Heavy vehicles should be limited to numbers necessary.	Checks to ensure that there is minimal heavy vehicle on the road. Frequency: Weekly. Responsible Person: **Scheme Superintendent**.
h. Minimise and if possible prevent the activities that accelerate erosion	Erosion.	▪ Runoff on steep inclines should be diverted to prevent the formation of erosion gullies.	Visual inspection to ensure that activities that accelerate soil erosion are minimised and if possible prevented at all cost.

Management Objectives	Potential Impact	Management Actions	Responsibility
during operation or maintenance.		▪ Vegetative cover is the most efficient and economical means of controlling soil erosion. ▪ Berms should be constructed at selected intervals on long sloping areas to prevent erosion. Diversion berms should be reshaped as necessary to divert runoff. ▪ Berms should be constructed with compacted soil, have a minimum top width of 60 cm and a minimum height of 30 cm, and should allow for 10% settlement. It should have side slopes with a gradient of at least 2:1. ▪ Runoff should be guided to a point where it will not cause damage. Scour by the discharge of runoff should be prevented.	Frequency: Weekly. Responsible Person: **Scheme Superintendent**.
i. Minimise and if possible prevent the collection and removal of firewood during operation and maintenance.	Collection of firewood.	▪ No vegetative matter may be removed for firewood. ▪ The collection and removal of firewood is not allowed.	Checks to ensure that there's no removal and collection of firewood by the employees. Frequency: Weekly. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
j. Noise	Generation of noise	▪ Install and maintain silencers on trucks and machinery. ▪ Repair faulty brakes. ▪ Operators should not use hooters for the purposes of general communication.	Visual inspection to ensure that activities that generate noise are minimised and if possible prevented. Frequency: Daily. Responsible Person: **Scheme Superintendent**.
k. Driving	Increased risk for accidents	▪ No operator will operate any equipment when he is under the influence of alcohol. ▪ Adhere to safety rules. ▪ Always keep your headlights on. ▪ Drivers must have the correct licence for the vehicle they are driving.	Visual inspection to ensure that activities that generate noise are minimised and if possible prevented. Frequency: Weekly. Responsible Person: **Scheme Superintendent**.
l. To avoid potential chemical /hazardous substance pollution	Pollution	▪ Designated areas for the storage of potentially hazardous material will be lined with concrete and secured. The bunded area will be of adequate capacity to contain 1.5 times the volume of the hazardous material to be stored in the bunded area.	Visual checks to ensure chemical/hazardous substances are stored appropriately. Frequency: Monthly.

Management Objectives	Potential Impact	Management Actions	Responsibility
			Responsible Person: **Scheme Superintendent**.
m. To ensure correct procedures are in place to avoid environmental impacts associated with maintenance activities as well as proactive intervention to avoid, and if required, to respond to emergencies	Environmental Degradation	▪ Establish regular reporting procedures on maintenance ▪ Undertake regular inspection and maintenance of all infrastructure to ensure in working order and to assess damaged / deficient equipment, as per the Operations and Maintenance Manual. ▪ Review, and if necessary, revise maintenance manual. ▪ Establish emergency procedures guidelines for the blockage/failure, flooding, contaminant removal and disinfection, power failure and fire of the scheme. ▪ Implement the response procedures when emergency incident occurs. ▪ Complete the incident report checklist in the case of emergency and keep with monitoring records for submission. ▪ Undertake annual education course for all operational staff. ▪ Review, and if necessary, revise emergency manual.	A review of the Operations and Maintenance Manual. Frequency: Bi-annual Responsible Person: NamWater Maintenance Team

Management Objectives	Potential Impact	Management Actions	Responsibility
n. To prevent the improper disposal of waste	Pollution	▪ Enforce a waste management programme. ▪ All waste will be removed to an appropriate waste dump. ▪ No waste should be buried. ▪ General Waste: Includes wastepaper, plastic, cardboard, harmless organic (e.g., vegetables) and domestic waste. ▪ Hazardous Substances include: sewerage, fuels, lubrication oils, hydraulic and brake fluid, solvents, paints, anticorrosives, insecticides and pesticides, chemicals, acids etc. It should be disposed of at designated hazardous disposal sites. ▪ Contaminated soil should be stored in drums and taken to the nearest appropriate waste dumpsite. ▪ Do not change oil on uncovered ground. Drip trays will be used to catch oil when vehicles are repaired in the field. ▪ Used oil and hydraulic fluids will not be discarded on the soil or buried. It will be removed from site and taken back to an appropriate dump. ▪ In the event of an hazardous spill:	A visual check to ensure wastes is managed according to the waste management plan. Frequency: Weekly. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
		- Immediately implement actions to stop or reduce the spill. - Contain the spill. - Arrange implementation of the necessary clean-up procedures. - Collect contaminated soil, water and other materials and dispose it at an appropriate waste dumpsite. ▪ Used solvents and grease should be stored in drums or other suitable containers. It should be sealed and recycled or disposed at an appropriate disposal site. ▪ Hazardous waste should not be burnt. ▪ Bunding, concrete slabs and/or other protective measures should be installed where hazardous materials are handled. ▪ Ensure that the staff are informed and have information pertaining to the management of spills or ingestion.	
o. Prevent diesel and oil spills during operation and	Concrete, diesel and oil spills and inadequate clean up.	▪ Clean up concrete, fuel and oil spills immediately. ▪ Clean small oil or fuel spills with an approved/appropriate absorbent material.	Checks to prevent and minimise oil and diesel spills and to ensure

Management Objectives	Potential Impact	Management Actions	Responsibility
maintenance and ensure adequate clean up.		▪ Contain oil or fuel spills in water using an approved oil absorbent fibre. ▪ In cases where oil spills cannot be cleaned up immediately, monitor seepage into deeper soils and groundwater. ▪ Do not bury polluted soil, but rather dispose it at an appropriate dump site. ▪ Provide bunding at fuel storage and transfer sites. The bunding should be big enough to contain 110% of the volume of the tank. Where a bund wall encloses a group of tanks, the bund wall must be able to contain 110% of the volume of the largest tank in the group. Tanks must stand on a concrete slab, or otherwise have a sealed, base in order to prevent the leakage of contaminants into the soil.	adequate clean up should spills occur. Frequency: Daily throughout the operation period. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
p. Waste Management	Littering (Litter such as paper, plastic etc. can be blown away into the surrounding environment).	▪ No littering will be allowed. The operation and maintenance areas will be kept free of waste at all times. All maintenance sites will be cleaned on a daily basis before leaving the site. ▪ Provide sufficient waste bins at worksites. Make sure that all waste is removed from the worksites. ▪ Bins should be placed in pairs to ensure that one is always present while the other is being emptied. ▪ Areas likely to generate higher quantities of waste shall be equipped with additional bins. ▪ Refuse bins must be stable, i.e. cannot be tipped by animals, and have scavenger and baboon proof lids. ▪ Make sure that the bins are covered so that plastic bags, paper etc. are not blown away. ▪ Make sure that the bins are regularly emptied and the waste taken to an appropriate waste dumpsite. ▪ The central waste storage vessel shall be emptied weekly or as necessary.	Checks to ensure that litter is disposed of correctly in bins provided. Frequency: Daily, at the end of the workday. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
q. Appropriate storage of machinery, vehicles and materials.	Inappropriate storage of machinery, vehicles and materials may result in the possible damage/disturbance of nearby undisturbed environments.	▪ Store machinery, vehicles and materials only in demarcated areas; ▪ Do not leave machinery and equipment standing around if not in use; ▪ Do not store machinery, vehicles or materials in undisturbed or rehabilitating areas	Regular inspection to ensure that machinery, vehicles and equipment are stored in designated areas. Frequency: Daily. Responsible Person: **Scheme Superintendent**.
r. Minimize the leakage of fuels and lubricants from vehicles and equipment.	The use of vehicles and equipment that may leak fuel and lubricants.	▪ Only service machinery and vehicles in designated areas. ▪ Regularly check your vehicle for fuel and oil leaks. ▪ Maintain vehicles and equipment in good conditions through regular and thorough servicing. ▪ Inform the Foreman of leaking vehicles and machinery so that he can schedule repairs. ▪ Only refuel on the bund created for that purpose. ▪ Immediately clean any accidental fuel and oil spills – do not hose spills into the natural environment. ▪ Dispose of contaminated soil as hazardous waste in the correct location on site.	Visual inspection to ensure that vehicles and equipment are in excellent condition and also to ensure that there is no leakage of fuels and lubricants. Frequency: Daily. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
		▪ If a mobile fuel bowser is used, then all refuelling shall occur with appropriate measures in place to prevent spillages (drip trays, funnels, non-dripping dispensing nozzles etc.) ▪ All mobile fuel browsers shall carry a spill kit that is adequately sized to contain at least a 200-litre spill. ▪ Train staff in the correct procedure/technique to transfer fuels. ▪ Make sure all vehicles are roadworthy. Repair faulty brakes, exhausts etc. immediately. ▪ Fire extinguishers shall be present whenever undertaking any form of hot work, i.e., welding, gas cutting, angle grinding, etc.	
s. Minimise the risk of HIV infection and the increase of STI's.	Risk of HIV infection.	▪ Provide an AIDS awareness programme to all the staff.	Verify that an awareness and education programme on the risks of HIV/AIDS and recommended preventative measures has been conducted. Frequency: Monthly

Management Objectives	Potential Impact	Management Actions	Responsibility
			Responsible Person: **Scheme Superintendent**.
t. Minimise the occurrence of injuries.	Injuries.	▪ Make sure that all staff are equipped and know how to use safety and protective gear. This includes hard hats, goggles, hearing protectors, dusk masks, steel-toed shoes etc. ▪ Keep a comprehensive first aid kit at the scheme offices and at maintenance sites. ▪ Establish an emergency rescue system for evacuation of serious injured people. ▪ Emergency procedures for accidents should be communicated to all employees. ▪ Dangerous areas must be clearly marked and access to these areas controlled or restricted.	Checks to ensure that correct procedures are followed, and that protective clothing are worn at all times during scheme operations and maintenance. Frequency: Check weekly. Responsible Person: **Scheme Superintendent**.

Management Objectives	Potential Impact	Management Actions	Responsibility
		▪ Good driving and adherence to safety rules will result in a minimum number of road and workplace accidents. ▪ Fire extinguishers must be available at all refuelling sites. Staff should be trained to handle such equipment. ▪ Nobody is allowed to dispose a burning or smouldering object in an area where it may cause the ignition of a fire. ▪ Hazardous substances must be kept in adequately protected areas to avoid soil, air or water pollution. ▪ Work areas, such as these for the maintenance of equipment, must be on concrete slabs. ▪ Explosives should be stored according to the prescribed regulations.	

7. REHABILITATION AND DECOMMISSIONING

7.1 Rehabilitation

Rehabilitation is the process of returning the land in a given area that has been disturbed by construction, operation, and maintenance to an acceptable state or an otherwise predetermined state. Many projects, if not all, will result in the land becoming degraded to some extent. However, with proper rehabilitation, most impacts associated with the construction, operation, and maintenance of the water pipeline could be mitigated and restored to an acceptable level. Poorly rehabilitated areas provide a difficult legacy issue for governments, communities, and companies, and ultimately tarnish the reputation of companies as a whole.

The Rehabilitation Phase refers to the period of the project after the completion of the actual construction works, the onset signalled by site clean-up, site rehabilitation, the withdrawal of the contractor from the site, and commencement of the maintenance period. To be fully effective, rehabilitation should begin as early as possible and be reviewed and updated on an ongoing basis. Rehabilitation should be an integrated part of all stages of the project life cycle.

Rehabilitation proposals and concept plans should be developed well before construction of the water pipeline and those plans should be revised from time to time.

7.2 Objectives of proper site closure and rehabilitation

The aim is to restore the area to an acceptable standard as close to its baseline environmental state as possible.

Objectives of proper site closure and rehabilitation include the following:

- Reduction or elimination of the need for a long-term management program to control and minimise the long-term environmental impacts;
- Clean-up, treatment or restoration of contaminated areas (e.g., soils contaminated by oil or fuel spills, concrete spills, etc.). Excavation of contaminated material and disposal thereof in an acceptable manner.

7.3 Rehabilitation measures to implement

a) A site inspection will be held quarterly by the CONTRACTOR after every maintenance work during the operation of the scheme. Rehabilitation will be done to the satisfaction of the ENV section and MET.

b) Frequent inspections of the scheme and effective follow-up procedures, to prevent minor defects from becoming major repair jobs.

c) Make sure all soil polluted during maintenance work is properly stored in drums and removed to an appropriate waste dump.

d) Make sure all windblown litter is removed once maintenance has seized.

e) Make sure that all potential hazards (i.e., the sewerage pit) are properly closed and left in a safe and neat position.

7.4 Rehabilitation and Closure Plan

All contractors will have to submit a Rehabilitation and Closure Plan for approval by the NamWater Environmental Section. The Environmental Section will also audit the implementation of the plan.

8. NAMWATER ENVIRONMENTAL CODE OF CONDUCT

What is an Environmental Code of Conduct?

It is a set of rules that everybody has to follow in order to minimise damage to the environment.

THE ENVIRONMENT

The ENVIRONMENT means the surroundings within which people live. The ENVIRONMENT is made up of the **soil, water, plants,** and **animals** and those characteristics of the soil, water, air, and plant and animal life that influence **human health and well-being**. **People** and **all human activities** are also part of the environment and have to be considered during the drilling process.

Do these ENVIRONMENTAL RULES apply to me?

YES, The Environmental Rules apply to EVERYBODY. This includes all permanent, contract, or temporary workers as well as any other person who visits the drilling site. Every person will be required to adhere to the Environmental Code of Conduct.

ALL PERSONNEL must study and keep to the

Environmental Code of Conduct

The Contractor will issue warnings and will discipline ANY PERSON who breaks any of the Environmental Rules. Repeated and continued breaking of the Rules will result in a disciplinary enquiry and which may result in that person being asked to leave the drilling site permanently.

What if I do not understand the ENVIRONMENTAL RULES?

ASK FOR ADVICE, if any member of the WORKFORCE does not understand, or does not know how to keep any of the Environmental Rules, that person must seek advice from the FOREMAN, CONTRACTOR'S REPRESENTATIVE or EMPLOYER'S REPRESENTATIVE. The PERSON that does not understand must keep asking until he/she is able to keep to all the Environmental Rules.

Safety and Security

1. Only enter and exit roadways and drilling areas at demarcated entrances.
2. Wear protective clothing and equipment as per signboards on site and according to instructions from your foreman.
3. Report to your CONTRACTOR'S REPRESENTATIVE if you see a stranger or unauthorised person in the drilling area.

4. Never enter any area that is out of bounds or that is demarcated as dangerous without permission of your CONTRACTOR'S REPRESENTATIVE.
5. Never climb over any fence or enter private property without permission of the landowner or your CONTRACTOR'S REPRESENTATIVE.
6. Do not remove any vehicle, machinery, equipment, or any other object from the drilling site without the permission of your CONTRACTOR'S REPRESENTATIVE.
7. Keep clear of blasting sites. Follow the instructions of your CONTRACTOR'S REPRESENTATIVE.
8. Never enter or work in the drilling area while under the influence of alcohol or other intoxicating substances.
9. Make your camp at a designated area. If possible, camp at already disturbed areas.
10. Campsites and work sites should not be on an archaeological site or sites of scenic or cultural interest. Camp sites and working sites must be clearly demarcated.
11. Keep drilling areas as small as possible.
12. All drilling areas and open trenches should be clearly demarcated.
13. All staff should know the emergency procedures in case of accidents.

Waste Disposal

14. Learn the difference between different types of waste, namely:
    - general waste, and
    - Hazardous waste.

Containers will be provided for different types of wastes.

<u>General Waste</u> includes waste paper, plastic, cardboard, harmless organic (e.g. Vegetables) and domestic waste

<u>Hazardous Waste</u> includes objects, liquids or gases that are potentially dangerous or harmful to any person or the environment. Sewage, fuel, tyres, diesel, oils, hydraulic and brake fluid, paints, solvents, acids, soaps and detergents, resins, old batteries, etc. are all potentially hazardous.

15. Learn how to identify the containers for the different types of wastes. Only throw general waste into containers, bins or drums provided for general waste.
16. Recycle drums, pallets and other containers.
17. Never bury or burn any waste on site, all waste is to be disposed in allocated refuse disposal containers, bins or bags.

18. Never overfill any waste container. Inform your CONTRACTOR'S REPRESENTATIVE if you notice a container that is nearly full.
19. Do not litter.
20. Do not bury litter or rubbish in the backfill trench.

Plants and Animals

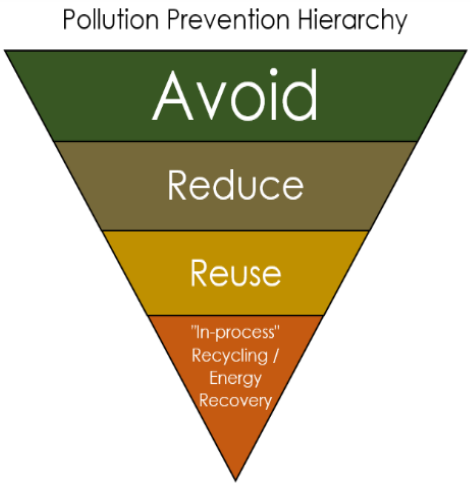
21. **Do not ever pick any plants, or catch any animal.** People caught with plants or animals in their possession will be handed to the authorities for prosecution.
22. Never feed, tease, play with, or set devices to trap any animal or livestock. Wild animals are not to be domesticated.
23. Keep off the rock outcrops unless given specific permission by the EMPLOYER'S REPRESENTATIVE to be there.

24. Never cut down any tree or branches for firewood.
25. Never leave rubbish or food scraps or bones where it will attract animals, birds, or insects.
26. Rubbish must be thrown into allocated waste disposal bins/bags.
27. Always close the gates behind you.

Preventing Pollution

28. Only work with hazardous materials in bunded areas.

29. Never discard any hazardous substances such as fuel, oil, paint, solvent, etc. into stream channels or onto the ground. Never allow any hazardous substances to soak into the soil.



30. Clean up spills immediately.
31. Immediately report to your CONTRACTOR'S REPRESENTATIVE when you spill, or notice any hazardous substance overflow, leak or drip or spill on site, into the streambeds or along the road.
32. Immediately report to your FOREMAN when you notice any container, which holds hazardous substances overflow, leak or drip. Spillage must be prevented.
33. Only wash vehicles, equipment and machinery, containers and other surfaces at work site areas designated by your CONTRACTOR'S REPRESENTATIVE.
34. Do not change oil on uncovered surfaces.
35. If you are not sure how to transport, store, use, or get rid of any hazardous substances ask your CONTRACTOR'S REPRESENTATIVE for advice.

Health

36. Drink lots of clean water every day.
37. Use toilets that have been provided.
38. Take the necessary precautions to avoid contracting HIV / AIDS. Condoms are available at most Clinics.
39. Inform your CONTRACTOR'S REPRESENTATIVE when you are sick.
40. Do not work with any machinery when you are sick.
41. If you are working in malaria areas you must take the necessary precautions.

Dust Control

42. Stockpile the top 20 cm of topsoil in small heaps and protect from wind erosion.
43. Do not make any new roads or clear any vegetation unless instructed to do so by your CONTRACTOR'S REPRESENTATIVE.
44. Keep to established tracks and pathways.
45. Keep within demarcated work areas.

Saving Water

47. Always use as little water as possible. Reduce, re-use and recycle water.
48. Never leave taps or hose pipes running. Close all taps after use.
49. Report any dripping or leaking taps and pipes to your CONTRACTOR'S REPRESENTATIVE.

Working Hours

50. Inform local authorities when the drilling process will commence.
51. You may only work on weekends and after hours with the consent of the CONTRACTOR'S REPRESENTATIVE.

Archaeological and Cultural Objects

52. If you find any archaeological, cultural, historical or pre-historical object on the drilling site you must immediately notify your CONTRACTOR'S REPRESENTATIVE.
53. Never remove, destroy, or disturb any cultural, historical, or pre- historical object on site.

<u>Cultural and Historical</u> Objects include old buildings, graves or burial sites, milestones, old coins, beads, pottery and military objects.

<u>Pre-Historical objects</u> include fossils and old bones, old human skeletal remains, pieces of pottery and old tools and implements.

For any enquiries, please call

Fillemon Aupokolo
Tell: 061-71 2095
Cell: 081 325 3301

OR

Jolanda Kamburona
Tell: 061-71 2105
Cell: 081 217 8116

9. REFERENCES

1. Christelis, G., and Struckmeier, W. (Eds.). 2011. Groundwater in Namibia an explanation to the Hydrogeological Map. Windhoek

2. Department of Water Affairs and Forestry. 2005. Environmental Best Practice Specifications: Construction. Pretoria.

3. Department of Water Affairs and Forestry. 2005. Environmental Best Practice Specifications: Site Management and Rehabilitation. Pretoria.

4. Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T. 2002. Atlas of Namibia: a portrait of the land and its people. Ministry of Environment & Tourism / David Philip: Cape Town.

5. Mendelsohn, J., Jarvis, A., Roberts, C., & Robertson, T. 2009. Atlas of Namibia: A portrait of the land and its people. Cape Town, South Africa: Sunbird Publishers (PTY).

APPENDIX A: GRIEVANCE PROCEDURE

All grievances should be submitted through the completion of the grievance registration form as presented below and submitted to the CONTRACTOR during the construction phase and to the Scheme Superintended during the operation and maintenance phase.

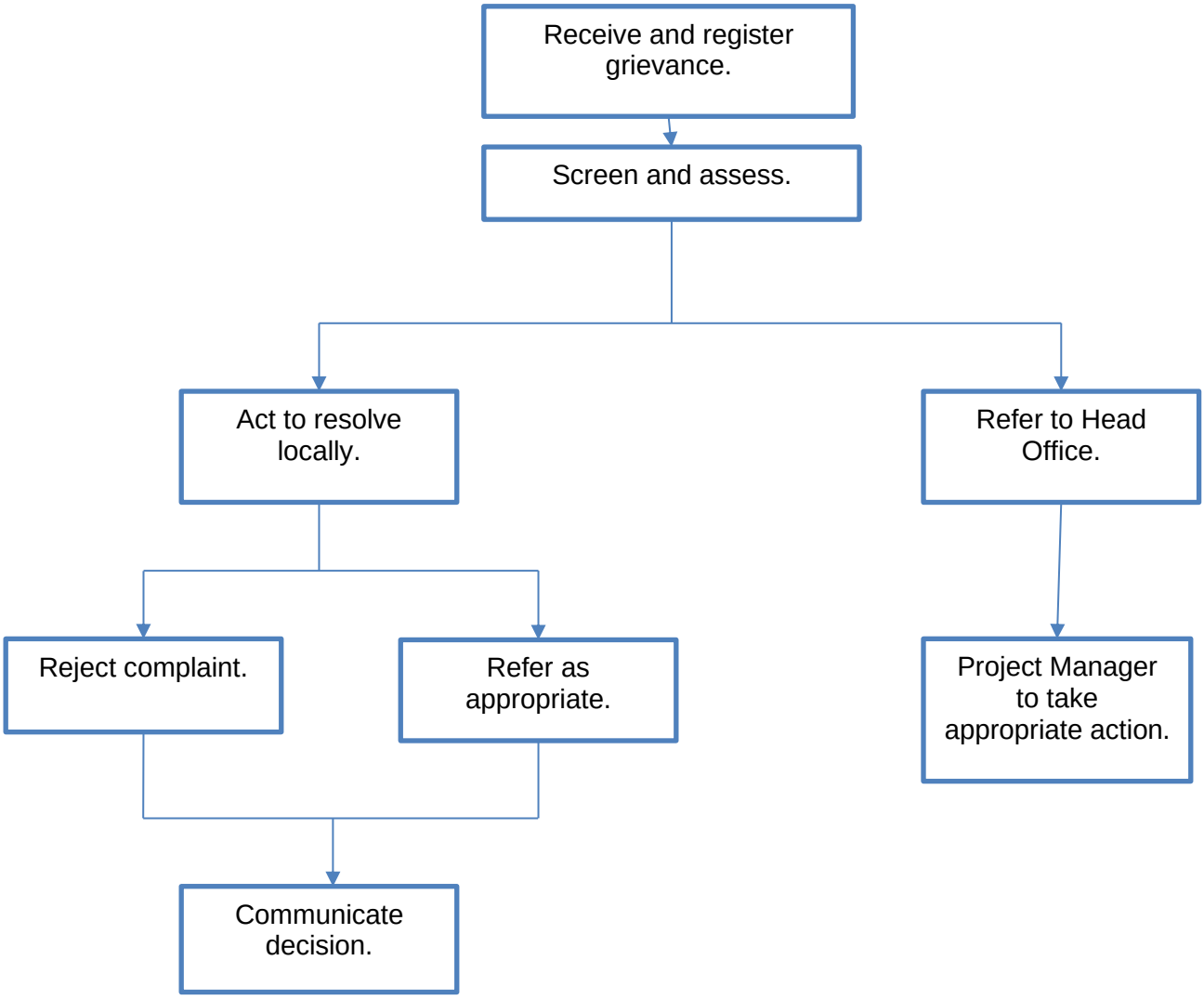


Figure 8: Grievance response procedure

Upon receipt of the registered grievance forms, the Contractor shall screen and asses to either act to solve the grievance locally or refer it to head office. If the grievance is referred to the head office, the line manager should decide. If the grievance is to be solved locally, it should either be rejected or handled appropriately of which the decision should be communicated to the aggrieved person.

GRIEVANCE REGISTRATION FORM

Grievance Registration	
Case No:	Date:
Name of complainant:	Cell no:
	Email address:
Details of grievance: (Date, location, persons involved, frequency of occurrence, effects of ensuing situation, etc)	
Name of person recording grievance:	Cell number:
Proposed date of response:	
Signature of recording person:	Signature of complainant:
Date of redress:	

APPENDIX B: EXAMPLE OF A METHOD STATEMENT

CONTRACT: ……..……... DATE: ……..

PROPOSED ACTIVITY (give title of Method Statement and reference number):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	**End Date:**

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible): Note: please attach extra pages if more space is required.

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____

(Signed) ***(Print name)***

Date: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement:

_____ _____

(Signed) ***(Print name)***

Date: _____

3) ENGINEER

The works described in this Method Statement are approved:

_____ _____

(Signed) ***(Print name)***

Date: _____

4) APPROVING AUTHORITY

The works described in this Method Statement are approved:

_____ _____

(Signed) ***(Print name)***

Date: _____