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ENVIRONMENTAL IMPACT ASSESSMENT AND COMPILATION
OF AN ENVIRONMENTAL MANAGEMENT PLAN FOR THE
CONSTRUCTION, OPERATION, MAINTENANCE AND
DECOMMISSIONING OF THE PROPOSED HENTIES BAY
PIPELINE AND THE REPLACEMENT OF THE
GROUND LEVEL RESERVOIR, HENTIES BAY, ERONGO REGION.

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ENVIRONMENTAL MANAGEMENT PLAN (EMP)

APRIL 2022

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LIST OF ACRONYMS

| | |
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| AC: | Asbestos Cement |
| DEA: | Directorate of Environmental Affairs |
| DWA: | Directorate of Water Affairs |
| EAP: | Environmental Assessment Practitioner |
| ECC: | Environmental Clearance Certificate |
| ECO: | Environmental Control Officer |
| EHP: | Environmental Health Practitioner |
| EIA: | Environmental Impact Assessments |
| EMA: | Environmental Management Act |
| EMP: | Environmental Management Plan |
| ERP: | Emergency Response Plan |
| ERWF: | Erongo Water Forum |
| GN: | Government Notice |
| HDPE: | High-Density Polyethylene |
| HWSS | Henties Bay Water Supply Scheme |
| I&APs: | Interested and Affected Parties |
| ILO | International Labour Organization |
| MEFT: | Ministry of Environment, Forestry, and Tourism |
| MoHSS: | Ministry of Health and Social Services |
| MSDS: | Material Storage Data Sheet |
| NYS: | National Youth Service |
| PM: | Project Manager |
| PPE: | Personal Protective Equipment |
| RE: | Resident Engineer |
| uPVC: | Unplasticized Polyvinyl Chloride |

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

The Namibia Water Corporation (NamWater) Ltd, supplies water to the Henties Bay Water Supply Scheme (HWSS) with groundwater from the Omdel well field that is linked to the Omdel-Swakopmund Water Supply Scheme. Due to aging infrastructure and increased demand, NamWater has decided to upgrade the bulk water supply infrastructure to the town of Henties Bay. Based on the future demand estimates, the bulk water supply pipeline from the Omdel off-take to the Henties Bay Town is not adequate. The class and size of the existing Henties Bay pipeline limit the maximum capacity of the off-take. Furthermore, the age of the pipes is an issue of concern as the oldest pipes are more than 50 years old and thus need to be replaced. The ground and elevated water storage facilities at Henties Bay have inadequate storage capacities, which cannot meet the 2-day storage requirement as per NamWater norm. Moreover, the reservoirs, although functioning, have been severely affected by the coastal environment resulting in the rusting of the reinforcing steel, which in turn has caused concrete spalling and exposure of rusted steel in some places.

This Environmental Management Plan (EMP) was prepared in line with Section 8 (j) of the EIA Regulations (GN 30 of February 2012), and the proponent's Terms of Reference. The EMP contains aspects of the proposed management and mitigation measures to be taken to address the negative environmental impacts and enhancement measures for the positive environmental impacts identified in the environmental scoping report. It also addresses the need for compliance monitoring of identified significant environmental impacts.

The EMP is therefore important in ensuring that the management actions arising from EIA processes are clearly defined and implemented through all phases of the project life cycle. It is not a standalone document; however, it must be read in conjunction with the Scoping report. All personnel taking part in the planning, construction, operation, and maintenance of the proposed HWSS should be made aware of the contents of this EMP. The EMP is also a dynamic document that allows for the evaluation of the success or failure of management actions and to carry out reorientation of the relevant actions if found necessary.

It should be noted that the EIA and EMP is a legally binding document between the proponent and MEFT and implementation of the recommended management actions is mandatory.

1.2 Objectives of the EMP

This EMP has been compiled for the management of potential environmental impacts during the planning, design, operation, and decommissioning phases of the proposed upgrading of the HWSS. The EMP also includes best practices for the generic issues of construction management and supervision as well as the ongoing management and operation of the scheme.

The specific objectives of this EMP are.

- Present measures to avoid, lessen and mitigate adverse impacts on various environmental components, and enhance the value of environmental components where possible.
- Define the roles and responsibilities for the implementation of environmental management and mitigation measures.
- Explain the need for compliance with regulatory provisions and guidelines.
- Explain procedures for compliance monitoring and reporting to the relevant competent and regulatory authorities.
- Present procedures for the possible decommissioning and required environmental rehabilitations.

2. ROLES AND RESPONSIBILITIES

2.1 Project involvement

The implementation of the EMP requires a multitude of administration of various role players, each with specific responsibilities to ensure that the proposed infrastructure is planned and designed, constructed, operated, and maintained in an environmentally sound manner.

Table 1: Project team

| NO. | SPECIFIC PROJECT ROLE | ADDRESS AND CONTACTS |
|-----|---------------------------------------|---|
| 1. | Proponent | <p>NamWater Ltd. Project Manager: Mr. Lazarus Muhimba Tel: +264 (61) 71-2240 Email: muhimbal@namwater.com.na</p> <p>Environmental Department: Mr. du Plessis Nicolaas Tel: +264 (61) 71-2093 Email: PlessisN@namwater.com.na</p> |
| 2. | Environmental Assessment Practitioner | <p>Green Gain Consultants cc Mr. Joseph Amushila Cell: +264811422927</p> <p>Mrs. Nangula Amutenya Amatsi Cell: +264 81 2024059 Email: info@greengain.com.na</p> |
| 3. | Local Authority | <p>Municipality of Henties Bay Mr. Dismon Kambatuamasa Executive: Infrastructure Exec.infrastructure@hbaymun.com.na</p> |

2.2 Responsible Parties

2.2.1 Proponent (NamWater)

The proponent shall play a pivotal role to ensure the successful implementation of this EMP. This can be achieved by designating an Environmental Control Officer (ECO) who should take responsibility to ensure the implementation of this EMP during the planning & design, construction, and decommissioning phase. As such the Resident Engineer (RE) in collaboration with the designated ECO shall ensure that:

- a) The objectives of the EMP are met.
- b) The Designing Engineer is aware of this EMP and has applied relevant proposed mitigation measures outlined in this EMP.
- c) Take disciplinary actions in cases of transgressions and non-compliance.
- d) That all environmental impacts are managed according to the environmental principles of avoiding, minimizing, mitigating, and rehabilitation as contained in this EMP.
- e) Appropriate compliance monitoring is executed as outlined in Section 7 (7.1).
- f) Handle grievances in the prescribed manners as outlined in Section 9.
- g) Notify the DWA and MEFT of any proposed changes to the scope of project and potential environmental impacts.

On the other hand, the Scheme Superintendent as the overall responsible official for the operation of HWSS shall oversee the implementation of this EMP during the operation and maintenance phases. The Scheme Superintended shall ensure.

- That a copy of this EMP is always kept on site.
- That all employees involved in the operation and maintenance of the HWSS are aware of this EMP and provide brief training (when necessary).
- Review of the on-site environmental management and implementation of the EMP by the employees.
- Conduct compliance monitoring as outlined in section 7 (7.2) of this EMP.
- Keep a record of emergencies and take corrective actions as per Section 8.
- All operation and maintenance activities are in line with NamWater's environmental code of conduct.
- Handle grievances in the prescribed manners as outlined in Section 9.
- Take appropriate disciplinary action against the HWSS maintenance employees in case of a transgression.

2.2.2 Design Engineer

The project Design Engineer is responsible for the completion of proposed project design layouts and drawings and providing technical information to the EAP for EIA study and preparation of the project EMP. The Design Engineer shall be available to consider amendments to the initial project design in accordance with the EMP.

2.2.3 Environmental Assessment Practitioner (EAP)

The EAP in collaboration with the NamWater Environmental team is responsible for the compilation of an Environmental Scoping report and EMP and submission of such reports to the competent authority (DWA) as well as the regulatory authority (MEFT). In addition, the EAP will make an application of the ECC on behalf of the proponent and make follow-ups on the application.

2.2.4 The contractor and sub-contractors

It is expected that various contractors and sub-contractors will be appointed at various stages and for various tasks during different phases of this project. All appointed contractors and sub-contractors involved in the project shall ensure compliance with the EMP and its conditions, thus the proponent must ensure that a copy of the EMP is given to all contractors involved. The contractor upon receiving this EMP, should ensure compliance to this EMP by:

- Undertaking their activities in an environmentally sensitive manner and within the context of this EMP.
- Undertaking good housekeeping practices during the duration of their activities.
- Ensuring that adequate environmental awareness training takes place in the language of their employees.
- Making provision for induction of the NamWater's environmental code of conduct.
- Keeping a record of emergencies and taking corrective actions as per Section 8.
- Taking appropriate disciplinary actions against their employees in case of transgression.

2.2.5 Erongo Water Forum (EWF)

The EWF was established by the Office of the Governor to ensure sustainable utilization of water resources in the region, and it consists of the Officer of the Governor, representatives from NamWater, representatives from various Local Authorities, including Henties Bay. The EWF is a good platform to ensure ongoing public participation and the involvement of relevant stakeholders in a meaningful way. It is expected that the progress and challenges facing the HWSS, and the main water source (Omdel Dam) will be discussed at this forum. Hence, NamWater and the concerned local authority (Henties Bay Municipality) should share information regarding the HWSS and also implement decisions taken at the EWF to ensure that the construction, operation, maintenance of the HWSS is done sustainably.

3. ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The successful implementation of this EMP will depend on various factors such as training and awareness, enforcement, good record keeping, and reporting.

3.1 Environmental awareness training

It is important to ensure that contractors, sub-contractors, and all HWSS employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and minimization of environmental harm.

To achieve this, all parties involved in any work at the HWSS during the construction, operation, maintenance, and decommissioning phases should be briefed on their obligation towards environmental protection in terms of the EMP before work commences. The training should also cover the actions outlined in the emergency response plan as well as NamWater's environmental code of conduct.

3.1.1 Construction phase

As part of tender requirements, contractors are obliged to educate their employees on the implementation of the EMP and NamWater's environmental code of conduct. Each contractor should provide training to their employees on environmental issues related to construction. This training can be in the form of an onsite talk before the commencement of any work. Employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) should be placed at prominent locations throughout the site. Record of such training should be kept by the contractor and should be handed to the Resident Engineer.

3.1.2 Operation and maintenance phase

The Scheme Superintendent should ensure that HWSS maintenance staff receive appropriate training on the environmental issues pertaining to the operation and maintenance of the proposed new pipeline and the new ground reservoir and to carry out their works in accordance with this EMP.

3.2 Recordkeeping

There should be an up-to-date filing system for the HWSS, whereby method statements, environmental incidents reports, training records, audit reports, and public complaints register are kept. It is advised that photographs of the site should be taken as a visual reference. The grievance register must be kept by the Resident Engineer (RE) during the construction phase and by the Scheme Superintendent during the operation phases, respectively.

3.3 Enforcements

This EMP upon approval by MEFT shall be a legally binding document, thus, the commitment and co-operation of the identified responsible person(s) will ensure effective implementation of the EMP. Adherence to this EMP will ensure that the environmental impacts associated with the project will be mitigated to a greater extent thus promoting sustainable development. The EMP will be enforced in accordance with the provisions of Section of the Environmental Management Act 07 of 2007 through a contract between NamWater and the contractor.

3.3.1 Method statements

The method statements are required especially during the construction phase to describe the scope of the intended work by the contractor. This should be provided in a step-by-step description for the RE or ECO to understand the contractor's intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. The method statements should also clearly stipulate mitigation methods of the intended works, against which the contractor's performance will be measured. In this case, the following method statements will be necessary during the construction phase.

- Details of the construction camps
- Construction procedures
- Materials and equipment to be used
- How and where materials will be stored
- The containment of accidental leaks or spills as prescribed by this EMP (Section 8.3.2: Emergency Response Procedures)
- Timing and location of activities; and
- Any other information deemed necessary by the ECO/RE

The contractor must submit the method statement two weeks before the commencement of any construction activity. Work may not commence until the method statement has been accepted by the RE and ECO and communicated to the workforce. The contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The RE or ECO may require changes to a Method Statement if the proposal does not comply with the specifications or if, the proposal may result in damage to the environment more than that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

3.3.2 Non-compliance and disciplinary actions

In cases of transgressions and non-compliance to the EMP, the following actions may be taken against the transgressor.

- Disciplinary actions
- Legal actions
- Termination of contract

The RE in collaboration with the designated ECO will ensure that the EMP is fully complied with by the appointed contractor and employees during the construction phase. The RE and ECO shall issue disciplinary actions based on the severity of the environmental damages and the nature and extent of the transgression / non-compliance. In addition, the proponent may also institute legal actions against the transgressor i.e., withholding of the contract retention money from the contractor until the transgression is rectified or terminate the entire contract for non-compliance, in line with the Public Procurement Act 15 of 2015 and NamWater's contract agreement.

The Scheme Superintended will ensure compliance during the operation and maintenance phase. Non-compliance or transgression shall result in disciplinary actions being taken against the transgressor. Transgressions should be recorded in a dedicated register and be filed.

3.4 Environmental reports

The ECO shall prepare a completion report upon the completion of the construction phase. The completion report should indicate the environmental performance, compliance to the EMP, and matter of incidental.

Furthermore, the proponent shall ensure regular monitoring of project activities during all project phases and keep records. These records may be required by the competent authority when deemed necessary or for the renewal of the ECC if the project is not complete within three years. The records will be required when applying for renewal of the ECC and NamWater will also have to indicate how the EMP was adjusted to make provision for improved mitigation measures and action plans.

4. LEGAL REQUIREMENTS

The EMP implementation shall be guided by the legislative framework as outlined in the Scoping report and briefly presented here below.

Table 2: Applicable National Laws

| LEGISLATION | PROVISION AND REQUIREMENTS |
|---|---|
| Constitution of the Republic of Namibia (1990) | <p>Articles 91 (c) commands the state to actively promote and sustain the environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include:</p> <ul style="list-style-type: none"> • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Protecting Namibia’s sense of place and character. • Maintain biological diversity. • Pursuing sustainable natural resource use. <p>Article 95(i) recites: “The State shall actively promote... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.</p> |
| Pollution Control and Waste Management Bill, 2003 | <p>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as provide for general waste management.</p> <p>The bill provides a framework for a multitude of administrations on pollution control and waste management in the country.</p> |
| Environmental Management Act 07 of 2007 | <p>Ensuring that the significant effects of activities on the environment are considered carefully and in time. To promote the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment.</p> <p>Of relevance to this project are the following listed activities, as provided in Section 27 of the Environmental Impact Assessment Regulations of 2012, which includes:</p> <p>No. 8.5 Construction of dams, reservoirs, levees, and weirs.</p> |

| | |
|--|---|
| | No.10.1 The Construction of oil, water, gas and petrochemical and other bulk supply pipelines. |
| Water Act 54 of 1956 and Water Resources Management Act 11 of 2013 | <p>The Water Resources Management Act 11 of 2013 is present without regulations; therefore, the Water Act 54 is still in force. The Act provides for the management and protection of surface and groundwater resources in terms of utilization and pollution.</p> <p>This Act further provides provision for the control, conservation, and use of water for domestic, agricultural, urban, and industrial purposes. In addition, the Act gives provisions that pertain to license or permit that required abstracting and using water as well as for discharge of effluent.</p> |
| Soil conservation Act 76 of 1969 | The objectives of the Soil Conservation Act 76, 1969 are to make provision for the combating and prevention of soil erosion, and the conservation, protection, and improvement of the soil, the vegetation, and the sources and resources of the water supplies. |
| Nature conservation Ordinance of 1975. | The Nature Conservation Ordinance Section 14 protects and preserves wild animal life, fisheries, wild plant life and objects of geological, archaeological, historical and other scientific interest and for the benefit and enjoyment of the inhabitants of Namibia. |
| Hazardous Substance Ordinance of 1974 | <p>This Ordinance provides for the control of toxic substances and is thus also relevant for pollution control. It covers the manufacturing, sale, use, disposal, dumping, importing, and exporting of hazardous waste.</p> <p>Of relevance to the proposed project are the use of Chlorine in water treatment and the unearthing of asbestos cement pipes which are classified as dangerous goods.</p> |
| Labour Act (No 11 of 2007) | <p>The Objectives of the National Labour Act are:</p> <ul style="list-style-type: none"> • To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. • Regulate basic terms and conditions of employment. • To ensure the health, safety, and welfare of employees; to protect employees from unfair labour practices. |

| | |
|---|---|
| | <ul style="list-style-type: none"> • To regulate the registration of trade unions and employers' organizations; to regulate collective labour relations. • To provide systematic prevention and resolution of labour disputes. |
| Asbestos Regulations: Schedule 1 (2) of Labour Act, 2007 (No. 11 of 2007, International Labour Organization Convention No. 162) | To comply with governmental requirements and minimize employee exposure, controls are necessary wherever there is a potential for exposure to airborne fibres. |
| Public Health and Environmental Act, 2015 | <p>The objectives of the PHE Act are to.</p> <ul style="list-style-type: none"> • Promote public health and wellbeing. • Prevent injuries, diseases, and disabilities. • Protect individuals and communities from public health risks. • Encourage community participation to create a healthy environment. <p>Provide for early detection of diseases and public health risks.</p> |
| Employment Service Act 8 of 2011 | To provide for the establishment of the National Employment Service; to impose reporting and other obligations on certain employers and institutions; to provide for the licensure and regulation of private employment agencies, and to deal with matters incidental thereto. |
| Atmospheric Pollution Prevention Ordinance 11 of 1976 | To provide for the prevention of the pollution of the atmosphere, and matters incidental thereto. The Ordinance deals with administrative appointments and their functions; the control of noxious or offensive gases; atmospheric pollution by smoke, dust control, motor vehicle emissions; and general provisions. |
| Pollution Control and Waste Management Policy, 2003 | The bill provides a framework for a multitude of administrations on pollution control and waste management in the country. Each authority identified by the bill shall play its respective role. |
| Basel and Rotterdam Convention, Framework Convention on Climate Change | Agreed to ensure environmentally sound management of hazardous waste and other wastes through the reduction of their movements, to reduce their impacts on human health and the environment. |

| | |
|---|--|
| Stockholm Convention on Persistent Organic Pollutants | Emphasizes the restriction and elimination of persistent organic pollutants especially the disposal of industrial and medical chemicals. It also provides information for future establishments to re-use, reduce and recycle waste with environmentally friendly technologies e.g., autoclaving. It was adopted in 2001 and entered into force on May 17, 2004. |
| MEFT Policy on HIV & AIDS | MEFT has recently developed a policy on HIV and AIDS. In addition, it has also initiated a program aimed at mainstreaming HIV and gender issues into environmental impact assessments. |
| National Heritage Act No. 27 of 2004 | The Act is aimed at protecting, conserving, and registering places and objects of heritage significance. |
| Local Authorities Act No. 23 of 1992 | The Local Authorities Act prescribes how a town or municipality should be managed by the Town or Municipal Council. |
| Roads Ordinance 17 of 1972 and its amendments | <ul style="list-style-type: none"> • Section 36.1 regulates rails, tracks, bridges, wires, cables, subways, or culverts across or under proclaimed roads • Section 37.1 deals with Infringements and obstructions on and interference with proclaimed roads. |
| Urban and Regional Planning Act No. 5 of 2018 | Town Planning Procedures will be applied for the proposed subdivision of Henties Bay town and Townlands No.133 and approval will be obtained from the Urban and Regional Planning Board. |
| Henties Bay Town Planning Scheme | Identify different land use categories, zoning, uses and consent uses. |
| Dorob National Park Rules and Regulations | Provides rules and regulations on what is allowed and not allowed in the park, as well as code of conducts within the park boundaries. |

5. MANAGEMENT OF IDENTIFIED IMPACTS

This section outlines the proposed mitigation measures to avoid, prevent and mitigate and/or enhance the identified potential impacts associated with the proposed HWSS. It also outlines the responsibilities of each party involved in the project implementation under each phase. The project activities are grouped according to the different operational processes and stages (planning & design, construction, operational, and decommissioning phase).

5.1 Planning and Design phase

This EMP aims to ensure best practices are implemented and environmental degradation is avoided through appropriate environmental protection and adherence to legal requirements. The EMP also ensures that the best alternative options are selected and implemented as recommended in the Scoping report. Below are some of the recommended actions

5.1.1 The new pipeline route and reservoir site

The recommended route for the new pipeline covers approximately 5,622 m and will take off from the same point as the old pipeline up to the new ground level reservoir site. The pipeline will be re-routed from the NYS fence and will cross the C34 road under the culvert. The recommended site for the new ground level reservoir is Alternative site 1 (Figure 1).

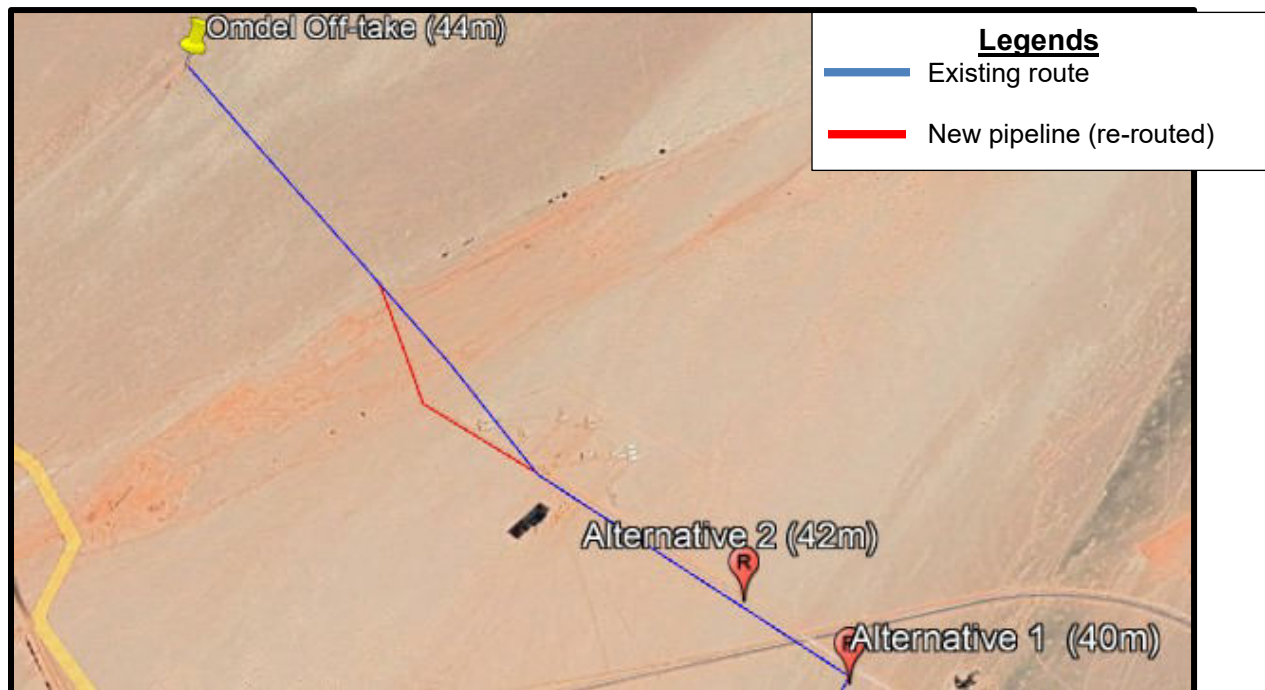


Figure 1: Recommended pipeline route and reservoir site

ii). Pipeline design and material type

In terms of pipeline construction design, the new pipeline will be buried next to the existing pipeline at a depth of 0.65 m for ease of construction and protection against weather effects. The UnPlasticized Polyvinyl Chloride (uPVC) material was considered as the preferred pipe material for the proposed pipeline replacement while the High-Density Polyethylene (HDPE) was recommended for the 760 m section of the Omaruru River crossing. At the crossing of the C34 road, the new pipeline should cross the road under the existing culverts (Figure 1). The culvert has 1800 mm length and 750 mm height, while the new pipeline size is 250 mm.



Figure 2: Existing culvert on the C34 road

As part of good practice, the pipeline should enter and exit the culvert at a 90-degree, perpendicular to the road, for a 10 m distance from the road.

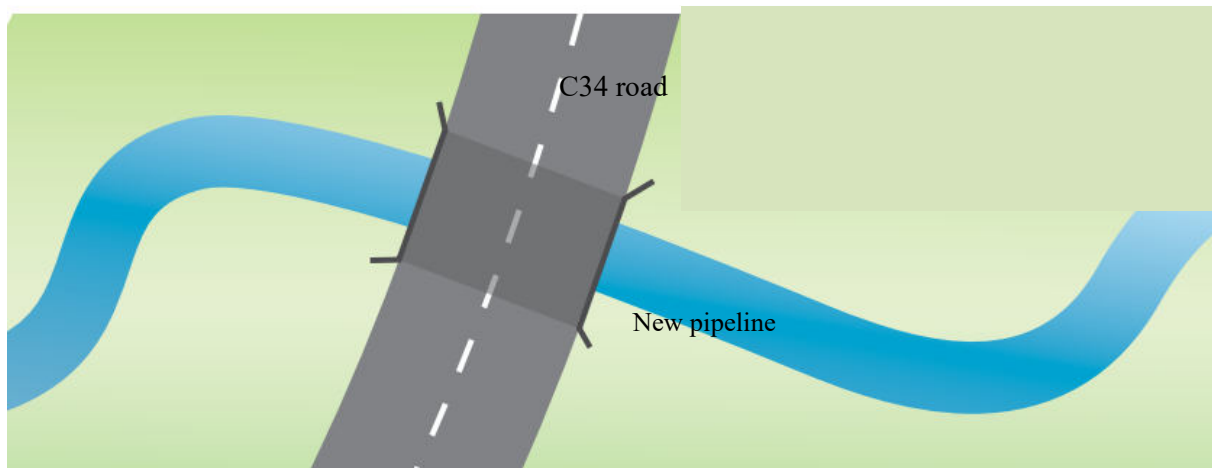


Figure 3: Recommended pipeline crossing at C34

5.1.2 Proposed mitigation measures

Table 3: Proposed mitigation measures during the planning and design phase.

| Environmental Issue/Impacts | Source of Impact | Mitigation Measures | Responsibility |
|---|--|---|------------------------|
| <p>Siting of the new pipeline route</p> | <ul style="list-style-type: none"> - The existing pipeline is crossing through the fence of the National Youth Services (NYS) center and the newly tarred C34 road is built on top of it. | <ul style="list-style-type: none"> - The proposed new pipeline will be rerouted outside the NYS center fence and to cross the C34 road under the culvert just a few meters away from the current crossing to avoid digging in the tarred road and smooth operations during the maintenance phase. - The servitude for the proposed pipeline should be registered with the Deeds Registry Office. This should also be incorporated in the Henties Bay Town Planning Scheme to safeguard the pipeline from future developments. - The size of the pipeline (250 mm) at the C34 road crossing will fit in the culvert (750 mm) and should enter the culvert at 90 degrees perpendicular to the culvert. - Approval should also be obtained from the Roads Authority before the construction commences. | <p>Design Engineer</p> |
| <p>The proposed pipeline capacity/size</p> | <ul style="list-style-type: none"> - The size of the existing pipeline (150 mm) was found be insufficient to supply the required amount of water as per | <ul style="list-style-type: none"> - The existing pipeline will be replaced with a bigger pipeline (250 mm) to meet the projected future water demand of the town. | <p>Project manager</p> |

| | | | |
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| | the current peak demand and projected future demand. | | |
| Storage capacity and siting of the new ground level reservoir | <ul style="list-style-type: none"> - The current capacity of the two 800m³ reservoirs does not correspond to the projected future water demand including NamWater's two-day storage norm. - Three alternative sites were considered for possible siting of the new ground level reservoir. | <ul style="list-style-type: none"> - The capacity of the proposed ground level reservoir (5000 m³) corresponds to the projected future water demand including NamWater's two-day storage norm. - The new ground level reservoir will be constructed at Alternative site 1. - NamWater should engage the Henties Bay Municipality to apply town planning procedures (Subdivision and rezoning) on the proposed reservoir site in line with the Urban and Regional Planning Act No.5 of 2018. - The site should be zoned as "Parastatals" in accordance with the Henties Bay Town Planning Scheme. - A geotechnical investigation should be conducted on the proposed site for the new ground level reservoir to assess the suitability of the soil and make recommendations for the floor design. - Provisions should be made for a perimeter fence around the area of the proposed ground level reservoir and associated infrastructure. - The provision of a security guardhouse should be made to protect the properties from vandalism and assure the safety of operators while on duty. | Project manager |

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| <p>Electricity/Power availability and sufficiency</p> | <ul style="list-style-type: none"> - It is expected that the site will be connected to the nearest Erongo Red overhead connection point. | <ul style="list-style-type: none"> - NamWater should make an application for power supply from Erongo Red to provide power to the new ground level reservoir site. | <p>Project Manager</p> |
| <p>Water pressure in the reticulation network</p> | <ul style="list-style-type: none"> - There is currently a problem of persistent low pressure in the northern and southern part of the Municipal reticulation network in Henties Bay | <ul style="list-style-type: none"> - The recommended site for the ground level reservoir was recommended because it is more elevated than the town centre. Hence, it will allow the water to gravitate to the distribution tower and other parts of the town with high pressure. - However, the Municipality of Henties Bay should construct a new supply pipeline from the new ground level reservoir to the elevated tower at the town CBD. - Another option is for the Municipality of Henties Bay to construct a booster pump station and more supply pipelines at the new ground level reservoir site to supply water to different main sections of the town. | <p>Municipality of Henties Bay</p> |

5.2 Construction phase

5.2.1 Environmental specifications

The following specifications cover the requirements for controlling the impact of construction activities on the natural and social environment. Although the specifications below apply during the construction phase, many of the activities are similar to the operation, maintenance, and decommissioning activities, hence, these specifications, where applicable will apply to these project phases as well.

i. Construction camp

It is recommended that Erf 419 located at Sand Street, in the town CBD should be used as a storage yard during the construction phase. The site is currently vacant, already belongs to NamWater, and is connected to the Municipal services i.e., freshwater, sewage, power, communication, etc.

However, should this site be found not suitable, the contractor should provide a method statement detailing the location, layout, lay-down yard, batching area, fuel storage, and other infrastructure. All construction vehicles should be parked at the dedicated parking area and no vehicle should be parked outside the designated area.

ii. Cement and concrete batching

The permitted location of a batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the ECO or RE. Concrete shall not be mixed directly on the ground. Boards, plastic sheeting, or other protective materials shall be used for this purpose.

iii. Access route

Existing routes (NamWater maintenance road) should be used as far as possible. No off-road driving should be allowed. Provision must be made for one access road to the site to minimize disturbances from vehicle movement during the construction phase. Notices should be placed on visible locations in the vicinity of the construction site to warn the public of construction activities and indicate that heavy vehicles may be using the road. Contractor/s shall control the movement of all vehicles and plant machinery so that they remain on designated/demarcated routes. Any

temporary roads required shall be decommissioned by the Contractor/s and rehabilitated using stockpiled topsoil.

iv. Earthwork and trenching

Earthworks are to be phased so that no areas are left exposed for longer than is necessary. This is especially important during the rainy season where runoff causes siltation downstream & overall erosion and loss of topsoil, etc. Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimize erosion.

v. Construction site; ground level reservoir

The construction works must be conducted within a limited area to facilitate control and minimize impacts on the surrounding environment. The purpose of the fenced areas is to control construction and personnel activity within the designated areas and limit unauthorized access. The fences and other temporary construction infrastructure must be removed upon completion of the construction works. The contractor should ensure the following

- The Contractor shall ensure that the clearance of vegetation is restricted to the working area.
- The Contractor shall at all times carefully consider what machinery is appropriate for the task while minimizing the extent of environmental damage
- The Contractor shall apply soil conservation measures to prevent erosion.
- Cleared vegetative material shall be collected and disposed of at the Henties Bay dumpsite. The disposal of vegetation by burying or burning is prohibited

vi. No-go areas

All areas outside the 20-30 m working corridor along the pipeline route and the demarcated working areas of the ground level reservoir site should be considered as 'no go' areas. The Contractor shall ensure that no unauthorized entry, stockpiling, dumping or storage of equipment or materials shall be allowed within the "no go" areas.

5.2.2 Proposed mitigation measures: Construction phase

Table 4: Potential negative impacts and proposed mitigation measures during the construction phase

| Environmental Issue/Impacts | Source of Impact | Mitigation Measures | Responsibility |
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| <p>Disturbance to local flora and fauna in the Dorob National Park</p> | <ul style="list-style-type: none"> - Part of the existing pipeline is in the Dorob National Park. National parks are gazetted with the aim of preserving wild animal life, fisheries, wild plant life and objects of geological, archaeological, historical and other scientific interest and for the benefit and enjoyment of the inhabitants of Namibia. - Construction activities such as offroad driving at unauthorised places, poaching of wildlife, illegal fishing and all other activities prohibited in the park will have negative impacts. | <ul style="list-style-type: none"> - Adhere to all Dorob National Park Rules and Regulations as attached in Annexure 7. - Comply with the instructions of signposts, signboards, pamphlets or communicated in any other manner. - Obey any legal order or instruction given by a Law-Enforcement Officer. | <p>Contractor/s/ Resident Engineer/ All drivers accessing the area including NamWater Employees</p> |
| <p>Disturbance to local flora and fauna</p> | <ul style="list-style-type: none"> - Construction activities will cause vegetation clearance and disturb natural habitats, especially for | <ul style="list-style-type: none"> - All disturbances will be limited to the existing NamWater pipeline maintenance zone (right of way width) which is 30 meters in extent and can be utilized as follows: | <p>Contractor/s/ Resident Engineer/ All drivers</p> |

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| | <p>small insects and ground burrowing animals.</p> <ul style="list-style-type: none"> - Disturbance to vegetation may also occur as a result of vehicle movement and off-road driving. | <ul style="list-style-type: none"> o 10 meters on one side (Soil side) of the trench to accommodate soil piles and 20 meters on the other side (working side) of the trench to accommodate the layup area, the work area, and the travel area for vehicles. - Existing access routes should be used as far as possible. - Avoid trapping of small animals and injury to any animal crossing or found along the pipeline route. - All vehicles should be driven at a maximum speed limit of 20km/hour. - Signage with speed limit should be erected along the route. - Only prepare trenches in short sections sufficient to be worked for a short period i.e., a week, and avoid leaving empty trenches for far too long - Provide barricades around uncovered trenches to ensure the safety of animals and people. | <p>accessing the area including NamWater Employees</p> |
| <p>Soil disturbances and contamination from bulk earthworks and civil works</p> | <ul style="list-style-type: none"> - The excavation of trenches and movement of construction vehicles will disturb the organisms in the soil and expose it to wind erosion. - Soil may also be contaminated from leaks and spills from construction | <ul style="list-style-type: none"> - Topsoil must be carefully extracted and kept separate from construction waste for use as backfill materials. - Limit the movement of vehicles to the construction working site and make use of existing access routes. - Vehicle movement should be restricted to within the width of the “working zone” which will be within 20 meters on the | <p>Contractor/s</p> |

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| | <p>vehicles and improper chemical handling.</p> | <p>one side of the trench as described and recommended above.</p> <ul style="list-style-type: none"> - Vehicles should be equipped with drip trays to prevent oil and fuel spillages. - Ensure proper maintenance of the construction vehicles and machinery. - In the event of spillages, they should be reported to the ECO and RE immediately and cleaned as soon as possible, following the spillage handling procedure presented in Table 11, response action during substance spillage. | |
| <p>Damage to geological resources</p> | <ul style="list-style-type: none"> - The alteration of topography due to excavations and bulk earthworks may disturb the surface geological settings. | <ul style="list-style-type: none"> - The disturbance of soil and geology associated with demolition and construction is inevitable. However, all site disturbances should be limited to the areas where structures will be constructed. - Stockpiles generated onsite must be used as backfilling materials rather than regarded as waste materials. | <p>Contractor/s</p> |

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| <p>Fuel and lubricants spill or leaks at construction, refuelling, and storage sites</p> | <ul style="list-style-type: none"> - The poor handling and spillage of fuel, lubricants, and chemicals i.e., oil, grease from construction vehicles could contaminate the soil, surface water, and groundwater. | <ul style="list-style-type: none"> - -There is a need for proper handling and storage of oil and fuel to ensure environmental protection. - -The RE shall provide specifications for storage of all oils and fuels (secondary containment etc.) and procedures for refuelling vehicles, plants, and equipment. - All leakages and spillages of oil and grease should be contained, cleaned up, and disposed of at the Henties Bay waste disposal site. <ul style="list-style-type: none"> • In the event of a hazardous spill: <ul style="list-style-type: none"> ✓ 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. - Drip trays should be provided for vehicles and machines with leakages. - All construction vehicles must be serviced at the maintenance workshop and no offsite maintenance should be allowed. - If refuelling is to be done onsite, a bunding wall, big enough to contain 120% of the volume of the fuel tank should be constructed at fuel storage and transfer site/s. | <p>Resident Engineer /Contractor</p> |
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| | | <ul style="list-style-type: none"> - Fire extinguishers must be available at all refuelling sites. Staff should be trained to handle such equipment. - Above ground fuel tanks should be on an impervious floor with bunding walls | |
| <p>Dust and air pollution</p> | <ul style="list-style-type: none"> - Excavation and construction-related activities i.e., cement mixing and backfilling will generate fugitive dust that will have a negative impact on the surrounding area and beyond. However, the worst case of dust pollution would be during windy conditions. - Trucks transporting construction material and construction residues to the dumping site will cause dust pollution to streets they would be passing through. - Other atmospheric pollution may result from fumes and noxious | <ul style="list-style-type: none"> - Employ dust control measures such as: <ul style="list-style-type: none"> • Sprinkler all haulage roads and construction areas with water. • Mixing of cement should be done with a concrete mixture or in an enclosed space. • Trucks transporting construction materials such as sand and stones should be covered with a tarpaulin. • Ensure proper maintenance of vehicles and equipment to minimize the release of fumes and other pollutants in the air. • All vehicles should be driven at a minimum speed limit of 40km/hr, within the Dorob National Park and 60km/hr, in town | <p>Contractor/s</p> |

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| | <p>gases released from vehicles and construction equipment i.e., hydrocarbon vapours, carbon monoxide, and sulfur oxides released.</p> | | |
| <p>Waste generation</p> | <ul style="list-style-type: none"> - Construction activities will generate several types of solid wastes such as waste rocks, food refuse, trash, scrap materials, oily rags, and empty products containers. - Additionally, liquid waste from construction camps will be generated. - All these types of waste will have a negative impact on surrounding areas if not disposed of properly and regularly. - In addition, the process of transporting all construction debris may also disturb neighbouring areas and constitute a nuisance to residents around the site and may not be aesthetically acceptable. | <ul style="list-style-type: none"> - All general waste generated at the site must be gathered and disposed to the Henties Bay waste disposal site. - Recyclable waste i.e., empty product containers, paper, plastic, etc., should be collected, sorted, and supplied to the recycling companies i.e. to Rent a Drum in Swakopmund. - Vehicles transporting waste should be sealed with a tarpaulin to avoid waste from being blown away by wind and prevent dust emissions. - Since the construction work is taking place away from the existing built-up area, provision must be made for sufficient portable ablution facilities during the construction period. - The recommended ratio is 2 toilets for every 25 people and separate water-closet for male and female) as per the general health Regulations (GN 121. 1969). - The ablution facilities should be cleaned regularly with detergents and disinfectant soap. | <p>Contractor/s</p> |

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| | | <ul style="list-style-type: none"> - Once full or at least once a week, the septic tanks should be emptied at the Municipality of Henties Bay sewage treatment plant. | |
| Disturbance to the hydrology of the Omaruru River | <ul style="list-style-type: none"> - The proposed supply pipeline will cross the mainstream of the Omaruru River by means of a 760 m steel pipe at a depth of 0.95 m. | <ul style="list-style-type: none"> - The pipeline section crossing the river should be constructed in such a way as to avoid blockage of surface flows and associated bedload. - Riparian vegetation outside the pipeline route should not be cleared as far as possible. - No refueling or fuel storage will be permitted within the Omaruru Riverbank. - Drip trays should be provided for vehicles and machines with leakages and such vehicles should not be parked for too long within the riverbank. - All leaks and spills of oil and grease should be contained, cleaned up, and disposed of at the Walvis Bay landfill site. | Contractor/s |
| Groundwater contamination | <ul style="list-style-type: none"> - The main impacts on groundwater associated with the pipeline construction could result from poor handling of liquid waste and chemicals, fuel spills, or leaks. | <ul style="list-style-type: none"> - The groundwater level in the area range occurs at a depth between 150-200 meters and around 20 m in the Omaruru River. The depth of excavation for the new pipeline will be approximately 0.65 m; hence it will not be encountered during excavations. - The construction depth for the ground level reservoir will be determined by geotechnical investigations. - Moreover, contractors should implement control measures on waste management and spill/leaks as outlined above. | Contractor/s |

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| <p>Land-use effects</p> | <ul style="list-style-type: none"> - The large section of the proposed pipeline passes through vacant land (which belongs to the Municipality of Henties Bay) and is far from residential areas. - The other land uses affected by the pipeline route are the Omaruru river, C34 road, and the NYS centre. - Disturbances to these land uses are expected as a result of vehicle movement and other construction-related activities. - Other noticeable impacts could be in the form of a nuisance because of noise, dust, and vibration. - The process of transporting all construction materials can also constitute a nuisance to residents in the access streets. | <ul style="list-style-type: none"> - Construction works should be limited to daylight and no work should be allowed during odd hours. - Construction materials i.e., pipes must be kept at the construction camps and only delivered when needed, rather than stacked onsite. - Only use designated access roads. - The construction site for the new ground level reservoir must be enclosed/barricaded. - The route of delivery vehicles should be selected to avoid residential areas as far as possible. - The emissions of dust and vibration from construction activities will occur for a short time and will likely be insignificant since the pipeline route is far from residential areas. | <p>Contractor/s</p> |
| <p>Disturbances from traffic movement</p> | <ul style="list-style-type: none"> - Construction of the proposed pipeline and ground level reservoir will require a large-scale transport operation due to the delivery of materials and construction workers to and from the site. | <ul style="list-style-type: none"> - The contractor must erect construction signage at the construction site. - Construction vehicles must be driven by authorized drivers only and stick to the authorized speed limits in urban areas. | <p>Contractor/s</p> |

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| | <ul style="list-style-type: none"> - Based on the experience of other similar projects, there will be a frequent movement of vehicles during the construction period. - Therefore, normal traffic movement, especially in the vicinity of the construction site and on the C34 road will be disrupted during the construction period. | <ul style="list-style-type: none"> - Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximize visibility and avoid accidents. - Revolving lights should be switched on when driving. | |
| Migrant construction workers and danger of HIV/AIDS and COVID-19 | <ul style="list-style-type: none"> - Migrant construction workers are likely to engage in casual relationships with locals. This may result in unplanned pregnancies, especially among school children, and may contribute to the spread of HIV/AIDS. - Moreover, the movement of people from other parts of the country will contribute to the spread of the latest pandemic of COVID-19. | <ul style="list-style-type: none"> - Provide health education and awareness. - Qualified local people should be given priority. - Enforce Public Health COVID-19 General Regulations: Public and Environmental Health Act 2015 as amended. - Regular health check-ups. - Non-local employees should return to their original residential areas after completion of the contract. | Contractor/s |
| Safety and health hazards | <ul style="list-style-type: none"> - Occupational health hazards are expected particularly about the construction workers who will be present at the site. - Workers will be exposed to dust, vibrations, high noise levels, sun | <ul style="list-style-type: none"> - Construction workers must be provided with appropriate Personal Protective Equipment. - Employees must also be trained on the nature of their job and made aware of potential hazards at their workplace. | Contractor/s |

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| | <p>exposure (sunstroke), and dehydration during the summer months.</p> <ul style="list-style-type: none"> - The safety of the public may also be compromised by certain construction activities i.e., uncovered trenches, increase in traffic volume generation of dust, noise, and vibration. | <ul style="list-style-type: none"> - Ensure there is always a safety representative equipped with a First Aid kit at the construction site. All staff should know who the Safety Representative is. - The construction site must be barricaded and out of bound for the public and visitors. - All health and safety standards specified in the Health and Safety Regulations of the National Labour Act 11 of 1992 should be complied with. - Construction vehicles should be marked with appropriate signage. | |
| <p>Impacts of temporary construction camps and workshops</p> | <ul style="list-style-type: none"> - The establishment of temporary construction camps will result in the generation of different types of waste. - Placing construction camps and workshops next to residential areas could result in a nuisance to the residents. | <ul style="list-style-type: none"> - Construction camps must be established on a site with impervious surfaces in line with Section 183 of the General Health Regulations (GN. 121 1969) and must be approved by the Municipality of Henties Bay's Environmental Health Practitioner (EHP). - Construction camps must be equipped with ablution facilities, including showers and a water closet with running water. The recommended ratio for toilets is 2 toilets for every 25 adults for separate for male and female as per the General Health Regulations (GN. 121 1969). - The floor of the maintenance workshop should be covered with industrial mats to contain oil and grease from vehicles and equipment servicing. - All operations should be limited to daylight and music played should not be at the discomfort of the neighbors. - No alcohol may be permitted in the construction camps and workshops. | <p>Contractor/s</p> |

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| | | - Fireplaces should be properly secured and controlled | |
| Landscape and visual/aesthetic impacts | - Visual impacts associated with the construction of the pipeline will occur because of the uncollected waste stockpile, unpacked construction materials, open trenches, and other facilities which makes the view of the site unappealing. | <ul style="list-style-type: none"> - Only prepare trenches in short sections sufficient to be worked for a short period i.e. a week and avoid leaving empty trenches for far too long - The stripped topsoil must be backfilled carefully in position after the completion of the pipe laying. - Waste generated should be collected and disposed of weekly. Excess sand from trenches should be regarded as waste. - Construction materials should be properly stacked in one place. - The construction area and construction camps and workshops should be kept neat as far as possible. | Contractor/s |
| Water requirements and consumption | - Construction activities will require a substantial amount of water. | <ul style="list-style-type: none"> - Employ water-saving measures such as <ul style="list-style-type: none"> • Re-use water for least important activities • Use water sparingly. • Avoid wastage, spillage, contamination, etc. | Contractor/s |
| Mixing of cement | - Pollution and contamination of the environment may occur as a result of improper handling of cement. | - Concrete shall not be mixed directly on the ground. Impermeable protective materials such as boards, plastic sheeting, mixing trays, etc., shall be used for this purpose. | Contractor/s |

- The concrete batching works shall be always kept neat and clean. No batching activities shall occur on an unprotected substratum of any kind.
- Contaminated water from batching areas shall not be allowed to overflow but shall be collected, stored, and disposed of at a site approved by the RE and ECO.
- Unused cement bags shall be stored in weatherproof containers to prevent windblown cement dust and water contamination during rainfall or runoff events.
- Used cement bags shall be disposed of regularly via the solid waste management system and shall not be used for any other purpose.
- Care shall be taken to collect contaminated wash water from cleaning activities and dispose of it in a manner approved by the RE and ECO.
- In the case of bulk cement, suitable screening and containment shall be in place during storage, loading, and batching to prevent wind-blown contamination.
- The contractor shall collect all contaminated water and fine material from exposed aggregate finishes and store it in sumps for disposal at an approved waste disposal site.
- All visible remains of excess concrete and aggregate shall be removed on completion of the plaster or concrete pour work and disposed of.

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| <p>Fire outbreaks</p> | <ul style="list-style-type: none"> - Construction activities such as welding, cooking, burning, etc., have the potential to cause fire outbreaks. This can be aggravated by the presence of flammable and combustible items i.e., fuel, vegetation, etc. | <ul style="list-style-type: none"> - In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a waste disposal method. - Any fires that occur shall immediately be reported to the RE. - Ensure a designated smoking area far from fire hazard areas such as the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. - Cigarette butts must be disposed of in a designated container. - There must be a competent fire safety officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. - Contractor shall be equipped with appropriate basic fire-fighting equipment (e.g., fire buckets, extinguishers, fire beaters, etc.) at all times. - Open fires for cooking purposes are not allowed, except within the accommodation camp under controlled conditions. Alternative energy sources should be provided. | <p>Contractor</p> |
| <p>Criminal activities i.e., theft</p> | <ul style="list-style-type: none"> - Construction materials and untended equipment kept onsite may attract criminals. | <ul style="list-style-type: none"> - Materials and equipment that will be stored in locked rooms or must be placed in a way that does not attract criminals. | <p>Contractor/s</p> |

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| Emergency response | <ul style="list-style-type: none"> - Emergency may occur may time during the construction phase and may delay the project implementation if not handled timely. | <ul style="list-style-type: none"> - Emergencies shall be handled as per the Emergency Response Procedures (ERP) presented in Section 8. | Resident Engineer |
| Handling of complaints and grievances | <ul style="list-style-type: none"> - Grievance may be received from residents with regard to construction activities. | <ul style="list-style-type: none"> - All complaints and grievances shall be reported in the Form (Annexure 3) and submitted to the RE. - The RE shall handle the grievance as per the Grievance response procedure presented in Section 8.4 - | Resident Engineer |
| Worker's Accommodation | <p>Accommodation of workers on site in a camp could lead to:</p> <ul style="list-style-type: none"> - Creation of new access roads, especially if workers are returning late at night with poor visibility - Unsanitary environment with production of domestic grey wastewater - Fires - Illegal hunting of wildlife at night | <ul style="list-style-type: none"> - Labour force should be sourced locally where possible. The local labour force already has places to stay and would not need to be accommodated on site. - The labour force sourced outside of Henties Bay should not be accommodated on site but should rather rent houses and accommodation establishments already existing in town. - The new pipeline will be about 7.3 km long. This is short distance and workers can be transported from town to the site and back. - Open fires are prohibited at the construction site. | Resident Engineer Contractor/s |

5.2.3 Proposed mitigation measures: Operation phase

Table 5: Potential impacts and proposed mitigation measures during operation and maintenance phase

| Environmental Issue/Impacts | Source of Impact | Mitigation Measures | Responsibility |
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| Biophysical | Disturbance to local flora and fauna | <ul style="list-style-type: none"> ✓ Existing maintenance roads should be used as far as possible ✓ All vehicles should be driven at a minimum speed limit of 40km/hr. within the Dorob National Park and 60km/hr, in town | Scheme Superintended |
| | Soil disturbances and contamination. | <ul style="list-style-type: none"> ✓ Soil disturbance from this activity is expected to be minimal. | Scheme Superintended |
| | Damage to geological resources. | Excavations will only be necessary for the repair of burst water pipes. Hence, disturbance from this activity is expected to be minimal. | Scheme Superintended |
| | Fuel and lubricants spills or leaks. | <ul style="list-style-type: none"> ✓ All leakages and spills of oil and grease should be contained, cleaned up, and disposed of at the Henties Bay waste disposal site. | Scheme Superintended |
| | Dust and air pollution | <ul style="list-style-type: none"> ✓ All construction vehicles and machinery must be roadworthy and driven within the maximum driving speed limits. ✓ Dump trucks loaded with sand or other building materials should be covered with tarpaulin to contain dust emissions. <p>All cement mixing should be done in an enclosed area.</p> | Scheme Superintended |
| | Waste generation | <ul style="list-style-type: none"> ✓ General household waste should be disposed of in the municipal refuse bins for disposal | Scheme Superintended |

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| | | <ul style="list-style-type: none"> ✓ Worn-out parts can be collected and sent to the local scrap yards. ✓ All empty disinfectants containers should be sent to the local recycling companies or properly cleaned before re-use. <p>Hazardous waste such as used oil, paints, unused chemicals, etc., should be collected separately and sent to Walvis Bay Hazardous waste cell.</p> | |
| | Disturbance to the hydrology of the Omaruru River. | No refueling or fuel storage should be permitted within the Omaruru riverbank. | Scheme Superintended |
| | Groundwater contamination | Contaminated soil must be removed and disposed of at the Henties Bay disposal site. | Scheme Superintended |
| Socio-Economic | Land-use effects | Use existing maintenance roads and no off-road driving should be allowed. | Scheme Superintended |
| | Disturbances from traffic movement. | <ul style="list-style-type: none"> ✓ All vehicles should be driven at a minimum speed limit of 40km/hr. within the Dorob National Park and 60km/hr. in town. <p>Use existing maintenance roads as far as possible.</p> | Scheme Superintended |
| | Safety, security, and health hazards. | Employees should be equipped with appropriate PPE. | Scheme Superintended |
| | Landscape impacts | <ul style="list-style-type: none"> ✓ Backfill all trenches/excavations ✓ Waste generated should be collected and disposed of regularly. | Scheme Superintended |
| Nuisance | The potential source of a nuisance during the operation phase is excessive noise from running pumps, especially if not properly maintained | <ul style="list-style-type: none"> ✓ The pumps are to be housed in one single room, hence the noise generated will not be emitted to the surrounding. ✓ The combined noise produced in the pump station should not exceed 85dBA as recommended by the National Labour Act. | Scheme Superintended |

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| <p>Public health and safety risks</p> | <p>- The HWSS maintenance staff are at risk of numerous risks such as.</p> <ul style="list-style-type: none"> ○ Exposure to noxious gases emitted from the dosing system in cases of malfunctioning. ○ Presence of disease-carrying vectors i.e., flies, mosquitoes | <ul style="list-style-type: none"> ✓ Maintenance staff must be made aware of potential occupational health hazards associated with their jobs. ✓ Employees must be equipped with appropriate PPE suitable for each task undertaken. ✓ Keep the area clean and tidy by removing waste and unwanted vegetation. | <p>Scheme Superintended</p> |
| <p>Exposure to chemicals and hazardous substances</p> | <p>- The operation and maintenance of the HWSS will generate certain chemical substances i.e., <i>chlorine, flocculants, lime, carbon dioxide, etc.</i></p> <p>The risk of exposure can be aggravated by factors such as lack of awareness, lack of protection, physical fatigue, etc.</p> | <ul style="list-style-type: none"> ✓ Compile an inventory of all hazardous substances at the workplace and implement hazard control measures as follow. <ul style="list-style-type: none"> • All chemicals and disinfectants must be handled and stored in accordance with their respective MSDS provided by the manufacturers/suppliers. • Employees must be equipped with chemical-resistant PPE when handling chemicals. • Provide training to all maintenance staff to create awareness of the danger of chemical exposure and possible response measures in case of accidents. • First aid kit must be kept at the plant and must be accessible to all staff. • Ensure regular inspection of the disinfection system and storage rooms to detect and report leakages. • Empty containers which contained chemicals can be reused for the same purpose or returned to authorized recycling | <p>Scheme Superintended</p> |

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| | | <p>companies and should not be thrown away as waste materials.</p> <p>✓ Warning signs must be placed in chemical storage rooms and chlorination rooms.</p> | |
| Waste generation | <p>- The operation of the HWSS will result in the generation of different types of waste from different plant operational activities such as.</p> <ul style="list-style-type: none"> • Debris from raw water screening and the inlet works. • General household waste from office operations and operator houses. • Wear-off parts from maintenance and repair of plant infrastructures, vehicles, and equipment. • Lubricants from maintenance of vehicles and equipment. • Building rubble from renovations • Empty containers and packaging materials. | <p>✓ Compile an inventory of all types and quantities of waste generated at the site.</p> <p>✓ Provide adequate and separate waste handling facilities for each waste type at the site and ensure regular collection and disposal.</p> <p>✓ Follow the waste management hierarchy in managing waste as follow: Avoid- Reduce- Reuse-Recycle- Recover- Treat- Dispose of.</p> <p>✓ General household waste, debris from the screening process, building rubble, and worn-out non-metallic parts must be disposed of at the Henties Bay waste disposal site.</p> <p>✓ Metallic worn-out parts should be taken to the nearest scrap yards for recycling.</p> <p>✓ Empty containers which contained chemicals should be taken to the Walvis Bay Hazardous Waste cell.</p> | Scheme Superintended |

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|--|---|---|----------------------|
| Risk of fire | <ul style="list-style-type: none"> - Sources of fire outbreaks during operations could be electrical shocks and due to the presence of flammable and combustible items i.e., fuel. | <ul style="list-style-type: none"> ✓ Ensure that all firefighting devices are in good working order and are serviced. ✓ Holistic fire protection and prevention plan are needed. This plan must include an emergency response plan, firefighting plan, and spill recovery plan. ✓ Maintain regular site, mechanical and electrical inspections, and maintenance. ✓ Clean-up and contain all oil spills/leaks. | Scheme Superintended |
| Visual Impact | <ul style="list-style-type: none"> - Improper handling of waste in and around the site could deplete the aesthetic view of the place. | <ul style="list-style-type: none"> ✓ Ensure regular waste disposal, at least weekly. ✓ Ensure good housekeeping and routine maintenance of infrastructures and surroundings. | Scheme Superintended |
| Increase in crime-related issues. | <ul style="list-style-type: none"> - The HWSS me infrastructures i.e., fences, storage dam, pumps, etc., are at risk of vandalism from the member of the public. | <ul style="list-style-type: none"> ✓ Provide security around the site and ensure regular inspections for all plant infrastructures. ✓ Ensure proper and regular maintenance of the perimeter fence around the site. ✓ Breaches in the fencing must be repaired immediately. | Scheme Superintended |
| Emergency response | <ul style="list-style-type: none"> - Emergency may occur may time during the operation and maintenance phase and may affect the water supply scheme operation and disrupt | <ul style="list-style-type: none"> ✓ Emergencies shall be handled as per the ERP presented in Section 8. | Scheme Superintended |

| | | | |
|--|---|---|--|
| | the quality and quantity of water supply to the area. | | |
| Handling of complaints and grievances | - Grievance may be received from residents, customers with regards to operation or maintenance. | <ul style="list-style-type: none"> ✓ All complaints and grievances shall be reported in the Form (Annexure 3) and submitted to the Scheme Superintended. ✓ The Scheme Superintended shall handle the grievance as per the | Scheme Superintended |
| Risk of fire | - Sources of fire outbreaks during operations could be electrical shocks and due to the presence of flammable and combustible items i.e., fuel. | <ul style="list-style-type: none"> ✓ Ensure that all firefighting devices are in good working order and are serviced. ✓ Holistic fire protection and prevention plan are needed. This plan must include an emergency response plan, firefighting plan, and spill recovery plan. ✓ Maintain regular site, mechanical and electrical inspections, and maintenance. ✓ Clean-up and contain all oil spills/leaks. | Scheme Superintended |
| Disturbance to local flora and fauna in the Dorob National Park | - Part of the existing pipeline is in the Dorob National Park. National parks are gazetted with the aim of preserving wild animal life, fisheries, wild plant life and objects of geological, archaeological, historical and other scientific interest and for the benefit and enjoyment of the inhabitants of Namibia. | <ul style="list-style-type: none"> - Adhere to all Dorob National Park Rules and Regulations as attached in Annexure 7. - Comply with the instructions of signposts, signboards, pamphlets or communicated in any other manner. ✓ Obey any legal order or instruction given by a Law-Enforcement Officer. | Contractor/s/ Resident Engineer/ All drivers accessing the area including NamWater Employees |

| | | | |
|--|---|--|--|
| | <ul style="list-style-type: none">- Construction activities such as offroad driving at unauthorised places, poaching of wildlife, illegal fishing and all other activities prohibited in the park will have negative impacts. | | |
|--|---|--|--|

5.2.4 Proposed enhancement measures: Positive impacts

Table 6: Proposed enhancement measures for the envisaged positive impacts of the HWSS

| Environmental Issue/Impacts | Source of Impact | Enhancement measures | Responsibility |
|-------------------------------------|---|--|--|
| Job opportunities for locals | <ul style="list-style-type: none"> - The proposed project will create job opportunities both direct and indirect for local people in technical and non-technical fields such as civil, electrical, mechanical, security, etc. | <ul style="list-style-type: none"> - The priority must be given to locally qualified and unqualified people given the local unemployment rate and job scarcity. Women must be given the same opportunities as men. - Recruitment should include both men and women. | Project Manager/Contractors |
| Business opportunities | <ul style="list-style-type: none"> - The construction works will create business opportunities for consultants, building contractors, and local suppliers of building materials. - Other local businesses such as hotels and street vendors will also benefit indirectly from the construction works. | <ul style="list-style-type: none"> - Qualified Namibian construction companies should be given a fair chance to compete in the bidding process, which will be done in accordance with the Public Procurement Act 15 of 2015. - Construction materials should be sourced locally as far as possible to enhance the local economy. | Central Procurement Board of Namibia (CPB), NamWater internal Procurement Committee. |

| | | | |
|------------------------------|---|--|--|
| Water supply security | <ul style="list-style-type: none"> - One of the significant positive impacts that will result from the proposed project is the improved water security of the supply to the area. Hence, the increased storage capacity will ensure a reliable supply of safe drinking water to the Henties Bay Town. | <ul style="list-style-type: none"> - Develop a water demand plan for the supply area. - A contingency plan must be in place to ensure water supply in case of an emergency. | Scheme Superintendent |
| Economic contribution | <ul style="list-style-type: none"> - The improved water supply will contribute to the growth of the local economy by attracting investments and development in the area. - During the construction of the proposed pipeline, ground reservoir, and associated infrastructure, it is expected that the local economy will be beneficially impacted by increased temporary employment opportunities and business opportunities. | <ul style="list-style-type: none"> - Approval for all economic developments in the town should be subjected to the water demand management plan of the HWSS to avoid future demand challenges. - The priority must be given to locally qualified and unqualified people given the local unemployment rate and job scarcity. Women must be given the same opportunities as men. | Henties Bay Municipality/ Scheme Superintendent |

6. DECOMMISSIONING AND REHABILITATION

6.1 Decommissioning of the existing supply pipeline

Once the new pipeline has been commissioned, the old pipeline will be decommissioned, and a switchover will be done without causing any interruption of the water supply. The typical ways to decommission pipelines are dismantling and local decommissioning. Local decommissioning entails the process of pigging, segmenting, plugging, and filling pipelines. The other decommissioning option is to leave it (pipe) in the ground.

6.1.1 Abandoning of pipeline in the ground

The section of the existing pipeline from the Omdel off-take to the C34 road consists of a 1340 m (160 mm diameter) Class 6 Unplasticized Polyvinyl Chloride (uPVC), 760 m (150 mm diameter) steel, and 410 m (160 mm diameter) Class 6 uPVC pipeline constructed in 1984. This section of the existing pipeline will not be removed but instead, it will be left in the ground. Although this section is located within the townlands, it is outside the built-up area and not within the expansion zone of the development. Leaving the pipeline in the ground will minimize disturbance to the surrounding environment. Removing the pipeline in totality also proves costly for the proponent at this given time. The following measures should be applied.

- A servitude should be registered for the section of the abandoned pipe.
- Additionally, the abandoned pipeline route should be marked using beckons. This will safeguard future developments from building on top of the pipeline which might affect the stability of structures.

6.1.2 Demolition of the pipeline section (Asbestos Cement)

The section of the pipeline from the C34 road to the existing bulk water storage facilities at the town CBD consists of a 4040 m (150 mm diameter) Class C 90 m working pressure Asbestos Cement (AC) pipeline, constructed in 1968. The section as depicted in the Figure 4 below is running through a portion of land planned for cemetery extension and is also in close proximity to adjacent private properties.

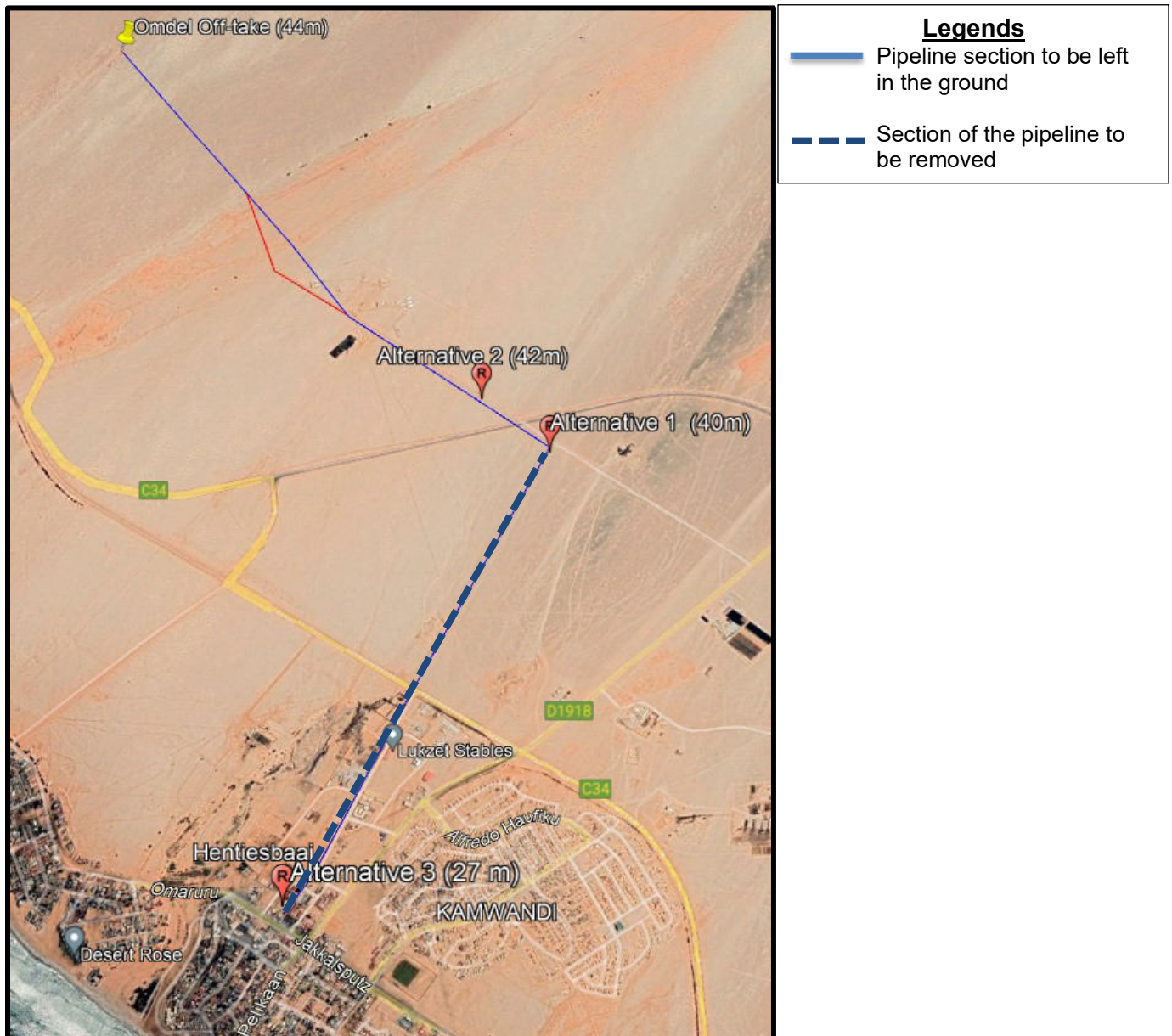


Figure 4 AC pipeline built in 1968

Currently, NamWater and the Municipality of Henties Bay are in negotiations regarding the future of the AC pipeline. Should the two party agree that the AC pipeline be left in the ground, then the registered servitude should be incorporated in the Henties Bay Town Plans.

Should the two parties agree that the AC pipeline be removed, then exhumation/unearthing of the pipeline material and covering of the trenches will be done. Several environmental and health impacts are likely to emanate from the decommissioning activities. The potential impacts and proposed mitigation measures during the removal and exhume of AC pipeline are described in Table 7 below.

6.1.3 Potential impacts during the removal of the AC pipeline section

Table 7: Potential impacts and proposed mitigation measures during the removal and exhumation of AC pipeline

| Environmental Issue/Impacts | Source of Impact | Mitigation Measures | Responsibility |
|--|---|--|---------------------|
| <p>Removal of old Asbestos Cement</p> | <p>Asbestos has been classified by the International Labour Organisation (ILO), Occupational Cancer Convention No. 139 as a carcinogenic (cancer-producing) material. Asbestos workers have increased chances of getting cancer.</p> <p>Cancer will not develop immediately following asbestos exposure but appear only after several years.</p> <p>Improper handling of asbestos-containing materials puts workers and the general public at risk of developing asbestos-related lung cancer and asbestosis.</p> | <ul style="list-style-type: none"> - All work should be done in conformance with the requirements of asbestos regulations made under schedule 1 (2) of the Labour Act, 2007 (No. 11 of 2007). - Asbestos materials should only be removed by a contractor who is registered as Approved Inspection Authority (AIA) for asbestos removal and demolition. - The registration can be done with the Ministry of Labour, Industrial Relations and Employment Creations: Division of Occupational Health and Safety. Deputy Director - Occupational Health & Safety Ms Petrina Nghidengwa Telephone: +264 61 2066302 Fax: +264 61 212323 Email: Petrina.Nghidengwa@mol.gov.na and or Johanness.Shihepo@mol.gov.na - Only personnel who are deemed competent to render asbestos removal and demolish are to remove asbestos. The competent person should always be present or readily available. | <p>Contractor/s</p> |

| | | | |
|-----------------------------------|--|---|--------------|
| | | <ul style="list-style-type: none"> - Asbestos removal shall only be done by asbestos workers approved to work with the competent person. - Wearing Personal Safety Protection: Workers must wear an N-100 or P-100 respirator and protective clothing to prevent asbestos exposure. - Asbestos-containing materials should be wetted before any removal efforts. All asbestos waste generated during the project must be wetted before it is double bagged in Certified packaging (usually polythene 'pipe bags' plastic bags with proper labelling). - Any part of any vehicle in which a person transports asbestos waste is covered, and leak-proof during transportation. - Bonded asbestos material is securely packaged during transportation. - Friable asbestos material is kept in a sealed container during transportation. | |
| Safety and health hazards: | The safety of residents living in the neighbourhood of the site and of the employees could be compromised by workplace hazards. | <p><i>Apply mitigation measures provided in Proposed mitigation measures: Construction phase</i></p> <p><i>Table 4 above</i></p> | Contractor/s |
| Environmental pollution | Different types of waste will be generated i.e., general household, excess sand, etc., and pipeline materials which are to be excavated. | Asbestos materials should only be disposed of at an approved Hazardous disposal site which is designated to receive asbestos waste. The nearest is the Walvis Bay Hazardous Waste Disposal Site. | Contractor/s |

| | | | |
|-------------------------|--|---|--------------|
| Land-use effects | <p>The existing pipes are located within a built-up area, hence unearthing them will cause disturbances to the neighbouring residents.</p> <p>Dust, Noise, and Vibration to be generated from excavations and demolishing works.</p> | <i>Apply mitigation measures provided in Table 4 above.</i> | Contractor/s |
|-------------------------|--|---|--------------|

6.2 Decommissioning the existing ground level reservoirs

Once the new HWSS has been implemented, the existing two ground level reservoirs will become obsolete. It is not clear at this stage whether the existing ground level reservoirs will be demolished or not. To make an informed decision of whether to demolish this infrastructure and or to continue making use of them, NamWater should commission a civil study to determine the structural form and stability of the existing infrastructure. Moreover, extensive repairs will have to be executed before this infrastructure can be utilized.

However, should it be decided that the two existing ground level reservoirs will be demolished, a thorough investigation should be done to identify the types i.e., hazardous, and determine the amount of waste to be produced. Some of the expected environmental impacts associated with the demolition of the ground level reservoirs are as follows.

- **Land use effects:**

The existing ground level reservoirs are located within a built-up area, hence demolishing them will cause disturbances to the neighboring residents. Dust, Noise, and Vibration to be generated from excavations and demolishing works.

- **Environmental pollution**

Different types of waste will be generated i.e., general household, excess sand, etc., and pipeline materials which are to be excavated. Asbestos materials should only be handled by a registered Approved Inspection Authority for Asbestos removal and demolition. Soil contamination from spills and leaks of lubricants and oil from vehicles, machinery, and equipment could also occur.

- **Safety and health hazards:**

The safety of residents living in the neighborhood of the site and of the employees could be compromised by workplace hazards.

Since all above-identified impacts are similar to issues during the construction phase, such impacts can be mitigated by applying measures provided in Table 4 above

6.3 Decommissioning of the proposed 5000 m³ reservoir

The decommissioning of the new proposed new 5000m³ and the associated infrastructure is not foreseen in the immediate future. However, should the decommissioning of the proposed reservoir or its components become pertinent at any stage, an EIA study should be undertaken and EMP should be prepared before the commencement of any decommissioning works. The EMP should entail the following components.

- The nature of the envisaged decommissioning and rehabilitation process
- Types and nature of components to be decommissioned i.e., buildings, piping, etc.
- Types and quantity of waste to be produced i.e., hazardous waste and non-hazardous waste like building rubble, uPVC, HDPE, asbestos, concrete, etc.
- Proposed waste management strategy.
- Responsibilities of each party to be involved in the decommissioning process.
- Envisaged environmental rehabilitation procedures.

6.4 Rehabilitation

Rehabilitation is defined as the process of taking all the necessary actions to repair the damaged environment in-order to make the land suitable for other uses or to simply beautify the affected area. In this case, the rehabilitation will entail clean-up, treatment, or restoration of contaminated areas (e.g., contaminated soils by oil or fuel spills, concrete spills, etc.) and refilling of excavated pits with the overburden. Upon commencing of construction works, the ECO and RE shall conduct a site inspection and instruct the responsible contractor to do the following.

- Removal of all waste produced to be disposed of appropriately.
- Rehabilitate the disturbed areas and refill of excavations.
- Clean up all spills and leave the area safe and tidy.

During the operation phase, the Scheme Superintended shall conduct a site inspection after every maintenance work and ensure rehabilitation of disturbed areas. Rehabilitation measures during the operation phase will include.

- Clean up all soil polluted during maintenance work and disposal to an appropriate waste dump site.
- Remove all windblown litter once maintenance has ceased.
- Remove all potential hazards (i.e., the sewerage pit) and ensure the area is left safely and neatly.

- Any temporary work camps setup should be dismantled, and the area rehabilitated as far as practicable, to their original state
- Driving vehicles on freshly rehabilitated areas will be prohibited.
- Temporary access roads not required for long term maintenance access will be closed and rehabilitated to a condition compatible with the surrounding land use.
- Signage will be erected where access routes are to be retained but are not public access.

Table 8: Rehabilitation management actions

| PARAMETER | REHABILITATION MANAGEMENT ACTION | RESPONSIBILITY |
|-----------------------|---|-------------------------|
| Overall | Progressive rehabilitation shall be undertaken to minimise the amount of disturbance time. The disturbed area will be re-profiled to original or stable contours, re-establishing surface drainage lines and other land features. | Construction Contractor |
| Infrastructure | All temporary infrastructure, signage and other installations other than those required for environmental, or safety reasons shall be removed once backfilling and tie-ins are completed. | Construction Contractor |
| Waste | All waste materials (e.g. bags, pegs, skids, pillows) shall be removed from the construction areas once backfilling and tie-ins are completed. | Construction Contractor |
| Soils | Compaction relief shall be undertaken by scarifying or ripping as required along the contours, followed by raking and levelling. | Construction Contractor |
| Erosion | The beds of watercourses to be restored to the original gradient and the bank to the natural contours post disturbance. | Construction Contractor |
| Erosion | Backfill crown to be graded and shaped as closely as practicable to pre-existing contours and flow patterns of riverbed and riparian zone. | Construction Contractor |
| Erosion | Banks to be reinstated in a manner that minimises erosion potential and does not alter natural streamflow - this may include the installation of rock gabions, rip rap, cement/s and hessian bags. | Construction Contractor |

7. ENVIRONMENTAL MONITORING

To ensure continual improvement in environmental performance and reduce adversity of potential negative impacts, it is advisable to keep monitoring the identified environmental receptors.

7.1 Monitoring during the construction phase

Monitoring of all activities during the construction period will be under the responsibility of the Contractor, whose environmental performance will be controlled by the RE and the ECO or NamWater's Environmental Section.

Table 9: Monitoring plan during construction

| Element | Location | Type of monitoring | Frequency of monitoring | Purpose of monitoring |
|--|--|---|--|---|
| Dust | At the construction sites | Visual monitoring | During periodic site visits | To ensure adherence to environmental protection requirements |
| Wastewater flows generated at the construction sites | At the construction sites | Visual monitoring | During monthly site visits | To ensure adherence to environmental protection requirements |
| Collection of solid waste | At the construction sites | Visual monitoring | During periodic site visits | To ensure adherence to environmental protection requirements |
| Use of dangerous materials (paints with heavy metals, lead compositions, asbestos-cement slabs, pipes, inflammable, toxic substances, etc.) | At the construction sites with the right documentation | Visual monitoring and study of documentation | Each month | To ensure adherence to environmental protection requirements |
| Protective measures at the construction site | At the construction sites with the right documentation | Visual monitoring | Each month | To ensure adherence to environmental protection and safety requirements |
| Earth restoration after excavation works | At the construction sites | Visual monitoring | After construction works | To ensure adherence to environmental protection requirements |
| Noise & vibrations resulting from equipment work | Project area/close to settlements | Portative noise metering device | During periodic site visits, daily | To ensure adherence to environmental protection requirements |
| Traffic operation /movement | At the construction sites | Visual monitoring of machinery and trucks carrying construction materials | During periodic site visits | To ensure adherence to environmental protection requirements |
| Vehicle and pedestrian safety when there are no construction activities | At the construction sites | Visual monitoring by supervisor | On daily basis during the construction phase | To ensure adherence to requirements |

7.2 Monitoring during the operation phase

During the operation phase, the Scheme Superintended must ensure that compliance monitoring is conducted at different intervals/frequencies throughout the HWSS operational life span as indicated in the table below.

Table 10: Monitoring plan during the operation phase

| The issue to be monitored | Monitoring Objectives | What needs to be monitored | Frequency and means of Monitoring |
|---|---|---|---|
| Production and distribution losses | Prevent water wastage and ensure water conservation. | -Overflows, leakages, pipe bursts, etc. | Daily inspections and meter reading |
| Public Health risks | Operate the HWSS in an environmentally friendly and socially acceptable manner. | Reeds and overgrown vegetation Presence of mosquitoes, snakes, rodents, etc. | Monthly inspections and physical observation. |
| Occupational health risks | Ensure health and safe working condition | Chemical exposure and presence of health hazards | Daily physical observations. |
| Water quality | Supply of safe and quality drinking water in line with the Water Quality Guidelines of the Water Act. | Physical quality of raw, settled, and treated water (<i>Chlorine level, N.T.U, pH, Conductivity, and Temperature</i>). Microbiological/ bacteriological quality (<i>Free Chlorine, Heterotrophic Plate count, Total Chlorine, Coliforms & Faecal Coliforms</i>). | -every two hrs. sampling and testing. -Once a week sampling and laboratory testing |
| Water Balance | Ensure water security of the supply area. | Production figures vs. sales figures and demand management | Monthly water balance checks. |
| Waste management | Prevent environmental pollution and contamination. | Litter chemical storage & handling, cleanliness, Chemical composition of sludge. | -Daily inspections and physical observation. -Quarterly chemical testing |
| Implementation of the EMP | Ensure compliance to this EMP and adherence to the regulative measures during planning & design, construction, operation, maintenance, and decommissioning of the envisaged HWSS. | Implementation of specified measures and compliance to the EMP and other relevant legal requirements. | Biannual environmental report to MEFT. |

8. EMERGENCY RESPONSE PLAN

This section provides an emergency response plan which entails the types and effects of emergencies associated with the proposed HWSS as well as procedures and actions to be taken in case of emergency during the construction, operation, and maintenance of the HWSS.

8.1 Types and effects of emergencies

Emergencies can occur at any time or place either during the construction, operation, and maintenance of the HWSS. These emergencies may affect the HWSS operation and disrupt the quality and quantity of water supply to the area. Some of the emergencies which are associated with the proposed HWSS are as follows.

- Substance spillage i.e., oil, concrete, chemicals, etc.
- Variation in water flow
- Construction accidents
- Fire outbreak
- Power failures
- Equipment failure

8.2 Sources of emergencies

The above-mentioned emergencies maybe occur as a result of accidents, faulty maintenance, and/or negligent operation. These factors and their relationships to the construction, operation, and maintenance of the proposed HWSS are detailed below.

8.2.1 Accidents

Accidents may occur during construction, operation or maintenance works and can cause an unavoidable interruption to the HWSS works, personal injury, and/or property damage.

8.2.2 Faulty maintenance

Faulty maintenance may cause unexpected breakdowns on the HWSS which may have a direct bearing on its operation and the life span of the HWSS infrastructure. Good maintenance will result in the infrastructure performing throughout the design period; however, poor maintenance or faulty maintenance will shorten the expected life of the infrastructure. Although some breakdowns can be repaired during a regularly scheduled repair program and probably do not

represent an emergency, the regular occurrence of such breakdowns will affect the continued satisfactory operation of the HWSS which may constitute an emergency condition.

8.2.3 Negligent operation

Certain operational procedures need to be followed to ensure the satisfactory performance of the HWSS. Not following correctly, the established procedures constitute negligent operation. The negligent operation may also result from a lack of knowledge to operate the HWSS components. Although the negligent operation may not be as readily noticeable as faulty maintenance, the emergency condition resulting from it could be more severe because it could affect HWSS operation before being discovered. The Scheme Superintended shall ensure routine maintenance of HWSS equipment, keep an extra supply of parts that require frequent replacements and ensure to always stock enough chemicals to maintain operations for at least 30 days.

8.3 Emergencies response procedures

8.3.1 Response priorities

Depending on the nature of the emergency, the following response plan must be implemented as an integral part of the HWSS routine operations to lessen the severity of the emergency. All response actions should be geared toward the following priorities in the order below.

- Safety of People (always First)
- Protection of the Environment
- Protection of Assets

8.3.2 Emergency response procedures

Table 11: Emergency response procedures during construction, operation, and maintenance

| NO. | Type of Emergency | Response actions | Responsible |
|-----|---|--|------------------------|
| 1. | Substance spill i.e., concrete, oil, chemicals, etc. | <ul style="list-style-type: none"> - Stop and control the spill at the source first. - Contain the spill/leakage with appropriate containers i.e., drip trays, sumps, etc., and in an approved manner to the satisfaction of the RE. - Clean the affected area with water or an approved cleaning product. - The contaminated soil should be removed and disposed of at the Henties Bay Waste Disposal Site. - Repair vehicle or machinery with leakage. - If it cannot be repaired, such vehicle or machinery should not be used until it is safe to do so. - Report the incident to the RE and record it in the logbook. | - Contractor |
| 2. | Variation in water flow due to lack of or limited availability at the source (Omdel Dam) | <ul style="list-style-type: none"> - All consumers should be encouraged to always store enough potable water to meet their emergency needs. - In case of emergency, the following actions should be taken. <ul style="list-style-type: none"> • Should any emergency arise, NamWater should inform the Municipality of Henties Bay immediately. The Municipality of Henties Bay would then keep the public well informed on the water supply situation and provide information on what customers can do to conserve and prepare for a large number of inquiries. • Isolate the raw water and emergency storage sump by closing sluice gates. • Ensure that the pumps on the feed pipeline are off. • The emergency raw water storage dam should be filled to cover for the next 7 days. | - Scheme Superintended |

| | | | |
|-----------|----------------------|--|------------------------|
| | | <ul style="list-style-type: none"> • The reservoir should always be filled up to 70% daily. • Make every effort to develop a fair and equitable system for allocating water to the customers. • Investigate alternative water supply measures to critically affected consumers such as schools, hospitals. For instance, hauling potable water by trucks or backup supplies from other HWSSs. | |
| 3. | Power failure | <ul style="list-style-type: none"> - Ensure there is an emergency power supply capable of maintaining minimum water treatment operations. - The emergency power equipment should be checked at least monthly to ensure that they remain in good operating condition. - Provide a log to document a monthly check of emergency power supply operation. - List name and number of power supplier: Erongo Regional Electricity Distributer - In case of power loss. <ul style="list-style-type: none"> • Check if the power failure is local (site) or the whole suburb/town. • If the whole town, contact Erongo RED. • If locally, inspect the source of power loss, restart the main switch. • If necessary, inform critical customers. • Record source of power shortage in the power supply logbook | - Scheme Superintended |
| 4. | Fire outbreak | <ul style="list-style-type: none"> - Follow the holistic Fire Approach as presented in Annexure 3 | - Scheme Superintended |

| | | | |
|----|---|--|-----------------------------------|
| 5. | Chemical leakage i.e., chlorine leak | <ul style="list-style-type: none"> - In case of Chlorine or CO₂ gas leakage <ul style="list-style-type: none"> • Make sure storerooms are built according to legal requirements for the storage of chlorine with appropriate ventilation. • Wear a face mask with a B2P3 filter. • Evacuate all persons in the affected room. • Shut down all the dosage system valves. • Check information on the dosage system control panel. • Isolate the faulty dosage system and replace the gas cylinder with the leak. • Record in the incident report form. | - Scheme Superintended |
| 6. | Accident i.e., injury to a person | <ul style="list-style-type: none"> - The priority after a construction accident should be to get medical attention for an injured person. - Assess the injured person's situation by checking breath, pulse. - Notify the First Aid Person - Assist the First Aid Personnel - Record in the incident report form. - Report incident to the Scheme Superintendent | - Contractor/Scheme Superintended |
| 7. | Equipment failure i.e., pumps failure, loss of pressure, etc. | <ul style="list-style-type: none"> - The HWSS is designed with limited automation, thus there should always be an Operator on duty. - In case of faulty pump/s <ul style="list-style-type: none"> • First analyze the source of emergency by checking information displayed on the SCADA system. • Check the flow rate of each pump to identify the fault. • Ensure that the standby pump is switched on. | - Scheme Superintended |

8.4 Grievance response procedure

All grievances should be submitted through the completion of the grievance registration form as presented in Annexure 5 and submitted to the RE during the construction phase and to the Scheme Superintendent during the operation and maintenance phase.

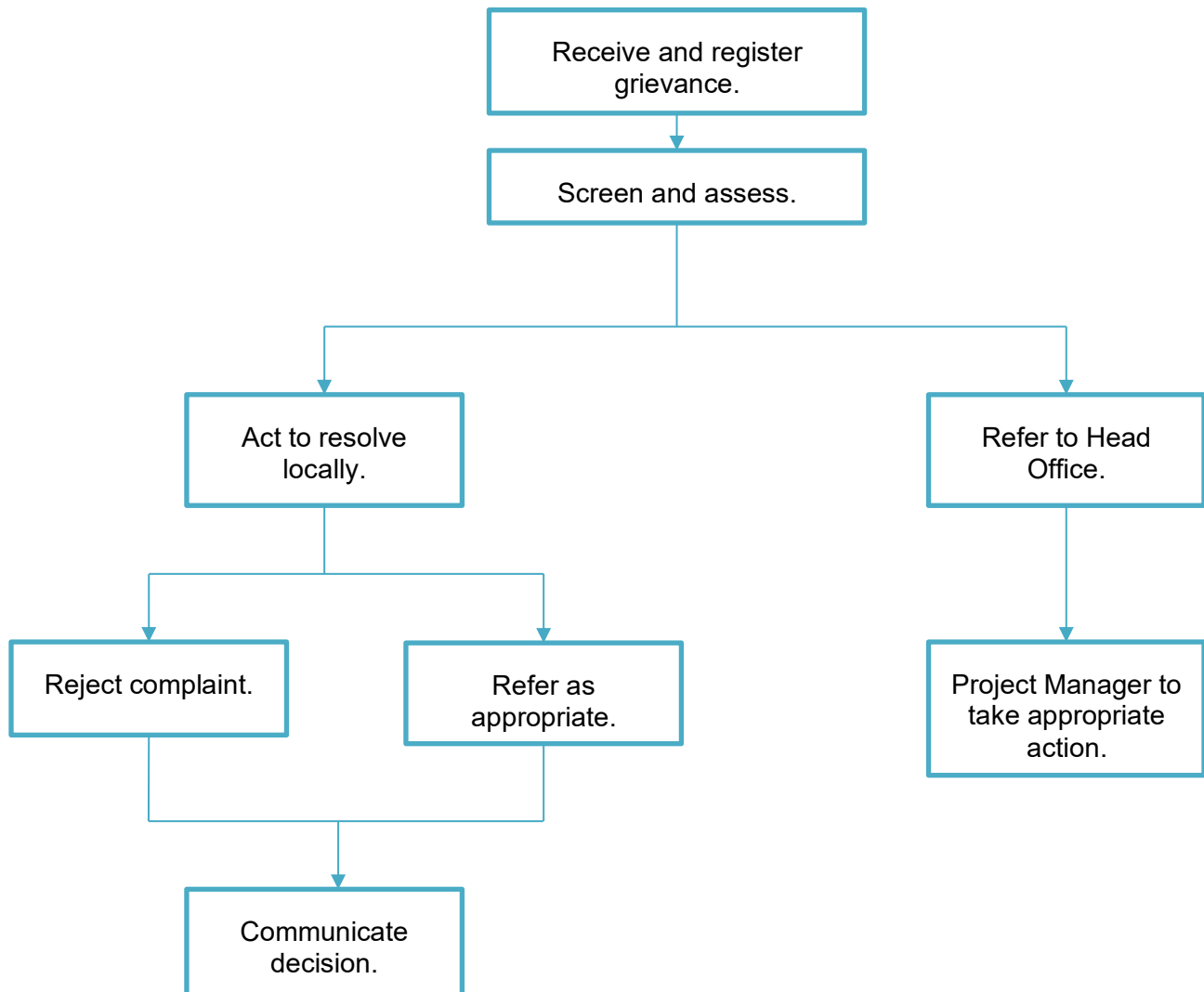


Figure 5: Grievance response procedure

Upon receipt of the registered grievance forms, the RE or Scheme Superintendent shall screen and assess 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.

9. CONCLUSION

The preparation of this EMP is based on the current information provided, any changes or deviation with regards to the proposed pipeline route and /or the proposed ground level reservoir site shall trigger changes to this EMP. If all mitigation measures are implemented as outlined in the EMP, it is anticipated that the consequences and/or probability of the predicted negative impacts will be managed/reduced.

Although the implementation of this EMP requires a multitude of administration, NamWater should play a pivotal role in the implementation as outlined in this report. NamWater should also ensure proper coordination with all parties involved in the project activities during all project phases. NamWater shall also ensure to avail necessary resources (i.e., human, financial, etc.) and training to enable the full implementation of this EMP. The implementation of this EMP can be combined with NamWater's environmental code of conduct. Monitoring of certain environmental parameters must be conducted regularly as outlined in this EMP. Environmental biannual reports must be kept available for possible submissions to the MEFT and ensure the renewal of the project's ECC.

Upon approval by the MEFT, this EMP should be used as an on-site reference document for the proposed HWSS, during the planning & design, construction, operation and maintenance, and decommissioning phase, thus a copy of this EMP shall be always kept onsite. It is a legally binding document, thus, any deviation or transgression from this EMP is punishable by law as per the Environmental Management Act 07 of 2007. Parties responsible for transgressing may be held responsible for any rehabilitation that may need to be undertaken.

10. ANNEXURE

10.1 Annexure 1: Environmental compliance monitoring checklist

10.2 Annexure 2: Emergency contacts

10.3 Annexure 3: Fire response procedures

10.4 Annexure 4: Incident / Accident report form

10.5 Annexure 5: Grievances register form

10.6 Annexure 6: Nam Water's environmental code of conduct

10.7 Annexure 7: Dorob National Park Rules and Regulations

Annexure 1: Environmental Compliance Monitoring Checklist

The following checklist should be used during the compliance monitoring.

PART 1: ADMINISTRATIVE INFORMATION

| | | |
|-----------------------|------------------|---------------------------------|
| Project Title: | | Date: |
| Project location: | Reporting period | Individual Preparing Checklist: |
| Region: | | Department: |
| Scheme Superintended: | | Phone No.: |

PART 2: ENVIRONMENTAL ASPECTS

| ENVIRONMENTAL ASPECT/IMPACT | ENVIRONMENTAL COMPLIANCE (AS PER EMP REQUIREMENT?) | | Remarks (specify the location, a good practice observed, causes of non-conformity, and proposed action) |
|-----------------------------|--|----|---|
| | YES | NO | |
| Waste management | | | |
| Water quality testing | | | |
| Water balance check | | | |

PART 3: RECOMMENDATION

FOR EACH ITEM CHECKED IN PART 2, DESCRIBE THE CORRESPONDING CONTROLS TO BE IMPLEMENTED TO REDUCE POTENTIAL ENVIRONMENTAL IMPACTS (e.g., spill prevention, erosion controls, air emission controls including dust suppression, selection of materials, etc.). Provide details of the activities and impacts for each box and the proposed mitigations. Include attachments where appropriate. Use the same number system for your input.

ECO: Signature: _____ Date: _____

Scheme Superintended: Signature: _____ Date: _____

Annexure 2: Contact Details for Emergency Services

| Emergency | Response Plan | Contact details |
|--------------------------|-----------------------------|--|
| Fire outbreaks | Henties Bay Fire Brigade | 064 502 011 081 291 2374 (After Hours) |
| Chemical exposure | Henties Bay Clinic | 064 500020 |
| | Ambulance | 064 410 6000 (Swakopmund Hospital) |
| | E – Med Services | 064 61 4116000 (from any landline) 085 9247 (from cell phone) |
| Injuries or loss of life | NAMPOL -Henties Bay | 064 500 201 (Police Station). 10111 (Toll Free) 0814039778 (Insp Sakala) 0812175222 (Insp Isaaks) |
| | Ambulance | 064 410 6000 (Swakopmund Hospital) E-Med Services 061 4116000 (from any landline) 085 9247 (from cell phone) |
| Theft or Robbery | NAMPOL -Henties Bay | 064 500 201 (Police Station). 0814039778 (Insp Sakala) 0812175222 (Insp Isaaks) |
| Power Loss | Erongo RED – Henties Bay | 064 500560 0811434439 (After Hours) 0811490179 (After Hours) |
| Water and Sewerage | Municipality of Henties Bay | 064 502000 0811276338 (After Hours) |
| Local Snake Rescuer | Mr. George Hummel | 0813490817 |
| | Mr. Leo | 0857263420 |
| Issues Wildlife | Dorob National Park | 064 404 576 |

Annexure 3: Fire Response Procedures

Things you must-do if you discover a fire!!!



STEP 1

- Do not panic
- Press the nearest alarm button
- Rescue any person in immediate danger, if safe to do so



STEP 2

- If possible, commence fighting the fire
- Call fire brigade



STEP 3

- Leave the building by the nearest emergency exit
- Ensure all other personnel are warned along the way
- Do not stop to collect personal belongings
- Do not use lifts, use stair ways



STEP 4

- Report to the assembly point
- Do not return to the building until authorized to do so

Annexure 4: Incident / Accident Report Form

This form is to be completed in case of an environmental incident and shall be forwarded to the Project's RE during the construction phase and NamWater's Environment Section during the operation and maintenance phase.

Note: This form is not intended to replace other NamWater's internal reporting procedures.

| Section 1. GENERAL DETAILS | |
|--------------------------------------|---|
| Date: Time: am / pm | Reported By: Name: Position: Company: Phone: |

| Section 2. RESPONSIBLE PARTIES | |
|--|---------------|
| Name: | Phone: |
| Company Name: | Email: |
| Witness Details (if applicable) | |
| Name: | Phone: |
| Witness Statement Taken? <input type="checkbox"/> Yes <input type="checkbox"/> No | |

| Section 3. INCIDENT DETAILS | |
|--|--|
| Type of Incident: | <input type="checkbox"/> Spill <input type="checkbox"/> Waste/rubbish <input type="checkbox"/> Wildlife disturbance <input type="checkbox"/> Vegetation disturbance/damage <input type="checkbox"/> Acid Sulphate Soils disturbance <input type="checkbox"/> Cultural Heritage disturbance/damage <input type="checkbox"/> Chemicals/herbicide Use <input type="checkbox"/> Water pollution/contamination <input type="checkbox"/> Nuisance (noise, air quality) <input type="checkbox"/> Other: |
| Incident Description | |
| Immediate Response Actions Taken: | |

Section 4. CONTRIBUTING FACTORS AND PREVENTATIVE ACTIONS

(to be completed by Manager/Supervisor)

| | | | |
|--|-------------------|--------------|--|
| Cause, Circumstances, and Contributing Factors: | | | |
| Measures that were in place to prevent this type of incident: | | | |
| Measures to be implemented to prevent/minimize this type of incident from occurring again | | | |
| Comments: | | | |
| Name: | Position: | | |
| Company: | Signature: | Date: | |

Section 5. NAMWATER ENVIRONMENT OFFICE ONLY

| | | | |
|--|----------------------------|--|--|
| Assessed Level of Potential or Actual Harm: | | | |
| Is an Investigation Required? <input type="checkbox"/> Yes <input type="checkbox"/> No | Investigation Team: | | |
| FOLLOW UP ACTION: | | | |
| | | | |
| COMMENTS | | | |
| | | | |
| Name: | Position: | | |
| Signature: | Date: | | |

Annexure 5: Grievances Register Form.

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

Annexure 6: NamWater environmental code of conduct

What is an Environmental Code of Conduct?

It is a set of rules that everybody has to follow to minimize damage to the environment.

What is 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 operation of the Scheme.

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 Scheme. 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 SCHEME SUPERINTENDENT/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 inquiry and which may result in that person being asked to leave the Scheme 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 SCHEME SUPERINTENDENT/CONTRACTOR. The PERSON that does not understand must keep asking until he/she can keep to all the Environmental Rules.

Safety and Security

1. Only enter and exit roadways and construction areas at demarcated entrances.
2. Wear protective clothing and equipment as per signboards at the Scheme and according to instructions from your SCHEME SUPERINTENDENT/CONTRACTOR.
3. Report to your SCHEME SUPERINTENDENT/CONTRACTOR if you see a stranger or unauthorized person in the construction area.
4. Never enter any area that is out of bounds or that is demarcated as dangerous without permission of your SCHEME SUPERINTENDENT/CONTRACTOR.
5. Never climb over any fence or enter private property without permission of the landowner or your SCHEME SUPERINTENDENT/CONTRACTOR.

6. Do not remove any vehicle, machinery, equipment, or any other object from the construction site without the permission of your SCHEME SUPERINTENDENT/CONTRACTOR.
7. Keep clear of blasting sites. Follow the instructions of your SCHEME SUPERINTENDENT/CONTRACTOR.
8. Never enter or work in the Scheme while under the influence of alcohol or other intoxicating substances.
9. All staff should know the emergency procedures in case of accidents.

Waste Disposal

10. Learn the difference between different types of waste, namely:
 - general waste, and
 - hazardous waste.

Containers will be provided for different types of waste.

General Waste includes wastepaper, plastic, cardboard, harmless organic (e.g. Vegetables), and domestic waste

Hazardous Waste 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.

11. 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.
12. Recycle drums, pallet,s, and other containers.
13. Never bury or burn any waste on-site, all waste is to be disposed of in allocated refuse disposal containers, bins, or bags.
14. Never overfill any waste container. Inform your SCHEME SUPERINTENDENT/CONTRACTOR if you notice a nearly full container.
15. Do not litter.
16. Do not bury litter or rubbish in the backfilled 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 SCHEME SUPERINTENDENT/CONTRACTOR 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 SCHEME SUPERINTENDENT/CONTRACTOR 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 SCHEME SUPERINTENDENT/CONTRACTOR 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 SCHEME SUPERINTENDENT/CONTRACTOR.
34. Do not change the oil on uncovered surfaces.
35. If you are not sure how to transport, store, use, or get rid of any hazardous substances ask your SCHEME SUPERINTENDENT/CONTRACTOR 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 SCHEME SUPERINTENDENT/CONTRACTOR 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. Do not make any new roads or clear any vegetation unless instructed to do so by your SCHEME SUPERINTENDENT/CONTRACTOR.
43. Keep to established tracks and pathways.
44. 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 SCHEME SUPERINTENDENT/CONTRACTOR.

Working Hours

50. You may only work on weekends and after hours with the consent of the SCHEME SUPERINTENDENT/CONTRACTOR.

Archaeological and Cultural Objects

52. If you find any archaeological, cultural, historical, or pre-historical object on the construction site you must immediately notify your SCHEME SUPERINTENDENT/CONTRACTOR.
53. Never remove, destroy, or disturb any cultural, historical, or pre-historical object on site.

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

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

Sensible Driving

54. Tracks and roads should be kept to a minimum. Where possible follow existing roads.
55. No off-road driving is allowed.
56. Never drive any vehicle without a valid license for that vehicle class and do not drive any vehicle that is not road worthy.
57. Never drive any vehicle when under the influence of alcohol.
58. **Always** keep your headlights on when driving on dusty roads.
59. Keep to the roads as specified by your SCHEME SUPERINTENDENT/CONTRACTOR. Vehicles may only be driven on demarcated construction roads. Drivers should always use three-point turns, “u-turns” are not allowed. Do not cut corners.
60. Do not drive on rocky outcrops.

Noise

61. Keep noise levels as low as possible.
62. Do not operate noisy equipment outside normal working hours.

Fire Control

63. Do not make open fires, use a drum or tin, and do not collect any vegetation to burn.
64. Do not smoke or make fires near refueling depots or any other area where fuel, oil, solvents, or paints are used or stored. Fireplaces should be at a safe distance from fuel and explosive storage sites as well as vehicle parking sites.
65. Cigarette butts should always be thrown in allocated refuse bins. Make sure that the cigarette butt is out before throwing it into the bin.
66. Immediately notify your SCHEME SUPERINTENDENT/CONTRACTOR. if you see an unsupervised fire at the campsite or construction site.

Dealing with Environmental Complaints

67. If you have any complaints about dangerous working conditions or potential pollution to the environment, talk to your SCHEME SUPERINTENDENT/CONTRACTOR.
68. If any person complains to you about noise, lights, littering, pollution, or any harmful or dangerous condition, immediately report this to your SCHEME SUPERINTENDENT/CONTRACTOR.

NP du Plessis

Tell: 061-71 2093

Cell: 081 127 9040

Email: PlessisN@namwater.com.na

Jolanda Kamburona

Tel: 061 71-2105

Cell: 081 217 8116

E-mail: KamburonaJ@namwater.com.na

Dorob National Park Rules and Regulations

Published by the Ministry of Environment and Tourism: December 2012

The unique Dorob National Park caters for both conservation and leisure activities

All visitors should please obey the park rules and regulations

Being one of the most unique parks in the world, the Dorob National Park along the central Namibian coast caters for various leisure, tourism and sports activities while also providing for conservation measures and specific conservation areas.

The Dorob National Park was declared in Government Notice No. 266 of 1 December 2010. Under section 84 of the Nature Conservation Ordinance, 1975 (Ordinance No. 4 of 1975), Regulation 36 of the Regulations Relating to Nature Conservation GN 240/1976 has been amended by the addition of specific regulations for Dorob National Park under Government Notice No. 210 of 15 August 2012. The Nature Conservation Ordinance 4 of 1975 and Regulations Relating to Nature Conservation GN 240/1976 remain in effect.

The Dorob National Park stretches from the Kuiseb Delta (south of Walvis Bay) northwards to the Ugab River; and eastwards from the low water mark of the Atlantic Ocean towards the boundary of the Swakopmund district (See the included maps for the go- and no-go areas and routes).

It includes the Walvis Bay Lagoon, a Ramsar Site, but excludes the municipal areas of Walvis Bay, Swakopmund, Henties Bay and the settlement area of Wlotzkasbaken.

It also excludes the railway line between Walvis Bay, Swakopmund and Arandis, the road reserves of the major B2 route; the minor routes C14, C28, C34, C35, C39; the district roads D1983, D1984, D1986, D1991, D1901, D1918 and D2302; and farms under private ownership or belonging to a parastatal institution.

Visitors to the Dorob National Park, who would wish to enjoy the various leisure, sports and tourism activities in the park, are notified that they should familiarize themselves with and obey the regulations, laws and rules, contained in this pamphlet. For further clarification they can also consult with the coastal offices of the Ministry of Environment and Tourism at Swakopmund or Walvis Bay.

Regarding the fishing regulations anglers should consult with the offices of the Ministry of Fisheries and Marine Resources in Walvis Bay and Swakopmund.

The Nature Conservation Ordinance Section 14 protects and preserves wild animal life, fisheries, wild plant life and objects of geological, archaeological, historical and other scientific interest and for the benefit and enjoyment of the inhabitants of Namibia. Therefore some activities in the Dorob National Park are allowed, while others are not.

Activities causing the least damage to park resources are regulated less, while those that would be the most damaging, are strictly regulated.

People & domestic animals in park

All people who enter the park must:

- Comply with the stipulations of the Ordinance, the regulations and the Environmental Management Act of 2007;
- Comply with the instructions of signposts, signboards, pamphlets or communicated in any other manner;
- Obey any legal order or instruction given by a Law-enforcement Officer.

When entering by foot people may:

- Go without a permit except in an area that is closed or exclusionary; and
- Go on foot if being young adults or younger than 16 without adult supervision, but do so at their own risk.

Domestic animals in the park:

- A person may take a domestic animal into the park without a permit, except in areas where it is indicated that such animals are not allowed;
- Such animals should be under control by the person at all times;
- The person and animal should adhere to all regulations;
- The person must remove the faeces of the animal; and
- The animal shall not cause any inconvenience, nuisance, damage or injury to other people, animals and any plants or any other aspect of the environment.

Entering the park by vehicle

Any person entering the Off-Road Vehicle (ORV) area in the Dune Belt between Langstrand and Walvis Bay by vehicle will need a permit (See information box about Permits on the other side of this pamphlet).

Currently a permit is not yet required for the use of a vehicle in other permitted areas or when driving on park routes in the Dorob National Park published herein.

Permitted and prohibited areas for sedans, 4x4s, bakkies and beach buggies:

- These vehicles may only drive in the ORV area with a permit (the Dune Belt between

- Langstrand and Walvis Bay) and without a permit on proclaimed roads and clearly marked MET routes, tracks and roads (except where prohibited).
- Where allowed, beach driving is only authorised on MET designated and clearly marked routes, tracks and roads.
- No driving is allowed on the beaches at the sea fronts of Henties Bay, Wlotzkasbaken, Swakopmund, Cape Cross and the Namibia Wildlife Resorts (NWR) managed camping sites at Mile 14, Jakkalsputz, Mile 72 and Mile 108.
- East of the minor C34 routes, self-drives are only allowed on the 4x4 tracks indicated on the attached maps. Detailed maps and GPS coordinates should be obtained from the Henties Bay Tourism Association.

Permitted and prohibited areas for quad bikes and other motorised bikes:

- Quad bikes and other motorised bikes may only drive in the ORV area with a permit (the Dune Belt between Langstrand and Walvis Bay) and without a permit west of the coastal road between Swakopmund and Henties Bay, only on proclaimed roads and clearly marked
- MET tracks and roads (except where prohibited).
- Where allowed, beach driving is only authorised on MET designated and clearly marked tracks.
- Quad bikes and other motorised bikes are prohibited on beaches between Walvis Bay and Swakopmund, in all areas north of Henties Bay, and on the beaches at the seafronts of Henties Bay, Wlotzkasbaken, Swakopmund, and the Namibia Wildlife Resorts (NWR) managed camping sites.
- Quad bikes are strictly prohibited north of the Omaruru River up to the Ugab River and other motorised bikes are prohibited off the proclaimed roads north of the Omaruru River up to the Ugab River.
- Quad bikes and other motorised bikes are permitted 10 km upstream from Henties Bay within the Omaruru River but not beyond.

General:

- People may use a vehicle in the park with their permit at any time except
- between 21:00 and 05:00. This provision does not apply to proclaimed roads and people may use those roads at any time.
- Young people aged 16 years or younger may only drive or use a vehicle if an adult accompanies him/her.
- A valid driver's license will be required to use any motor vehicle in the park.
- No person shall drive or use any vehicle in the park whilst under the influence of alcohol or any other narcotic substance or in such a way that is dangerous to human life or that may cause damage to any property or the environment.
- Between Walvis Bay and Swakopmund, no person shall offload their
- quad bike or motorised bike at any other area than the designated off loading areas in the Dune Belt between Langstrand and Walvis Bay.

Specific conservation provisions

Although many activities are allowed in the park, no person may:

- Angle on the beach in such a way that is inconvenient to other people;
- Leave or use angling tackle in a place where it may cause inconvenience or injury to other persons or animals;
- Throw away or get rid of any part of a fish, bait, refuse or rubbish other than in the refuse bins provided;
- Collect or remove any shell, shell grit, sand, rock or stone;
- Use water or electricity in excessive quantities or for any other purpose other than for reasonable domestic use;
- Pollute or degrade the environment;
- Kill, injure, hunt, capture, disturb or feed any wild animal or remove any part of any wild animal, whether alive or dead;
- Remove, destroy, damage or disturb any egg, nest or burrow;
- Pick, collect, mutilate, destroy, damage, tamper with, disturb or remove any tree, plant, shrub, herb, mineral or any other object of botanical, zoological, geological, archaeological, historical or any other scientific interest, or part thereof;
- Collect or gather firewood;
- Remove, damage, destroy, soil, mutilate or interfere with any form of State property;
- Possess or use any weapon, explosive, trap or poison; or
- Throw away a burning or smouldering object or put or leave it at a place where it may possibly ignite another object.

Entering the park by Air

- Although aircraft and helicopters may fly above a game park, it is unlawful to fly at the altitude of less than 1 000 metres, except for lawfully landing or taking off.
- It is illegal to land in, take off from, enter or fly over the Dorob National Park in such a way that is dangerous to human life or that may cause damage to any property or the environment.

Commercial activities and business

A permit is required from the Ministry of Environment and Tourism to do any of the following in the park:

- Carry on, transact, or conduct any trade, business or tourism;
- Hold any organised competition or event;
- Undertake any construction activities of any nature; or
- Engage in any kind of commercial activity.

Camping

- People may overnight or camp in the Dorob National Park but only with a permit and only at officially designated sites.
-
- Domestic animals may not be brought into a camping site unless the officer in charge grants permission indicating where the animal may stay overnight.
-
- Although people may enter a camping site by vehicle, they may not: (i) use a buzz-bike, power driven cycle, quad bike or motor cycle in the campsite; (ii) drive any other vehicle faster than 20 kilometres per hour in any place within a camping site; and (iii) drive or use a vehicle on any portion of the beach that is situated between a camping site and the sea.

Permits

A permit is required for the Off-Road Vehicle (ORV) area in the Dune Belt between Langstrand and Walvis Bay. Get this free permit to drive in the specially demarcated off-road area between Swakopmund and Walvis Bay (see relevant map) from:

Ministry of Environment and Tourism (MET):

Swakopmund Office, Cnr. Bismarck St. & Sam Nujoma Avenue. Tel: 064 - 404 576

Walvis Bay Office, 643 Heinrich Baumann Street. Tel: 064 - 205 971

Office hours for both offices during weekdays: 08:00 – 17:00.

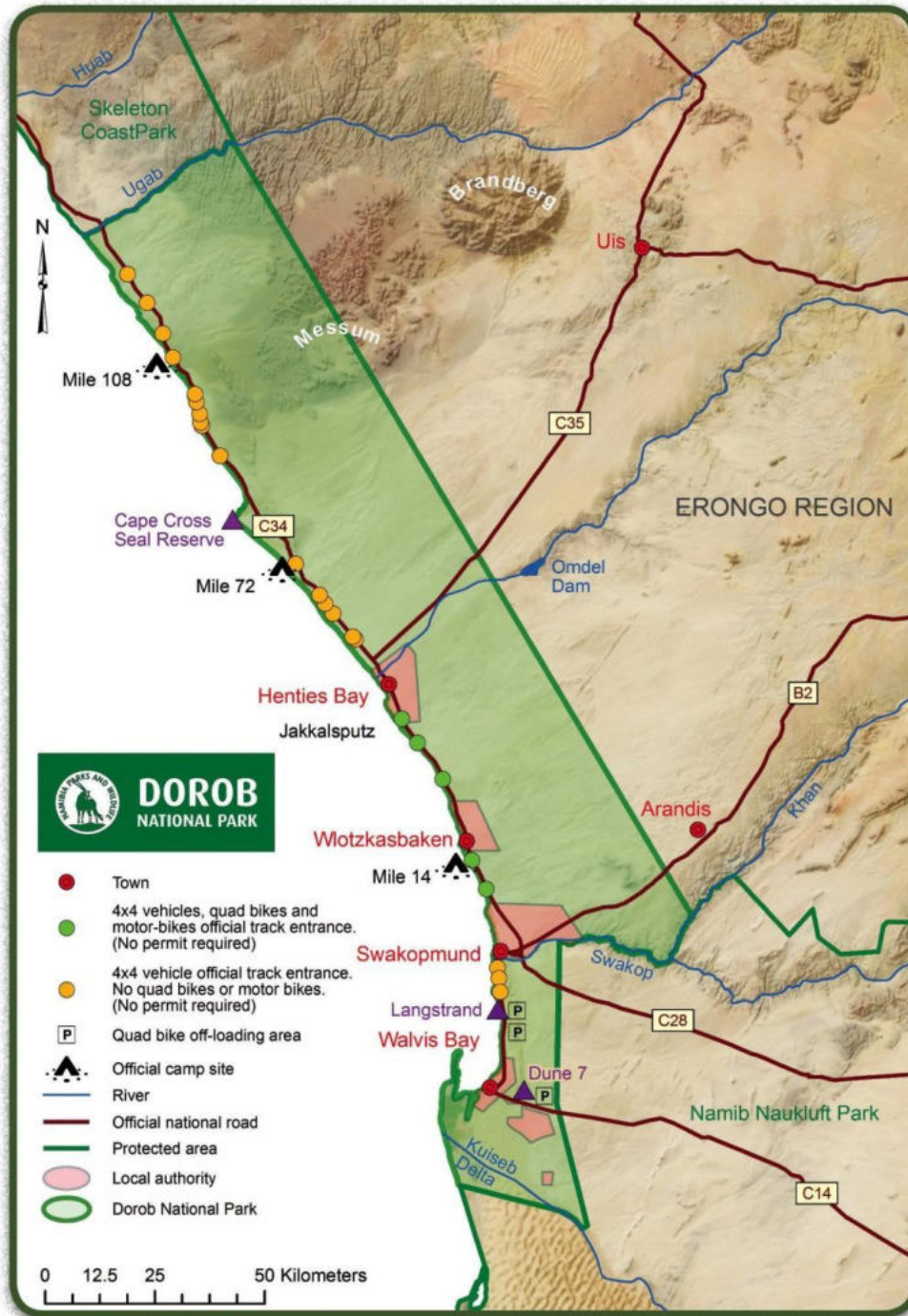
Weekends & Public Holidays: 08:00 – 13:00.

A permit for the park routes, roads and tracks will only be required once a date has been determined in the near future.

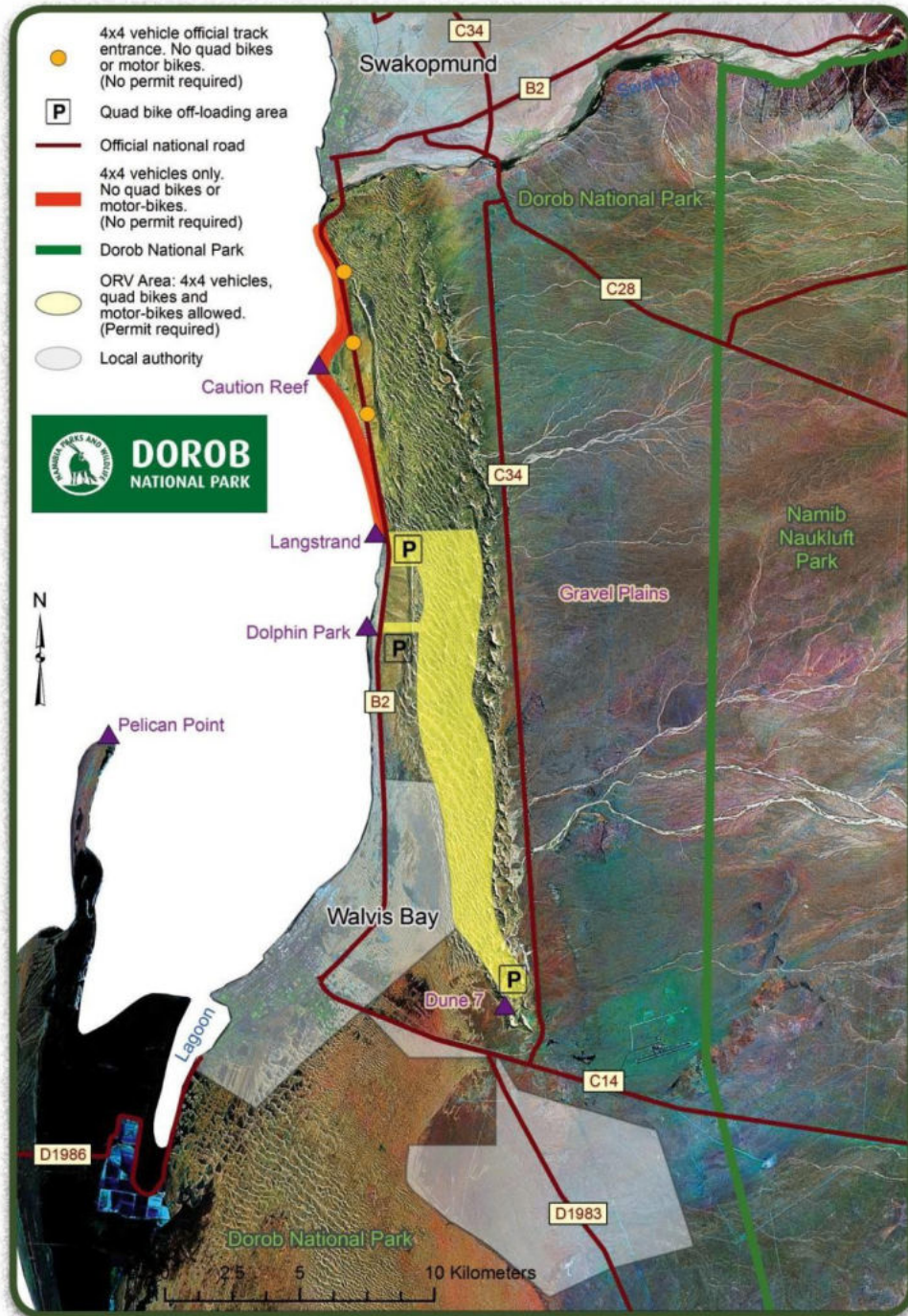
Vehicles are by no means allowed off MET designated routes, tracks and roads except in the ORV area and vehicles are not allowed in closed or exclusionary areas. Closed and exclusionary areas include the Damara Tern Breeding Area, the Swakop River, Lichen Fields and any other areas designated closed or exclusionary.

Please be reminded that although in some cases the general public may not need a permit, tourism operators, commercial activities, and competitions, events, and meetings/assemblies are required to obtain a specific permit from MET and registered with the Namibia Tourism Board (NTB) for these activities, no matter the location within the Dorob National Park.

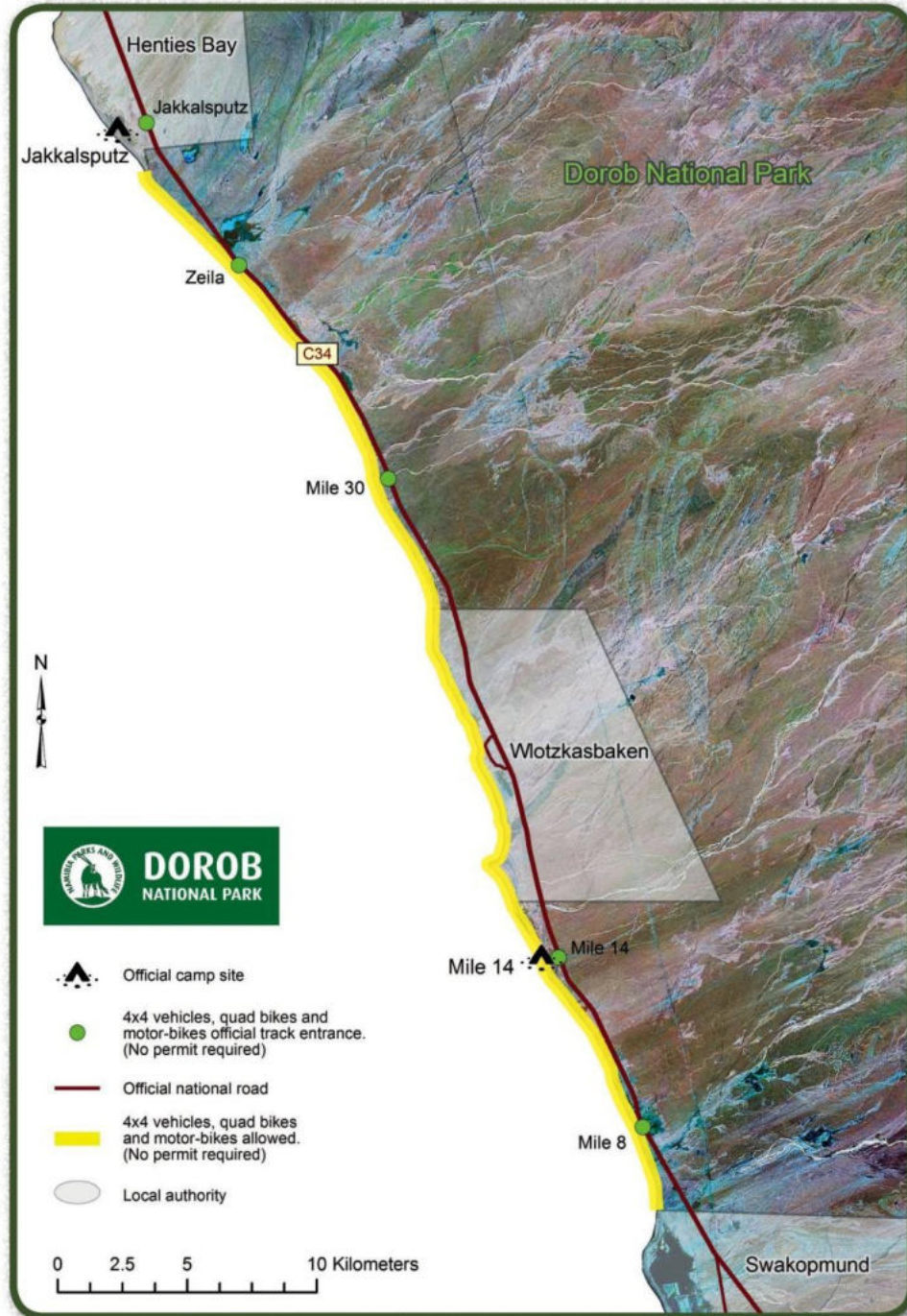
Map of entire Dorob National Park



Walvis Bay to Swakopmund including Dune Belt



Swakopmund to Henties Bay



Henties Bay to Ugab River including Messum Crater

