



Delta Marine
Consultants and



NAMPOR TENDER 674/ 2008

EIA Study for Strategic Expansion of the
Walvis Bay Container Terminal

PART B:

Environmental Management Plan



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Environmental Management Plan

1. Introduction

The Environmental Management Plan (EMP) aims to provide a logical, systematic and 'user-friendly' approach to implementing the EIA recommendations, in order to mitigate and manage the potential environmental impacts associated with the construction phase and operational of the proposed new container terminal. All measures for mitigation of impacts that were identified during the EIA are incorporated, thus ensuring that the project does not deviate from the environmental profile that formed the basis of the assessment. The EMP is also intended to ensure that any conditions attached to the Environmental Clearance are met, and provides a clear and auditable indication as to how those requirements should be implemented during project execution.

This EMP and associated annexures must be read in conjunction with the Final Scoping Report, the Final EIR, the Record of Decision for Environmental Clearance, and any other relevant and applicable Namport policy and documentation. This provides a context for the EMP and its role and purpose in the integrated environmental management process for the proposed expansion of the container terminal in Walvis Bay.

The purpose of the EMP is the following:

- Ensure that the project complies with the goals of the Namibian Environmental Management Act (No. 7 of 2007); and, more specifically, the Record of Decision on Environmental Clearance.
- Summarise the environmental policy and principles of Namport to serve as a foundation for implementation of the EMP and for the setting of environmental objectives and targets.
- Promote understanding of the common environmental impacts associated with the construction and associated mitigation measures.
- Provide a framework for implementing the management actions from the EIA during the construction and operational phases of the proposed project.
- Clarify and specify the roles and responsibilities of various stakeholders responsible for implementing the EMP and ensuring its effectiveness.
- Specify clear environmental management actions to ensure that the negative environmental impacts predicted through the EIA process are prevented or, where impacts occur, that the severity of impacts is minimised. Where positive impacts are anticipated, the objective of the EMP is to ensure that these are enhanced and maximised.
- Develop a framework for the development of Method Statements and Environmental Sub-Plans (by sub-contractors), and Management Plans (by The Contractor) to detail how management actions included in the EMP shall be implemented during the construction phase to achieve specified objectives.
- Recognise health and safety issues associated with the project.
- Develop a framework for regular monitoring and reporting of impacts and management actions in order to test and verify assumptions contained in the EIA.



- Develop a framework for undertaking regular auditing and management reviews to ensure continuous improvement.

The EMP, in short, provides consistency in environmental management, identifies project specific environmental risks, their associated management measures, and procedures for compliance with environmental legislation and contract requirements. It shall be submitted to the Namibian Ministry of Environment and Tourism (MET) as part of the application to receive an Environmental Clearance certificate for the proposed strategic expansion of Walvis Bay container terminal. This EMP must be amended if any additional specifications are required in terms of the Environmental Clearance and any additional requirements Namport may find necessary. It may also require further amendments as the project unfolds and as a “living” document, therefore, can never become a “Final” EMP. Any significant amendments require DEA:MET approval before being implemented.

1.1 EMP Performance Assessment

Through regular environmental audits that evaluate compliance with statutory requirements and Namport’s ISO 14001 standards, Namport is responsible for ensuring that The Contractor complies with this EMP during the construction phase. Operational activities will be subject to Namport’s existing ISO 14001 environmental management system (EMS).

1.2 Responsibilities

The responsibility for all management actions specified in environmental management and monitoring plans rests with Namport’s Safety, Health, Risk and Environmental Quality (SHREQ) department.

Prior to any development on the site, Namport and the Contractor must ensure that the following responsibilities are fulfilled:

- Emergency procedures are in place.
- The Contractor and sub-contractors have been briefed and fully understand their responsibilities in terms of the EMP.
- An independent environmental consultant has been appointed as the Environmental Control Officer to monitor construction activities.
- The DEA:MET is notified one month prior to commencement of construction activities
- Compliance with any conditions described in the Record of Decision (ROD) on Environmental Clearance.
- Records of compliance / non-compliance with the conditions of the ROD are documented and available to the DEA:MET on request.



1.3 Overview of the project phases

A detailed description of the proposed container terminal and a description of the affected environment are contained, respectively, in Chapter 3 and Chapter 4 of the Environmental Impact Report, that is, part A of this Report. This EMP focuses on environmental management for two main phases for the project, namely,

- **Construction**, where the EMP focuses on preventing adverse impacts to environmental media. Though the focus is on construction of the new container terminal, any additional construction in the port after its completion would also need to comply with the conditions of this EMP for such activities.
- **Operations**, where management interventions are placed on operational activities. Catastrophic fuel spills are infrequent and can be covered in the port's contingency plan. Bilge and ballast water discharges are covered by the MARPOL convention.

1.1.1 The construction phase

Construction covers dredging, reclamation and terminal construction, as follows:

- Causeway construction
 - Formation of the outer perimeter of the reclamation area with a rock bund and installation of measures that retain sand fill.
- Dredging
 - Capital dredging of the approach channel. The entrance channel must be extended, widened and deepened.
 - Capital dredging of a new turning circle, and deepening to -15.5 m opposite Berths 1-8.
 - Dredging the basin between the proposed new container terminal and existing berths.
 - Dredging at the quay wall of the new container terminal.
- Reclamation
 - Land reclamation for the new container yard opposite Berths 4-8. Treatment/compaction to consolidate and construct the pavement.
- Terminal construction
 - Construction of the causeway, quay walls, rock revetments, container terminal surfacing, operational buildings and workshops, services/utilities, roads and railway lines.
 - Installation of equipment such as ship-to-shore quay cranes, rubber-tired gantry cranes, etc.
 - Finishing off.



1.1.2 Overview of the operational phase of the project

Operational activities at the port include the following:

- Vehicle traffic – entering and leaving the port, and within it;
- Building and grounds maintenance;
- Cargo handling;
- Chemical storage and handling;
- Fuelling, painting;
- Public access;
- Ship liquid discharges;
- Ship air emissions;
- Equipment maintenance,
- Vessel repair and maintenance.

2. Approach to preparing the EMP

The EMP is based largely on the findings and recommendations of the EIA Report. It is assumed that Namport, the project proponent, shall apply the EMP within the statutory requirements of Namibia. Its refinement for the construction phase, with sub-sections developed in more detail, shall be developed at the tendering stage when individual contractors shall specify in detail how they propose to achieve the environmental objectives. These shall be developed through Management Plans based on consolidation of Management Sub-Plans and Method Statements, where necessary and applicable. It is important to note that the EMP is a “live” document and shall be updated with additional information or actions during construction and operation.

The approach adopted conforms to the ISO 14001 structure illustrated in Figure 2.1.

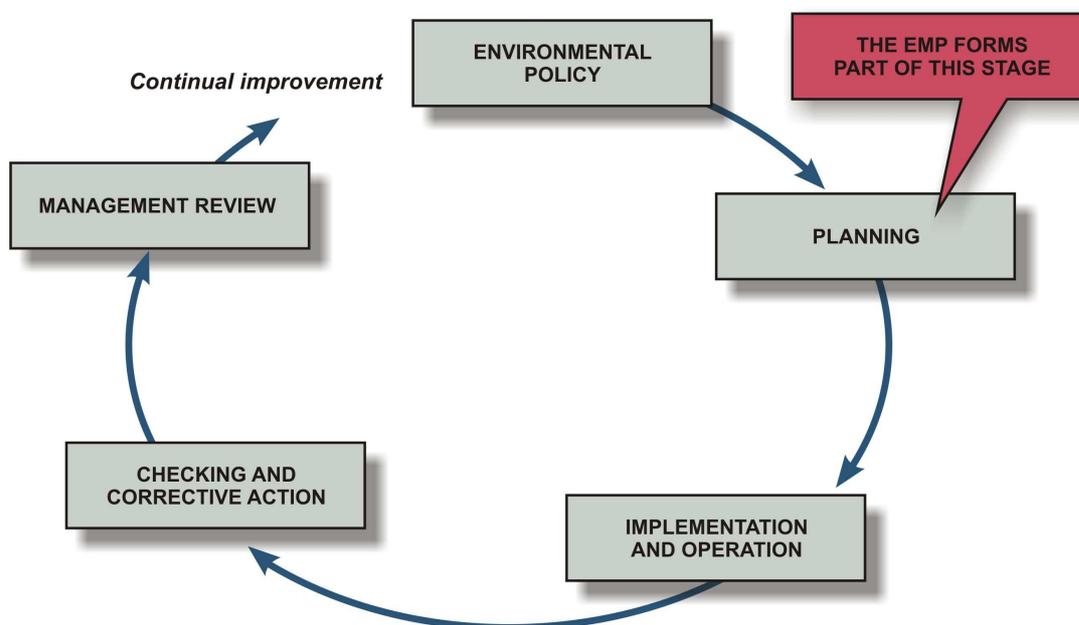


Figure 2.1: The ISO 14001 process for environmental management systems

2.1 Namport’s ISO 14001 Environmental Management System

Namport’s commitments to responsible and sound environmental management of all their activities are reflected in their Environmental Policy. It is envisaged that this Environmental Management Plan can be successfully integrated into Namport’s ISO 14001 Environmental Management System. It deals with the issues requiring management and defines the management objectives and management standards. These management objectives and standards are based on:

- Applicable environmental laws in Namibia;
- Namport’s policies that relate to the environment;
- Namport’s policy on Occupational Health Safety and Environment;



- The concept of Best (Proven) Available Technology Not Entailing Excessive Cost (BATNEEC).

The EMP also forms part of the legally binding agreement that stipulates how the environmental monitoring, management and mitigation shall be undertaken for the proposed container terminal expansion. It provides information on the following:

- The objectives.
- The activities.
- Environmental aspects.
- Their risk sources and associated environmental impacts.
- Action plans and control measures.
- Person(s) responsible for the management of these impacts.

These commitments shall become part of the authorisation agreement between Namport and the Government of the Republic of Namibia, represented by the Ministry of Environment and Tourism (MET), in the form of a clearance certificate to implement the proposed operations.

2.1.1 Environmental policy: Namport

An environmental policy is derived from the guiding principles whereby an organization defines the scope of its commitment to the environment. The policy is a public document that communicates the organization's overall approach to managing its interaction with the environment.

Various components of the Environmental Management System are strongly influenced by the policy in terms of their scope and level of resource allocation. As a rule, objectives and targets are set to achieve compliance with the environmental policy, and overall environmental performance is evaluated against the organization's stated intent regarding level of commitment. With this in mind, a policy should meet the following criteria:

- It must be relevant to the nature of Namport's activities, and the specific environmental aspects associated with those activities;
- It must consider specific local environmental conditions;
- It must consider relevant environmental legislation;
- It must define and formulate Namport's fundamental approach to environmental management;
- It must include a commitment to continual improvement; and
- It must set a precedent for communication and liaison with stakeholders.

Details of Namport's policy for safety, health, risk, environment and quality are provided in Box 1.



Box 1: Namport's SHREQ Policy

The Safety, Health, Risk, Environmental and Quality (SHREQ) Policy of the Namibian Ports Authority

The Namibian Ports Authority, focus of promoting all port related services, has the vision of being the first-choice world-class port service provider in Africa.

We work according to internationally recognized standards, which are:

- Quality according to ISO 9001
- Environment according to ISO 14001
- Occupational Health and Safety according to OHSAS 18001

In terms of **Quality**, our aim is to satisfy the customer expectations.

- We provide timely and cost effective service.
- We nurture a Quality Culture in whatever we do and maintain a high level of professionalism, efficiency and reliability.
- Based on the analysis of customer satisfaction, supplier performance and the results of process monitoring, quality objectives and targets will be set and reviewed on a regular basis.

In terms of **Environment**, we commit ourselves to Environmental Management and Pollution Prevention in every phase of the company's planning and operating processes.

- We continuously improve environmental protection within our area of jurisdiction.
- We clearly communicate pertinent environmental information and expectations to the employees, to all parties involved and to the interested public.
- Based on information about our environmental impacts and aspects, objectives and targets will be set and reviewed on a regular basis.

In terms of **Occupational Health and Safety**, we commit ourselves to safety and health in the workplace and acknowledge the right of all staff to a safe and healthy work environment.

- We aim to conduct our business in a way that presents no risk of injury or ill health to our employees and port users.
- We expect each and every employee and Port User to place safety of fellow workers and the public as one of the top priorities, with the aim of minimizing all incidents or losses in the work place.
- Based on information about our occupational health and safety risks, objectives and targets will be set and reviewed on a regular basis.

In terms of **Risk Management**, we aim to protect employees, assets, environmental and income by eliminating or reducing the potential for loss and the provision of funds to recover losses.

- We will identify risks to which our employees, assets and the environment are exposed to.
- We will analyze and assess the risks identified and implement cost effective risk prevention and reduction measures.
- We will provide for adequate and timely compensation, restoration and recovery.



2.1.2 Environmental goals: Namport EMS

Environmental goals for Namport are aligned with its ISO14001 requirements and set on an annual basis. Progress towards achieving these is continually reviewed in a standard manner. Four key environmental goals were set by Namport for the EMS for the period July 2009 – August 2010, namely:

- The ISO 14001 Environmental Management System is maintained.
- A strategic EIA with EMP of the whole port and its operations is prepared.
- The Namport carbon footprint in Walvis Bay and Luderitz is determined, and mitigating measures are implemented.
- Noise levels port-wide are assessed, and reduced.

2.1.3 Environmental objectives: EMP

The environmental objectives broadly describe the levels of environmental quality to be attained/maintained through construction and operation.

The objectives for this EMP shall direct the following construction activities:

- Namport general procedures.
- Namport environmental and safety management systems.
- Construction – the causeway, reclamation and buildings.
- Dredging and vessels at sea.

For operational activities, the objectives for this EMP shall direct the following:

- Vehicle traffic.
- Cargo and container handling.

Tables 1 and 2 provide the link between the goals, objectives, activities and legislation for construction and operation of the new container terminal.

2.1.4 Risk Sources

Risk sources potentially generate impacts on people and the natural environment; these either provide (negative) constraints or (positive) opportunities for achieving the above-mentioned objectives and sub-objectives.

2.1.5 Action Plans and Control Measures

These are the management actions required to mitigate the significance negative impacts identified through the EIA process and enhance the benefits, noting that these EIA recommendations are to be supplemented with more detailed management actions during the



detailed design phase by the contractor. The actions are structured according to the EMP environmental objectives outlined above.

2.1.6 Monitoring and ongoing assessment of impacts

The purpose of monitoring is to check whether the actions have been undertaken, and if so, whether they have been effective in achieving the overall objectives and desired levels of environmental quality. Monitoring recommendations proposed in the specialist studies for the EIA are detailed, where the description and the timing of monitoring are given. The Monitoring Plan described in Table 5 deals with all impacts identified in the EIA that are listed in Tables 3 and 4.



3. Roles and responsibilities for implementation of the EMP

This section defines the roles of the key parties involved in the implementation of the EMP. At this time, the engineering team for detailed design and construction has not been appointed.

3.1 Namport

Namport, as project initiator and applicant for the environmental authorisation, has overall accountability and responsibility for environmental management, and for ensuring that any conditions attached to the Record of Decision are communicated to, implemented and complied with by the Main Contractor and its sub-contractors during construction. Although it shall be the responsibility of these parties to prepare and implement detailed Method Statements, Management Sub-Plans and Management Plans, Namport shall remain accountable for their implementation. Therefore, Namport shall continue to liaise directly with the relevant authorities with respect to the implementation of the ROD and the EMP. This shall include the submission of relevant documents and Management Plans identified by the EMP.

3.1.1 Environmental Manager

Namport shall designate an **Environmental Manager** who shall be in charge of all health, safety and environmental matters and be responsible for:

- The Environmental Impact Assessment (EIA) and implementation of the conditions in the Record of Decision (ROD).
- The implementation of the Environmental Management Plan (EMP).
- Ensuring a high level of environmental commitment within Namport, and that adequate and appropriate resources are allocated to the development and implementation of the EMP within Namport's ISO 14001 environmental management system.
- Ensuring that the requirements of the EMP are communicated, understood and enforced for all activities on site. A photographic record – properly dated – shall be kept of progress on site and an *ad hoc* record of all environmental incidents or events on site. This shall include a photographic record of all major stages of construction, of all working and construction camp areas before and after the start of construction, and at any time during construction if there are any deviations from or transgressions of the EMP that can be digitally recorded. This record can be used, where applicable, for any disputes and for review after completion of construction.
- Monitoring programmes that are set up and implemented.
- Review of Method Statements and Management Sub-Plans prepared by sub-contractors for specific activities and risk sources.
- Review and approval of Management Plans prepared by The Contractor based on the consolidation of the sub-contractors' Method Statements and Management Sub-Plans.

- Actions to be taken in the wake of incidents or public complaints.
- Responses to external communication.
- Provide the results of the monthly environmental reports to Namport management, as required.
- Ensuring that the scheduled internal and external audits and management reviews are adequately resourced and effectively undertaken.
- Management of emergency response situations.
- Resolution of disagreements that pertain to non-conformances.

3.1.2 Environmental Control Officer

A full-time **Environmental Control Officer** (ECO) shall be appointed by Namport. The overall role of the ECO is to oversee and monitor adherence to and implementation of the EMP, which includes compliance with relevant conditions contained in the Record of Decision.

The ECO shall be independent, qualified and with appropriate experience and knowledge of environmental management.

Roles and responsibilities include:

- Ensuring compliance with the Management Plans, Management Sub-Plans and Method Statements by monitoring environmental impacts, record-keeping and updating of the EMP.
- Meeting on site with The Contractor prior to the commencement of construction activities to confirm the construction procedure (method statements) and designated activity zones.
- Monitoring site activities to ensure adherence to the specifications contained in the EMP, through validating the regular site inspections that are to be undertaken by The Contractor's **Environmental Officer** (EO).
- Maintenance and management of the environmental monitoring programme.
- Providing assistance in the event of an emergency situation.
- Checking the EO's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken, for submission to the Environmental Manager at the scheduled regular site meetings (usually monthly).
- Checking The Contractor's public complaints register in which all complaints are recorded, as well as action taken; and shall notify the Environmental Manager of any relevant complaints lodged by a third party and provide appropriate information for inclusion in the ECO's monthly environmental report.
- Conducting monthly audits to ensure that the system for implementing the EMP is operating effectively. Preparation of monitoring reports based on regular (e.g. weekly) site visits. The results of these checks are to be captured in the ECO's monthly report, which



shall include and confirm the following:

- Findings of the weekly Site Inspection Forms;
 - Notice of any major incidents and complaints and follow up actions taken;
 - Confirmation that the Method Statements, Management Sub-Plans and Management Plans being used are the most recent version;
 - Documentation of variations to the EMP/Method Statements and non-compliances and corrective action;
 - Progress on baseline environmental monitoring programmes;
 - Confirmation that appropriate environmental training of personnel is undertaken; and
 - Confirmation that emergency procedures are in place and effectively communicated to personnel.
- Providing information to the Environmental Manager as required during scheduled internal audits that shall be conducted as part of Namport's ISO 14001 Environmental Management System (EMS). The information required shall include the monthly environmental reports compiled by the ECO.
 - Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

A protocol for managing infringements by The Contractor or sub-contractors needs to be developed by Namport in consultation with The Contractor. This protocol shall clearly articulate which parties have the power to intervene and stop the activities of a sub-contractor which constitute an infringement of the EMP and the conditions of the ROD.

3.1.3 Environmental Monitoring Committee

Namport shall institute a EMP monitoring committee. This committee shall typically consist of various stakeholders that include representatives from the Ministry of Fisheries and Marine Resources (MFMR), the Ministry of Environment and Tourism (MET), the Local and Regional Authorities, The Contractor, the local fishing industry (white fish and pelagic), NGOs like the Coastal Environmental Trust of Namibia, and the general public. This body shall focus on monitoring the implementation of the ROD. The EMC shall also review monitoring programmes and may request regular feedback from Namport on relevant issues.

3.2 The Authorities

The authorities are responsible for the processing and issuing of any permits necessary for the construction and operation of the container terminal. They shall ensure that Namport complies with any conditions of authorization.

3.3 The Contractor and Sub-contractors

The Contractor shall be the successful Tenderer appointed by Namport. Such a Contractor shall have overall responsibility for all construction activities on site and the management of sub-contractors during the construction phase of the new terminal and during any other construction during its operational phase. All obligations endorsed by Namport shall apply to The Contractor and its sub-contractors, as well as any other contractors associated with the construction phase. However, Namport may have further contracts with other suppliers.

Namport shall inform The Contractor, as well as any other contractors not under the responsibility of The Contractor, of these obligations, in addition to any Management Plans, Management Sub-Plans and Method Statements required in terms of these obligations. The Contractor shall convey the requirements of the EMP to the sub-contractors, and ensure that they comply with their obligations.

The general philosophy underlying the EMP is to establish objectives for contractors without dictating the means of achieving of these objectives. Namport shall thus set health, safety and environmental objectives aligned with its port ISO 14001 System that must be met by The Contractor and their sub-contractors. It is the responsibility of The Contractor and sub-contractors to prepare and implement Management Plans, Management Sub-Plans and Method Statements that detail the means they shall employ in order to meet the objectives set in the EMP.

Should Namport appoint contractors to undertake activities on site that do not fall under The Contractor's management, appropriate planning shall be undertaken to ensure that these contractors are managed according to the requirements of the EMP.

Sub-contractors shall be required, where specified, to provide Management Sub-Plans and/or Method Statements to The Contractor, setting out in detail how management actions shall be implemented in order to ensure that the environmental management objectives shall be achieved. The Method Statements shall be consolidated into Management Sub-Plans that, in turn, shall be consolidated by The Contractor into a Management Plan for a particular component of the EMP. The Contractor and sub-contractors shall carry out activities in accordance with the approved Method Statements, Management Sub-Plans and Management Plans.

3.3.1 Environmental Officer

The Contractor shall appoint an Environmental Officer who shall:

- Support the ECO in the monitoring and execution of the sub-contractors' Method Statements and Management Sub-Plans, and The Contractor's Management Plans, by maintaining a permanent presence on site.
- Meet on site with the Environmental Control Officer prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Inspect the site regularly to ensure adherence to the management actions of the EMP, Management Plans and Sub-Plans and Method Statements.

- Ensure that all appointed sub-contractors are aware of this EMP and their responsibilities in relation to it.
- Arrange induction and training sessions for all construction personnel, including senior site staff, sub-contractors and suppliers, which shall inculcate a health, safety and environmental awareness prior to commencing work on site. This includes any additional staff, sub-contractors and suppliers that enter the site.
- Arrange for all personnel to become be fully aware of any environmental impacts associated with construction activities being undertaken on site and the mitigation actions that accompany them.
- Complete Site Inspection Forms on a weekly basis.
- Provide inputs to the monthly environment report that is to be prepared by the ECO.
- Liaise with the construction team on issues related to implementation of and compliance with the EMP.
- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken, for submission to the Namport ECO.
- Provide emergency assistance.
- Maintain a public complaints register in which all complaints are recorded, as well as action taken, for submission to Namport ECO.
- Enforce prompt preventative and corrective action for non-conformances and incidents.
- Repair, at own cost, any environmental damage as a result of a contravention of the specifications contained in the EMP, to the satisfaction of the Environmental Control Officer as well as MET.

3.3.2 Health and Safety Officer

The Contractor shall appoint a Health and Safety Officer who shall be responsible for ensuring the health and safety of all personnel on the site, in accordance with Namport's standards that include housekeeping of buildings and vessels, pollution incidents, equipment use and materials handling and fire prevention. He/she shall ensure that all personnel are aware of the procedures to be followed.

3.3.3 Fire Officer

The Contractor shall appoint a Fire Officer who shall be responsible for fire protection and prevention, and for ensuring immediate and appropriate actions in the event of a fire. He/she shall ensure that all personnel are aware of the procedures to be followed.

3.3.4 Waste Management Officer

The Contractor shall appoint a Waste Management Officer to ensure compliance with the waste sorting and disposal requirements as contained in the Waste Management Sub-Plan that includes solid and liquid waste.



4. Reporting Procedure and Communications

4.1 EMP documentation

Namport shall establish and maintain information in the port's ISO 14001 EMS that describes the core elements of the EMP as described here. Reference shall also be provided to related documentation, for example, to monitoring relevant to the EMP that is undertaken by other bodies such as MFMR.

The core elements are the key areas that need to be documented. As a minimum, these shall include the following:

- Company environmental policy;
- Roles and responsibilities of stakeholders responsible for implementation and monitoring of the EMP;
- Management objectives;
- Detailed Management Plans (including the Sub-Plans and Method Statements provided by sub-contractors);
- Operational, reporting and communication procedures;
- Site Inspection Forms, monthly environmental reports and audit reports;
- Any other relevant environmental information (e.g. description of possible environmental accidents and training activities provided).

4.2 Reporting channels for implementation of the EMP

Namport shall ensure that the requirements of the EMP are communicated to The Contractor and any other contractors, and that contractors clearly understand their responsibilities in terms of this EMP.

Namport shall develop a reporting procedure whereby regular feedback and reports are submitted by The Contractor's Environmental Officer(s) to Namport's Environmental Control Officer (ECO) and Environmental Manager for checking, corrective action (where necessary), incorporation into the EMP documentation and feedback to MET and other authorities, The Contractor and other stakeholder groups.

4.3 Site inspections

The Contractor's Environmental Officer (EO) shall undertake regular site inspections, to ensure that sub-contractors adhere to the EMP including the relevant Method Statements and Management Plans.



Site Inspection Forms (including details of spills and other incidents) shall be completed on a weekly basis and submitted to the Namport ECO for the monthly environmental report. In addition the EO shall provide any other inputs required by the ECO for this report.

4.4 Monthly reporting

The Namport ECO shall:

- Check the EO's record of significant incidents (e.g., spills, impacts, complaints, and legal transgressions, as recorded in the weekly Site Inspection Forms) as well as corrective and preventive actions taken, for submission to the Namport Environmental Manager at the scheduled monthly meetings.
- Check The Contractor's public complaints register in which all complaints are recorded, as well as action taken; and shall notify the Namport Environmental Manager of any relevant complaints lodged by a third party and provide appropriate information for inclusion in the ECO's monthly environmental report.
- Provide the Namport Environmental Manager with a monthly written report, detailing compliance with the EMP and environmental performance. This report shall be made available to other authorities should they wish to see it. The ECO's monthly report shall include:
 - Findings of the weekly Site Inspection Forms;
 - Notice of any major incidents and complaints and follow up actions taken;
 - Confirmation that the Method Statements, Management Sub-Plans and Management Plans being used are the most recent version;
 - Documentation of variations to the EMP and non-compliances and corrective action;
 - Progress on baseline environmental monitoring programmes;
 - Confirmation that appropriate environmental training of personnel is undertaken; and
 - Confirmation that emergency procedures are in place and effectively communicated to personnel.
- Conduct regular audits to ensure that the system for implementing the EMP is operating effectively. Routine audits are to be undertaken of all Method Statements, Management Sub-Plans and Management Plans. Where inspections and monitoring highlight problems, an internal audit shall be initiated and a report produced.

4.5 Records and registers

The Contractor shall ensure that all attendees at environmental awareness training course(s) sign an attendance register, and shall provide Namport's ECO with a copy of the attendance register after each course.

The Contractor shall advise the Namport Environmental Manager immediately of any emergencies (including spillages) on site and along the transport routes, together with a record of immediate actions taken. The Contractor shall submit a full report on the handling of the emergency as soon as possible (i.e. within the following hours or days).

The following details shall be recorded:

- Type of material spilled;
- Reason for spillage;
- Volume of spillage;
- Clean-up actions taken.

Compliance/non-compliance records shall be kept and shall be made available on request from the relevant authorities. The Contractor shall keep a Public Complaints Register on site.

4.6 Document control

Namport shall establish and maintain procedures for controlling all documents required for the EMP that shall be based on a recognised system (e.g., ISO 9000 or similar). These documentation procedures shall ensure that:

- As a minimum, three complete sets of current EMP documentation are maintained: a set with the Namport ECO on site, a set with the Namport Environmental Manager, and a set with the Namport Document Control Team.
- Documentation is in English, legible, dated (with dates of revisions) and be readily identifiable. The documents shall include clear cross-referencing to other applicable documentation, in particular to any relevant clauses in the ROD.
- Approved Management Plans, Management Sub-Plans and Method Statements shall be readily available on the site and shall be communicated to all relevant personnel as required or upon request.
- Documentation is reviewed annually to ensure that all required documentation is being properly stored and updated.
- Updated documents are promptly distributed to organisations involved in the monitoring (e.g., authorities) and implementation (e.g., The Contractor and sub-contractors) of the EMP. Methods such as the use of a website or electronic document management system are recommended for providing a library of current documents.



- Obsolete documents are removed promptly. Obsolete documents shall be kept at least till the end of the construction phase.

Namport's ECO and Document Control Team shall be responsible for ensuring that documentation is kept up to date. Namport's Environmental Manager shall be responsible for ensuring that documentation is reviewed regularly.

4.7 Stakeholder engagement and community relations

Namport shall facilitate an ongoing and constructive relationship with stakeholders. This will include the following actions:

- Namport, in consultation with The Contractor, shall provide a communications protocol for The Contractor (e.g., communication with the public or the media).
- Namport shall institute an environmental monitoring committee (EMC) that shall focus on monitoring the implementation of the ROD.
- The public shall be kept informed with regard to environmental performance during construction. Mechanisms to facilitate communication between Namport and the public may include reporting to the Environmental Monitoring Committee.
- Where necessary, The Contractor shall erect and maintain information boards in appropriate positions. Such boards shall also include contact details for complaints by members of the public in accordance.
- The public shall be kept informed of any activities that may cause a disturbance, such as loud and noisy construction activities, e.g., piling or bad odours due to disturbance of sulphurous sediments during dredging.
- A system shall be set up for public reporting on compliance of The Contractor and sub-contractors to the EMP. The Contractor shall maintain a Public Complaints Register in which all complaints are recorded.
- Namport shall be responsible for responding to queries and/or complaints and may request assistance from The Contractor's representative for the purpose of explaining the construction process and answering queries if necessary.



5. Auditing and Management Review

This EMP outlines the actions and monitoring to be implemented or achieved during construction and operation. In order to ensure compliance with MET's Record of Decision and implementation of the management actions included in the EMP, formal internal and external audit procedures shall be established.

5.1 Annual internal audits

The Namport Environmental Manager shall ensure that an internal audit of the EMP is undertaken. The results are to be documented and made available to MET and other key stakeholders.

5.2 Post-construction audit

A post-construction environmental audit shall be carried out and the report submitted to MET. As a minimum, this audit shall:

- Determine whether or not the environmental management system conforms to the planned arrangements for environmental management.
- Determine whether the EMP has been properly implemented and maintained.
- Determine adherence to any relevant conditions in MET's Record of Decision and the stipulations of the EMP.
- Provide information on the results of the audits to management and stakeholders.

The Namport Environmental Manager is responsible for ensuring that an appropriate audit programme is prepared, and that the audit is undertaken by a suitably qualified body within six months of the completion of the construction phase, and results published promptly.

5.3 Management review

Namport shall review the implementation of the EMP to assess its suitability, adequacy and effectiveness. The frequency of this review is to be clarified, but shall at least be yearly. The management review process shall ensure that the necessary information is collated. This review shall be documented. In addition to the EMP documentation, the review should take into consideration the results of the post-construction audit, concerns raised by stakeholders, and changing circumstances both internal and external to Namport.

Based on this review, Namport Management shall consider the need for changes to environmental policy and elements of the EMP. This has the benefit of improving environmental management for future construction projects of a similar nature.

6. Initiation of the project

6.1 Introduction

Namport, with the ECO, shall be responsible for monitoring compliance with the Environmental Management Plan.

6.1.1 Compliance with the EMP

The Contractor shall ensure that all construction staff, sub-contractors, suppliers, etc. are familiar with, understand and adhere to, this EMP. Failure by any employee of the Contractor, Sub-contractors, or Suppliers to comply with the EMP shall be considered sufficient cause for the ECO to instruct The Contractor to have the employee removed from the site. Namport may also order The Contractor to suspend part or all of the works if there is non-compliance with both the EMP or construction procedures supplied by the Contractor. Such suspension shall be lifted only when the offending procedure or requirement is corrected and/or if required remedial measures are put in place.

6.1.2 Management Plans, Management Sub-Plans and Method Statements

The Contractor shall submit Management Plans for all activities that could be potentially harmful to the environment. Such Plans shall consist of Management Sub-Plans and Method Statements that include timing of activities, equipment and materials to be used (where applicable), protection of the site, methods for cleaning the site both during construction and on completion of the works, disposal of waste and any other relevant information. No work may commence work on any activity until the Management Plan has been approved in writing by Namport. When emergency Management Plans are required for activities that are deemed harmful to the environment, or of which The Contractor was previously unaware, these shall be submitted within 24 hours of work commencing.

Where necessary, changes may be made to Management Plans, Sub-Plans and Method Statements once construction has commenced. In such instances the proposed changes shall be agreed to in writing by Namport prior to implementing the change.

6.2 Recruitment procedures and staff development

Where appropriate, practicable and reasonable, a 'Locals first' policy shall be adopted for recruitment, with preference given firstly to Walvis Bay residents, then Namibians followed by international contractors and employees. The recruitment office shall be housed well away from the port or Namport offices, so that work seekers do not slow down traffic at the port entrance gates.

The Contractor shall establish a Management Plan for recruitment and personnel development that includes transfer of skills for development of Namibians. This shall include a Sub-Plan for Occupational Health, Wellness and Safety that comprises:



- An HIV/AIDS programme that is linked to Namport's Directly Observed Treatment Strategy (DOTS) programme for TB along with its HIV/AIDS programme.
- Health, safety and environmental awareness information sessions prior to commencing work on site, attended by all construction personnel, including senior site staff, sub-contractors and suppliers. This includes any additional staff, sub-contractors and suppliers that enter the site. An important outcome is that all personnel shall be fully aware of any environmental impacts associated with construction activities they undertake on site and the mitigation actions that accompany them.

6.2.1 Project induction and training

6.2.1.1 Project induction

All personnel working on the project, including sub-contractors, shall be required to complete an induction session prior to starting work. The Contractor's Environmental Officer is responsible for the environmental induction and training procedure that ensures that all staff and sub-contractors working on the site achieve a level of awareness and competence appropriate to their assigned activities. The environmental induction shall be reviewed for adequacy during project environmental management reviews. The project induction shall include the following environmental aspects:

- Namport's environmental policy and its EMS.
- Legal and statutory requirements.
- Concepts of due diligence and duty of care.
- Minimising potential impacts such as noise, air and water quality.
- Site specific issues, such as:
 - Location and protection of environmentally sensitive areas, e.g., lagoon, aquaculture farms, salt works intake;
 - Waste management and minimization;
 - Washing, refuelling and maintenance of vehicles, plant and equipment,;
 - Efficient use of plant, equipment and materials,;
 - Risks from construction activities;
 - Communication and stop work procedures;
 - Emergency response procedures and contact arrangements in case of an incident;
 - Environmental emergency plans, and incident reporting procedures for environmental harm/incidents.

6.2.1.2 Task-Specific Training

Task-specific training is required before staff and sub-contractors can commence high risk activities, or work in environmentally sensitive areas. The Environmental Officer determines what these activities are, which and personnel must have specific instruction, when this training will take place, how it will be delivered, and if there is a need to retrain personnel. This includes training on noise minimisation for staff working at night and any other subjects listed in Sub-Plans and/or work Method Statements.



6.3 Baseline monitoring

6.3.1 Noise

Reduction of noise port-wide is one of the goals for Namport's EMS. It was also raised by stakeholders as an issue that needs to be resolved by Namport. In order, therefore, to realize the management objective of reducing both construction and operational noise, The Contractor shall conduct a baseline measurement of noise levels at the proposed new terminal site and around the perimeter of the port. Suggested locations for monitoring of ambient noise levels are shown in Figure 6.1 below. However, the local community should be consulted to identify areas and times that are sensitive to noise, and whether these locations are adequate or suitable.



Figure 6.1: Suggested locations for monitoring points of ambient noise levels

6.3.2 Natural turbidity

In order to achieve the management objective of minimizing the extent of the dredge plume in time and space, it is necessary first to gain an understanding of turbid conditions that are presently found in the bay. Namport shall therefore commission an independent pre-construction measurement campaign that will aim to do the following:



- Compile a baseline record of existing turbidity conditions in the bay.
- Calibrate an optical backscatter sensor (OBS) for local conditions. This will require that water samples be taken *in situ* at the sites where the OBS systems are to be deployed, to determine the weight concentration of the total solids suspension. These must be used to determine a mathematical correlation between suspended sediment concentrations (SSC) in mg/l and the units used by the OBS at the site, namely, formazin backscatter units (FBUs) or nephelometric turbidity units (NTUs).
- With an infrared sensor, the OBS will not “see” organic material, so that only suspended sediment concentrations are measured. However, it needs to be determined whether this is the most efficient and effective manner for distinguishing between fluctuations in turbidity due to phytoplankton and that due to suspended sediment. A dual system of OBS and chlorophyll sensor (fluorometer) might be more reliable and accurate.
- Determine the optimal depth for deployment of the turbidity measurement system. The goal is to avoid upper turbulence. In the port of Cape Town, the instrument was deployed at a depth of 3 m - mainly because of the configuration of the mooring and the requirement to avoid surface (upper 1 m) turbulence (R. Carter, *personal communication*).
- Confirm a suitable reference site that will enable fluctuations in turbidity due to natural causes to be distinguished from those caused by dredge operations.

Sensitive areas for which baseline data is required are (Figure 6.2):

- Lagoon mouth (inspection survey to determine deepest point);
- Salt works intake and aquaculture farms;
- Intakes for the fishing industry;
- Reference site.

In order to avoid too much spilling during dredging and reclamation activities, threshold values for suspended sediment concentrations will be specified for management of dredge operations. These are default values based upon the environmental thresholds of bivalve molluscs and fish, and combine biological effects data and values based on a background, reference signal (Embecon, 2000, 2004). If background suspended sediment concentrations exceed the lower threshold limit, ANZECC and ARMCANZ (2000) recommend that the 80th percentile of at least 10 observations of background values should constitute the new guideline value for the lowest limit. This shows the importance of the recommended pre-construction background turbidity measurement campaign that will determine background values. The following suspended sediment concentrations for the upper portion (- 3m) of the water column are recommended as turbidity levels:

- < 20 mg/l or 80th percentile of background levels – desirable low risk scenario.
- 20 – 80 mg/l for continuous periods of three days or longer - lower threshold of possible adverse ecological effects.
- 80 – 100 mg/l for more than six hours - probable adverse effects, mitigation measures must be considered.
- 150 mg/l - proven negative impacts, cease dredge operations.

Real time turbidity meters will be placed adjacent to the following sensitive areas to monitor turbidity thresholds. These were deployed at a 3 m depth in Cape Town (R. Carter, *personal communication*). This is something that needs to be “fine tuned” during the background turbidity survey for Walvis Bay.

- Lagoon mouth;
- Salt works intake and aquaculture farms;
- Intakes for the fishing industry;
- Reference site, to measure natural background levels.

During construction of the causeway, suspended sediment concentrations will exceed these threshold values at the lagoon mouth in the short term.

When turbidity levels due to sediment particulates exceed specified maximum values at the monitoring sites, corrective action must be taken by the dredge operator. This includes ceasing dredge operations until turbidity levels drop below threshold levels.

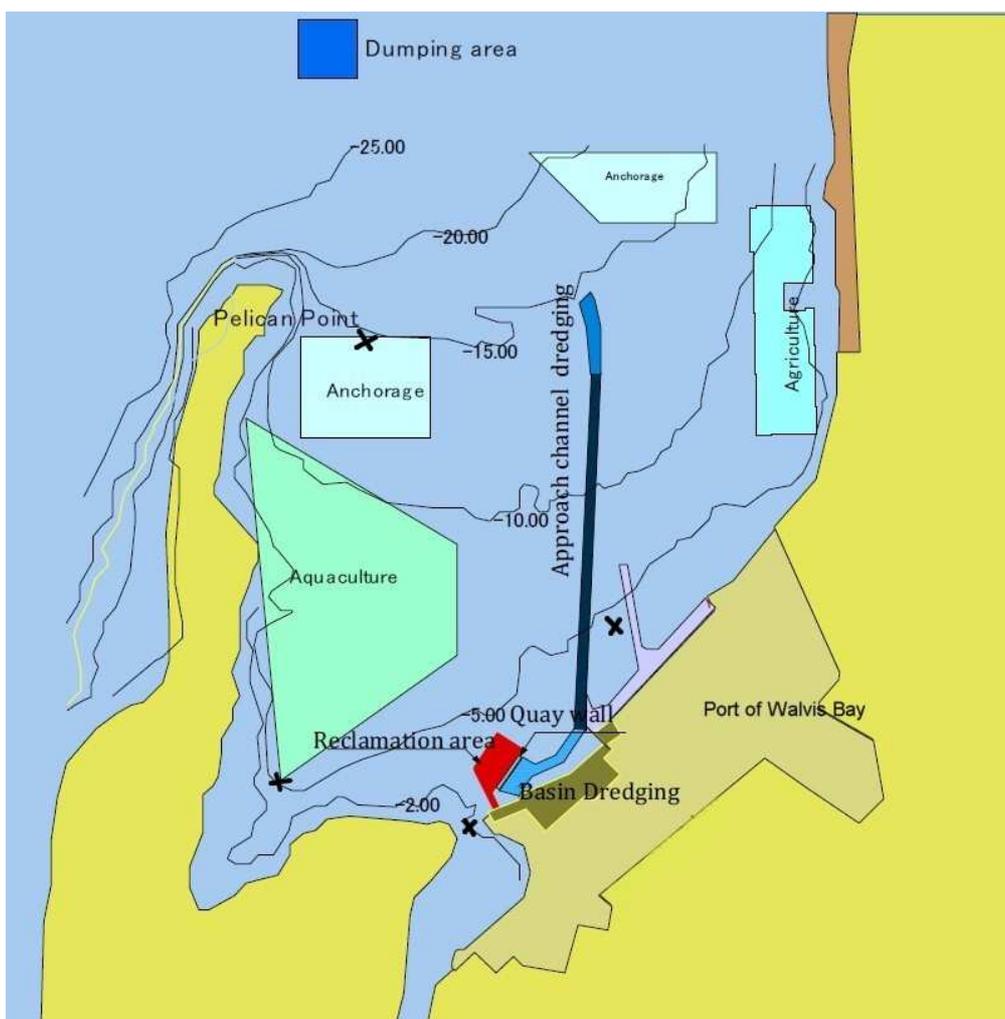


Figure 6.2: Suggested locations for real-time monitoring of dredge plume.



Though the fishing industry's specifications for their intakes might allow for a higher minimum threshold, this must be determined in consultation with them during the pre-construction turbidity measurement campaign. The focus of monitoring at this site would be on not exceeding a suspended sediment concentration maximum specified by the fish processing facilities.

6.4 Construction site: general site preparation and management

The "construction site" is the area required for construction purposes; its boundary, method of marking the boundaries, and specific areas where safety precautions are necessary for other port users shall be agreed with Namport. The site boundary demarcation fence shall be removed when the site is disestablished. The Contractor shall ensure that all plant, labour and materials remain within the boundaries of the site, unless otherwise agreed in writing with Namport. A Management Plan for general site preparation and management of equipment and personnel shall be developed and implemented. It shall include a site plan that shows the location of fuel supplies, stockpile sites, offices, vehicle parking, access points, delivery dock/embayments, equipment cleaning areas, laydown area, as well as the location of where construction personnel shall be accommodated, for approval by Namport.

6.4.1 Living areas

With the exception of security personnel, construction personnel shall not be housed on the site. The Contractor shall supply security personnel with adequate sanitation, water and refuse collection facilities, and facilities for cooking and heating. All other personnel shall be housed in facilities – whether a construction camp or leased accommodation - that comply with the health and safety standards of the Walvis Bay municipality.

6.4.2 Eating areas, ablution facilities, provision of water

The Contractor shall provide the necessary eating areas and ablution facilities for all site personnel. A Management Sub-Plan shall be provided by The Contractor that deals with the location, servicing and maintenance, and spillage control for these facilities.

6.4.3 Movement of construction personnel and equipment

The Contractor shall develop and implement Traffic and Noise Management Plans that shall be reviewed by the Environmental Monitoring Committee. This shall include a management procedure for dealing with complaints about traffic and noise on public roads.

The Traffic Management Plan shall include the following:

- Ensure that all construction personnel and equipment remain within the demarcated construction site at all times. Any movement outside the boundaries of the site, e.g., utilizing an area closer to the TransNamib railway line to unload equipment arriving by rail, shall be approved in writing by Namport.



- A system of access control for all heavy vehicles that transport rock and sand, that avoids stoppages at the entrance gates and public roads near the entrances, shall be instituted by Namport, e.g., access card or large windscreen disc.
- Location and nature of proposed traffic safety measures
- Maximum number of delivery vehicles that shall be allowed on, or close to the site, at any time.
- Quarry operations and transport of rock fill comply with Namport's ISO 14001 environmental management system.
- A system of public transport to the port is implemented.

The Noise Management Plan shall include the following:

- Monitoring of noise levels. These shall comply with World Health Organisation guidelines for night noise.
- Construction vehicles shall use routes through the industrial areas of the town as much as possible at night, and the 5th Road entrance shall not be used continuously during night time construction.
- Vehicles shall have low noise emissions and comply with the Namibian Road Traffic Regulations for noise level emissions.
- Vehicles, machinery and equipment used on site shall be regularly maintained.
- Equipment shall be altered or enclosed to reduce noise at the source, or to isolate it.

6.4.4 Materials handling and storage

No fuels shall be stored on the site for heavy vehicles that transport rock and sand. These shall refuel outside port boundaries. Fuels required for use by construction vehicles and equipment shall be stored in a central depot at the construction site at a location agreed upon by Namport.

The Contractor shall provide Namport with a list and location of all petroleum, lubricant, chemical (including concrete and cement), harmful and hazardous substances and materials on site, together with a Management Sub-Plan on storage, handling, servicing and maintenance, disposal, and spillage and control procedures for these materials. This includes details on training and education about its proper use, handling and disposal for all personnel on site who will be handling the material, and servicing, refueling and storage of construction equipment.

6.4.5 Solid waste and waste water management

The Contractor shall institute a waste control and removal system for the site that is acceptable to Namport, and a Management Sub-Plan in this regard is required. This includes Method Statements for dust suppression on site and for trucks in transit that transport rock and sand.

Waste management on site shall incorporate reduction, recycling, re-use and disposal of waste where appropriate. The Contractor shall dispose of collected waste water in a manner agreed with Namport. Working areas shall be cleaned regularly. All builders' rubble and waste generated during the

construction phase shall be removed from site upon completion of construction activities to a licensed landfill site, and The Contractor shall supply Namport with a certificate of disposal.

Trucks delivering rock, cement or sand shall not be washed on the site. All washing operations shall take place off-site at a location where waste water can be disposed of in an acceptable manner.

6.4.6 Emergency procedures

The Contractor shall provide a Management Sub-Plan on emergency procedures for the site. This shall include, but not be limited to:

- The location of emergency equipment;
- Parties responsible for their maintenance;
- How regularly the equipment is checked to ensure that it is in good working order;
- Who shall be notified in the event of an emergency;
- The size of spills that emergency procedures are able to contain;
- Where and how spill material shall be disposed of.

6.4.6.1 Fire

The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of activities on site; all fires shall be reported immediately to Namport. The necessary basic fire-fighting equipment shall be provided by The Contractor and maintained in good operating order.

The Contractor shall supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other areas identified by Namport with suitable tested and approved fire-fighting equipment. No open fires for heating or cooking shall be permitted on site. Closed fires or stoves shall only be permitted at agreed designated safe sites in the construction camp. Adequate suitable fire-fighting equipment shall be provided at each fire place or stove.

Every possible precaution, including approved fire extinguisher immediately available and the use of welding curtains, shall be taken when welding, cutting of metal or gas cutting is done near potential sources of combustion.

6.4.6.2 Accidents on site

The Contractor shall comply with the Health and Safety Act (1992) and any other national or local regulations with regard to safety on site. The Contractor shall ensure that the contact details of local medical services are available to personnel prior to commencing work.

6.4.6.3 Petroleum, chemical, harmful and hazardous materials

The Contractor shall be responsible for establishing an emergency procedure for dealing with spills or release of these substances, and for ensuring that relevant personnel are familiar with these emergency procedures. These procedures and recording of spills and accidents shall be approved by



Namport prior to such substances being brought on to the site. Clean up and damage shall be for The Contractor's account.

6.4.7 Emergency advisory procedure for potentially damaging incidents to the environment

The Contractor shall ensure that a Management Sub-Plan for an emergency advisory procedure on site is approved by Namport before any operations that may cause damage to the environment are commenced. The Contractor shall also ensure that personnel on site are familiar with all emergency procedures to be followed. Lists of all emergency telephone numbers/contact people shall be kept up to date, and all numbers and names shall be posted at relevant locations at all times.

6.4.8 Site closure

Once construction has been completed, The Contractor shall remove whatever is not permanent from the site, unless otherwise agreed with Namport. A Management Plan for site closure must be developed and implemented, and include the following:

- All site structures must be removed;
- Any spills (i.e. oil and paint) in site must be cleaned up;
- All imported material, waste and rubble must be removed and disposed off at appropriate waste sites;
- Residual stockpiles and building material must be removed from the site; and
- All temporary roads must be closed and rehabilitated to the specifications of the ECO and Environmental Manager.

6.5 Traffic and noise

The objectives for management of traffic impacts are:

- Protect amenity values and business efficiency by ensuring that adverse impacts from traffic density, haulage loads and associated noise are minimised or avoided.

The objectives for management of noise impacts are:

- Protect amenity values by ensuring that noise levels from construction and operations are minimised.
- Ensure that noise levels meet statutory requirements and acceptable standards.

The Traffic and Noise Management Plans developed for general site preparation and management of personnel (see 6.4.3.) shall be implemented for the duration of the construction period, and regularly reviewed by the Environmental Monitoring Committee. Namport shall adapt these plans for mitigation of impacts during the operation of the terminal.

7. Mitigation and Enhancement Plan

7.1 Construction of Causeway

This phase of construction will include the following:

- Construction of the causeway with rock.
- Dumping of rock bund to form the outer perimeter of the reclamation area, and the installation of a geofabric membrane at the inner slope to retain the sand fill.

7.1.1 Mitigation measures on site

The Contractor shall provide a Management Plan that addresses the following, described in 6.2 and 6.4 above. These shall be general requirements for the construction site till construction is completed:

- Living areas, ablution facilities, eating areas and provision of water.
- Movement of construction personnel and equipment.
- Materials handling and storage.
- Solid waste and waste water management.
- Emergency procedures.
- Emergency advisory procedures.

7.1.2 Mitigation measures for traffic and noise

The Contractor shall provide Management Plans as described in 6.5 above.

7.1.3 Enhancement measures for employment

The Contractor shall provide a Management Plan for recruitment and staff development as described in 6.2 above.

7.2 Dredging operations and reclamation

Once the causeway has been constructed, the following will comprise the dredging and reclamation activities:

- Capital dredging of the approach channel. The entrance channel must be extended, widened and deepened.
- Capital dredging of a new turning circle, and deepening opposite Berths 1-8.
- Basin dredging between the new container terminal and existing berths, and at the quay structures of the new terminal.



- Land reclamation for the new terminal area opposite Berths 4-8.
For dredged sand spoil (lower layer) assumed to be relatively “clean”, two alternatives are possible:
 - Land reclamation;
 - Designated spoil site outside the Bay;

The Contractor shall submit a Management Plan on dredging and reclamation in accordance with IFC guidelines¹ that shall consist of Management Sub-Plans by the sub-contractor on the following:

- Vessel movements.
- Plume movement.
- Hydrogen sulphide emissions.
- Reclamation strategy.
- Disposal of spoil at the approved offshore site.

7.2.1 Mitigation measures for vessel movements

The Management Sub-Plan on how interaction with other vessels in the port shall be managed shall include the following:

- Other potential user groups (maritime authorities, fishing industry) in the area shall be notified in writing, providing particulars regarding the location, nature and extent of such operations.
- Sightings of and interactions with other vessels shall be recorded to note potential conflicts over rights of passage and access to resources.
- Exclusion zones shall be clearly marked, using light buoys and/or radar reflectors.
- Disturbance of whales shall be avoided; vessels shall not approach within 300 m of a whale whilst underway (particularly during dredging).
- If a whale surfaces within this distance of the vessel when at anchor, or during discharging of dredged sediments, the vessel shall remain stationary until the whale has moved to a distance 300 m away.
- In the event of an oil spill:
 - The Shipboard Oil Spill Emergency Response Manual procedure shall be followed.
 - Oil bunkering and refuelling of contracted dredgers shall be undertaken under controlled conditions in port only.
 - Ballast water may only be released when the vessel is more than 12 miles from land and in water depths greater than 25 m.
- Waste management practices within Namport’s EMS shall be in place and enforced on all contracted vessels.

¹ IFC: “Environmental, Health, and Safety Guidelines - Ports, Harbors, and Terminals”, pp 2-3.



7.2.2 Mitigation measures for plume movement

The Management Sub-Plan for reducing suspended sediment concentrations in the water column shall include the following:

- Appropriate dredging technology in place to reduce the generation of suspended sediments, such as:
 - The use of dragheads that minimise sediment suspension,
 - Use of underwater pumps to maximise solid concentration, and
 - Control of the overspill.

Mitigation measures to restrict silt release would include dredging of a silt containment pocket to which the run-off from fines should be directed. These fines have to be removed and disposed off regularly when it reaches a level that hinders shipping. In the final stage all fines must be removed by hopper.

The majority of the “ooze” material in the sand layer (older deposits), although fine, sinks reasonably well. In contrast to this, the green organic mud may sink very slowly (if at all); however volumes are expected to be small based on existing borehole information. The “no overflow condition” in the outer channel where the large ooze layer is found is recommended mainly because overflow does not improve dredging efficiency, and because it contributes to turbidity in the water. A silt trap could also be used for temporary storage of suitable material dredged by the THSD in the inner access channel which can then later on be taken up by the CSD and pumped on the terminal reclamation area. This would either require a separate “silt trap” or a proper timing/ management of the silt trap which is used for the overflow of fines from the reclamation area.

Because sites at sensitive areas will be monitored for turbidity levels, it allows for overflow, as long as the turbidity limits at the sensitive areas are adhered to. However, the preferred mitigation strategy is to avoid overflows – particularly since dredging in the entrance channel will move the dredge plume closer to the fish factories and the monitoring sensor deployed there.

- Obtain information about the sediment type from vibrocore logs, and determine if there is any risk of exceeding the water quality guidelines in the tailings/overspill plume.
- Visual observations of the plumes.
- Wind speed and direction recorded in vessel’s bridge log.
- Conduct real-time monitoring of turbidity at selected sites, described in 6.3 above, which indicate when the concentrations of suspended sediment in the water are too high. This includes placing real time turbidity meters adjacent to sensitive areas that measure total suspended solids.

The contractor shall make a vessel, crew and all necessary instrumentation available to an independent contractor. The vessel should be capable of sampling during adverse weather



conditions to determine ambient suspended sediment concentrations under these circumstances. Any suspended sediment measurements shall be taken by the contractor in the presence of the ECO or a designate for the duration of the dredging operation. Measurements shall be taken with an optical backscatter sensor (OBS) with data logger or similar approved instrumentation. The sensor shall be calibrated once per week, or as directed by the ECO, to allow accurate correlation of the NTU measurements of the probe with the suspended sediment concentrations (mg/l) of the dredged material. The responsibility for accurate calibrations and measurements rests with the contractor but must be done to the ECO's satisfaction. When the OBS shows that suspended sediment concentrations in the dredge plume exceed 80 mg/l, this shall be confirmed with analysis of an *in situ* water sample.

Daily suspended sediment concentrations must be collected from the monitoring and reference sites. At spring tides, whenever possible the monitoring must be done at mid-tide during the ebb tide. Monthly reports indicating daily results, mitigation measures implemented, guideline exceedances and remedial actions must be submitted to the Environmental Monitoring Committee and Namport's Environmental Manager.

When the 100 mg/l level is attained or exceeded, the contractor should ensure that the necessary mitigation measures steps are taken and documented to prevent a further increase in suspended sediment concentration, which could lead to suspension of the operation when 150mg/l is exceeded.

- Implement corrective actions required by results of the monitoring of turbidity. Such mitigation interventions include slowing cutter head speed, a slower rotational speed of the CSD, a different cutter head, a slower rate of progress for the TSHD (slower drag rate of suction head along the bottom means less disturbance), a slower rate of hopper loading to control the overflow, and moving the dredger to another sediment type. If 150 mg/l (above ambient) is attained or exceeded, dredge operations must be immediately suspended until levels are reduced to below the threshold mark. The Contractor shall provide reasons for exceeding limits, and these documented in a report on the exceedance. The ECO shall decide whether the situation has been sufficiently rectified for the operation to resume.

7.2.3 Mitigation measures for H₂S emissions

The Management Sub-Plan on minimizing risks from H₂S emissions shall include the following:

- Determine if there is any risk of H₂S gas escaping in specific areas by obtaining information about sediment type from Namport's vibrocore logs.
- Monitor on-board air quality during dredging operations.
- Train health, safety and environmental personnel in how to attend to personal safety in the event of H₂S eruptions during dredging.
- Dredging and support vessels shall be equipped with special protection gear and instruments. Sudden releases of gas shall be anticipated by preventive measures such as availability of gas masks on the deck, and first aid shall be designed to accommodate these occurrences.
- During dredge operations engine rooms and the bridge shall be pressurised so that gasses shall not enter if a large sulphide eruption is encountered.



7.2.4 Mitigation measures for reclamation strategy

The Management Sub-Plan for minimizing negative impacts on the environment that are associated with reclamation shall include the following:

- Reduction of suspended sediment concentrations in the water column.
- Appropriate disposal of sediments that contain heavy metal contaminants.
- Reduction of noise levels.
- Reduction of wind-blown dust and sand when reclamation is above water.

7.2.5 Mitigation measures for disposal of spoil at the approved offshore site

The Management Sub-Plan for disposal of spoil at the approved offshore site shall include the following:

- Liaison with MFMR on their existing monitoring programme;
- Chemical analyses of water, mussel and oyster samples, as specified by the existing EMP authorized by MET:
 - Before disposal commences;
 - During the dredging operations.

7.3 Construction of terminal buildings and facilities, and finishing

Once the required channels have been dredged and reclamation for the new quay has been created, the following activities will be implemented:

- Treatment/Compaction of reclamation to consolidate and construct the pavement.
- Construction of quay structure and revetments.
- Construction and installation of buildings, services/utilities, roads and railway lines.
- Installation of equipment such as ship-to-shore quay cranes, rubber-tyred gantry cranes, etc.
- Finishing off, site closure.

7.3.1 Mitigation measures on site

The Contractor shall provide a Management Plan that addresses the following described in 6.4 above:

- Movement of construction personnel and equipment
- Materials handling and storage
- Solid waste and waste water management
- Safety and emergency procedures
- Site closure



7.3.2 Mitigation measures for traffic and noise

The Contractor shall provide Management Plans as described in 6.5 above.

7.4 Operation of the terminal

7.4.1 Mitigation measures on site

Namport shall address the following in its EMS:

- Movement of vehicles and equipment.
- Materials handling and storage.
- Solid waste and waste water management.
- Emergency procedures.
- Emergency advisory procedures.

7.4.2 Mitigation measures for traffic and noise

Namport shall manage traffic and noise in terms of a Management Plan, guided by 6.5 above.

7.4.3 Enhancement measures for employment

Namport shall institute provide a Management Plan for recruitment and staff development that is guided by 6.2 above.

7.4.4 Mitigation measures for impacts on the environment

Hydrodynamic modelling indicates that the proposed container terminal has the potential of reducing the water refreshment rate into the lagoon by up to approximately 10-15 % at various times in the year. To assess the potential long-term effects of cumulative changes, Namport shall commission regular bird counts of top intertidal predator as an indicator species, namely, the Grey Plover. This must be discussed with the Coastal and Environmental Trust, Namibia (CETN).



8. Management framework for the EMP

The EMP provides a framework for managing the environmental impacts associated with the construction phase of the proposed new container terminal expansion. It incorporates the recommendations of the Environmental Impact Report (EIR) and any conditions of the Record of Decision. The EIR provides background resource information for users of the EMP.

The scope of the EMP includes management actions applicable to direct construction activities, but does **not** provide specific details on **how** construction phase impacts are to be managed and management actions implemented. It is structured around a number of construction and operational phase activities and risk sources and identifies where more detailed Method Statements, Management Sub-Plans and Management Plans are required. It also describes monitoring programmes and reporting, auditing and review procedures. All incidents of non-compliance with the EMP shall be identified and corrective actions taken shall be recorded.

The framework for the EMP is illustrated in Figure 8.1, using the construction phase of the project, where the linkages between Management Plans and Sub-Plans for construction are shown. A similar framework applies to the operational phase.

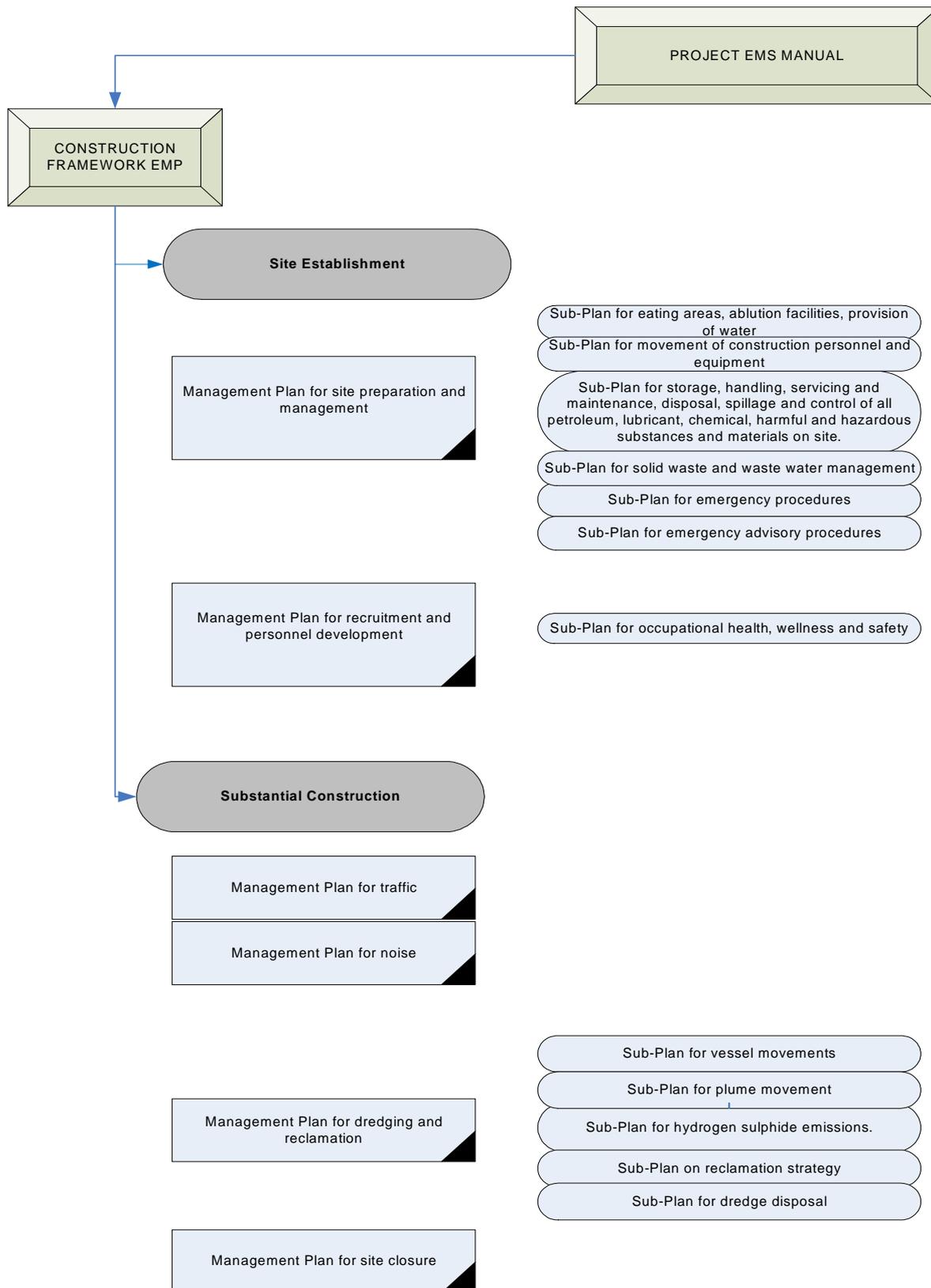


Figure 8.1 Linkages in the EMP between Management Plans and Sub-Plans for construction



The details for these Management Plans and Sub-Plans, and how they link to Namport's EMS and recommendations from the environmental impact assessment of the project, are presented in tabular form in the next section, as follows:

- Table 1: Relevant legislation for the EMP, the environmental goals for 2009-2010 from Namport's ISO 14001 EMS, and environmental objectives for each of the specialist studies that assessed the impacts of the project.
- Table 2: A summary of impacts for construction that were assessed in the environmental impact assessment.
- Table 3: A summary of impacts for operations that were assessed in the environmental impact assessment.
- Table 4: A framework for management of the EMP. The structure of this table is as follows:
 - Construction and operations phase activities and potential risk sources are identified.
 - Management actions to be implemented in order to meet the identified objectives are listed. These have been identified by specialists as part of the EIA process, or stipulated in the Record of Decision (ROD) by the MET. These include the actions for noise and traffic, which The Contractor shall use as a basis for relevant and appropriate Management Plans and Sub-Plans. For negative impacts, these management actions may take one of three forms:
 - 'Preventative' or 'proactive' management: Design and management of project activities and facilities so that they do not result in impacts in the first place.
 - 'Curative' or 'reactive' management: Mitigation of impacts after they have occurred.
 - 'Capacity' management: Overarching management that aims to ensure that the necessary capacity exists to implement both preventative and curative management. This management involves building capacity within the company, as well as the capacity of external organisations that would be required to assist with curative management.
 - As part of the section on *management actions*, the requirement for Method Statements and Management Sub-Plans are identified. These are to be prepared by The Contractor and sub-contractors, and shall specify how they shall manage potential environmental impacts in line with best practice principles, and how the management actions shall be implemented and complied with to ensure that the objectives of the EMP are achieved. Method Statements are consolidated into Management Sub-Plans and, in turn, consolidated by The Contractor into Management Plans for specific activities or risk sources. As construction proceeds and new sub-contractors start on site, they shall be required to submit Method Statements and Sub-Plans that are aligned with the existing EMP. Management Plans shall therefore be updated as and



when new sub-contractors come on site and new Method Statements and/or Sub-Plans are submitted.

- Construction-related work Method Statements are the means by which specific requirements from Sub-Plans are addressed at an operational level, that is, for specific tasks relating to environmental control, such as installation of sediment control devices and spill management.
 - The purpose of Environmental Management Sub-Plans is to guide construction activity concisely, by specifying measures to manage impact on the environment, based on mitigation measures identified in the environmental impact assessment, or equivalent. Environmental monitoring is also defined, to quantify any impact and measure compliance with environmental obligations. Information in Sub-Plans is used to generate site-based plans and work Method Statements that detail relevant environmental controls to be implemented. These are aimed specifically for use by construction superintendents, foremen and workers.
 - o Responsibilities are identified for the different parties involved in implementing the management actions.
- Table 5: A plan for monitoring mitigation measures that were recommended in the environmental impact assessment.
 - o Monitoring measures shall be pragmatic and implementable. As far as possible, measurement parameters shall be selected that provide immediate results in order for appropriate management actions to be taken as soon as possible, in the event of an exceedance of guideline values or accepted performance levels.
 - o Any sections of any monitoring programmes that are specific to particular Management Plans shall be included in those Management Plans.
 - o These shall include the following information:
 - Monitoring objectives, that is, the EIA mitigation recommendation;
 - Action required, that is, measurement parameters and environmental data required, method applied, monitoring location/s, timing and frequency of monitoring;
 - Instrumentation to be used (where applicable);
 - Responsible person(s);
 - Data recording sheet.



Table 1: Goals and objectives for environmental management of construction and operational activities and relevant legislation

Activity	Namport EMS environmental goals for July 2009-August 2010	EMP objectives	Legislation
General Namport procedures Namport environmental and safety management systems General site preparation and management	<ul style="list-style-type: none"> • A strategic EIA with EMP of the whole port and its operations. • Determination of the Namport carbon footprint in Walvis Bay and Luderitz, and implementation of mitigating measures. • Assessment of noise levels and the reduction thereof Port wide 	<ul style="list-style-type: none"> • All action plans outlined in this EMP are achieved. • An ethic of environmental responsibility is instilled in all staff and contract workers. • There is compliance with standards in the Labour Act. • There is compliance with occupational standards regarding exposure to dust and noise. • A balance is achieved between economic, social and environmental responsibilities. Opportunities are provided for local business and socio-economic stability promoted. 	<ul style="list-style-type: none"> • Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation • Namport's Environmental Policy • Environmental Management and Assessment Act (2007) • Labour Act (1992) • Nature Conservation Ordinance (1975) and amendments • Marine Resources Act (2000) • Sea birds and Seals Protection Act (1973) • London Convention 1972/1996 • United Nation Convention on Law of the Sea • Territorial Sea and Exclusive Economic Zone of Namibia Act (1990) • Dumping at Sea Control Act 73 of 1980 • Water Act (1956) and amendments



Activity	Namport EMS environmental goals for July 2009-August 2010	EMP objectives	Legislation
Construction of causeway		<ul style="list-style-type: none"> • Protect amenity values and business efficiency by ensuring that adverse impacts from traffic density, haulage loads and associated noise are minimised or avoided. • Protect amenity values by ensuring that noise levels from construction are minimised. • Ensure that noise levels comply with statutory requirements and acceptable standards such as those recommended by the World Health Organisation. • Maintain the integrity and ecological functions of the seabed, lagoon and coast. • Ensure that the development does not impact significantly on existing marine sediment and water quality. 	
Dredging and reclamation		<ul style="list-style-type: none"> • Minimise direct loss and disturbance to marine habitat during dredging and disposal of dredge spoil, and indirect loss through turbidity. • Minimise the risk of introduction of unwanted marine organisms from dredge vessels. • Maintain the integrity and ecological functions of the lagoon and bay. • Minimise the loss and adverse impacts to recreational amenity and aquaculture resources. 	



Activity	Namport EMS environmental goals for July 2009-August 2010	EMP objectives	Legislation
Terminal construction, finishing and site closure		<ul style="list-style-type: none"> • Protect amenity values and business efficiency by ensuring that adverse impacts from traffic density, haulage loads and associated noise are minimised or avoided. • Protect amenity values by ensuring that noise levels from construction and operations are minimised. • Ensure that noise levels comply with statutory requirements and acceptable standards such as those recommended by the WHO. • Ensure that aesthetic values and public experience of the landscape are considered. • Maintain the integrity and ecological functions of the lagoon and bay. 	
Operation of the terminal		<ul style="list-style-type: none"> • Protect amenity values and business efficiency by ensuring that adverse impacts from traffic density, haulage loads and associated noise are minimised or avoided. • Protect amenity values by ensuring that noise levels from operations are minimised. • Ensure that noise levels meet the statutory requirements and acceptable standards. • Maintain the integrity and ecological functions of the seabed, lagoon and coast. • Minimise the risk of introduction of unwanted marine organisms from dredge vessels. • Enhance social capital by providing opportunities for employment , education and training in scarce skills for Namibians. 	

Table 2: Summary of impacts from construction that were assessed in the environmental impact assessment of the container terminal expansion

Nature of the impact	Extent	Duration	Intensity	Probability	Significance (without mitigation)	Significance (with mitigation)	Status	Degree of confidence
Socio-economic impacts								
Job Creation through the recruitment of contractors	National	Short Term	Medium	Definite	Low	Medium	Positive	High
Impact of new development on Walvis Bay as population increase through influx of workers.	Local	Medium to long term	Medium	Probable	Medium	Low	Negative	Medium
Increased pressure on existing services.	Local	Medium term	Medium to high	Probable	Medium	Low	Negative	Medium
Educational opportunities and skills transfer.	Local	Long term	Medium	Probable	Medium	High	Positive	Medium
Impact on the spreading of communicable disease in and via Walvis Bay.	National to International	Long term/ Permanent	Medium	Probable	Medium	Low	Negative	Medium
Impact of new development on Walvis Bay as population increase through influx of workers.	Local	Medium to Long term	Medium	Probable	Medium	Low	Negative	Medium
Increased pressure on existing services.	Local	Medium term	Medium to high	Probable	Medium	Low	Negative	Medium
Educational opportunities and skills transfer.	Local	Long term	Medium	Probable	Medium	High		Medium
Impact on the spreading of communicable disease in and via Walvis Bay.	National to International	Long term/ Permanent	Medium	Probable	Medium	Low	Negative	Medium
Increased nuisance and negative attitude caused by bad odours liberated during dredging.	Local	Temporary	Medium	Highly probable	Medium	Medium to low	Negative	High

Nature of the impact	Extent	Duration	Intensity	Probability	Significance (without mitigation)	Significance (with mitigation)	Status	Degree of confidence
Increased traffic in Walvis Bay	Local	Short term	Medium	Highly probable	Medium	Medium to low	Negative	High
Noise resulting from piling and drilling during the construction of the container terminal on residents in Walvis Bay	Local	Long term	Medium	Probable	Medium	High	Positive	Medium
Flood lighting during construction.	National to International	Long term/ permanent	Medium	Probable	Medium	Low	Negative	Medium
Increased economic activities of construction companies during construction.	Local	Medium to Long term	Medium	Probable	Medium	Low	Negative	Medium
Increase in number of business people to the area.	Local	Long term	Medium	probable	Medium	Medium	Positive	Medium
Threat to lagoon can decrease property value around and near the lagoon.	Local	Permanent	Medium	Highly probable	Very low	Very low	Negative	Medium
Costs involved and capability of Walvis Bay Municipality to dispose of dredged materials.	Local	Temporary	Low	Improbable	Neutral	Neutral	Neutral	High
Impact of a low water quality on the costs incurred by aquaculture and the fishing plants for the treatment of the water.	Local	Temporary	Low	Highly probable	Low	Very Low	Negative	High
Siltation of the lagoon as a result of dredging operations	Local	Short term	Low	Highly probable	Low	Very low	Neutral	High
Spread of pollutants from dredging	Local	Short term	Low	Improbable	Low	Very low	Negative	High
Potential effect of dredging on the benthos	Local	Short term	Low	Highly probable	Low	Very low	Negative	High



Nature of the impact	Extent	Duration	Intensity	Probability	Significance (without mitigation)	Significance (with mitigation)	Status	Degree of confidence
Noise impacts								
Impact of the construction noise on the residents of Walvis Bay	Local	Temporary	High	Definite	Medium	Medium	Negative	High
Cumulative Impact from the construction vehicles conveying rock	Regional	Short	High	Definite	Medium	Medium	Negative	High
Traffic								
Reduction in road-based level of service due to increase in traffic volumes during construction	Local	Short term	Low	Highly probable	Medium	Low	Negative	High
Accelerated degradation of road structure due to construction traffic	Local	Short term	Low	Highly probable	Low	Low	Negative	Medium
Increased number of road accidents due to increased traffic during construction	Local	Short term	Low	Probable	Low	Low	Negative	Low

Table 3: Summary of impacts from operations that were assessed in the environmental impact assessment of the container terminal expansion

Impact	Impact status	Extent	Duration	Intensity	Probability	Degree of confidence	Significance (without mitigation/ enhancement)	Significance (with mitigation/ enhancement)
Socio-economic Impacts								
Job creation	Positive	Local Regional	Long-term	Medium	Definite	High	Low	Medium
Impact of new development on Walvis Bay as population increases through influx of workers.	Negative	Local	Medium-Long-term	Medium	Probable	Medium	Medium	Low
Increased pressure on existing services.	Negative	Local	Medium-term	Medium-high	Probable	Medium	Medium	Low
Educational opportunities and skills transfer.	Positive	Local	Long-term	Medium	Probable	Medium	Medium	High
Impact on the spreading of communicable disease in and via Walvis Bay.	Negative	Local Transnational	Long-term	Medium	Probable	Medium	Medium	Low
Increase in land traffic in Walvis Bay and Erongo Region.	Negative	Regional National	Long-term	Medium	Probable	Medium	Medium	Low
An increase in heavy vehicles on the road between Swakopmund and Walvis Bay can bring about safety issues, especially for daily commuters.	Negative	Local	Long-term	Medium	Highly probable	Medium	Medium	Medium-low

Impact	Impact status	Extent	Duration	Intensity	Probability	Degree of confidence	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)
Noise that results from the handling of containers	Negative	Local	Long-term	Medium	Highly probable	Medium	Medium	Medium
Construction of new storage facilities on current container terminal.	Negative	Local	Short-term	Medium	Probable	Medium	Medium	Low
Noise barrier that has a negative visual impact.	Negative	Local	Long-term Permanent	Medium	Probable	Medium	Medium	Low
Increased economic activities during operations, especially those related to the transport industry.	Positive	National	Long-term	Medium	Highly probable	Medium	Low-medium	Medium
Lack of collaboration between Namport, WBM and other stakeholders, that limits realisation of opportunities.	Negative	Local	Medium-term	Medium	Highly probable	High	Medium	Low
Increased scope for marina development and associated tourism activities.	Positive	Local Regional	Long-term	Medium	Highly probable	High	Medium	High
Increase in number of business men to the area.	Positive	Local	Long-term	Medium	Probable	High	Medium	Medium
Threat to lagoon can decrease property value around and near the lagoon.	Negative	Local	Permanent	Medium	Improbable	Medium	Low	Low
Impact of water quality on fish factories.	Negative	Local	Long-term	Medium	Probable	Medium	Low	Low

Impact	Impact status	Extent	Duration	Intensity	Probability	Degree of confidence	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)
Noise Impacts								
Impact of the operational noise on the residents of Walvis Bay	Negative	Local	Long-term	Low	Probable	Medium	Medium	Medium-low
Cumulative Impact of the increased vehicle noise	Negative	Regional	Long-term	High	Probable	Medium	Medium	Medium-low
Traffic Impacts								
Reduction in level of service due to increased number of heavy vehicles transporting containers during operation	Negative	Regional	Long-term	Low	Highly probable	High	Low	Low
Accelerated degradation of road structure due to increase in container traffic	Negative	Regional	Long-term	Medium	Highly probable	Medium	Medium	Low
Increased number of road accidents due to increase in container traffic	Negative	Regional	Long-term	Low	Probable	Low	Medium	Low
Coastal and Marine Impacts								
Increased ship traffic affects cetaceans in the bay	Neutral	Local	Long -term	Low	Highly probable	High	Low	Low
Changed noise levels affect cetaceans	Neutral	Local	Long –term	Low	Highly probable	High	Low	low
Impact on functioning of the lagoon	Negative	Local/international	Long –term	Medium	Highly probable	Medium-high	Low	Low
More intense HABs and sulphur eruptions	Negative	Local	Short periods	High	Probable	Low	Low	Very low
Increase in COD/BOD in the harbour	Negative	Local	Long –term	High	Probable	Medium	Low	Very low

Impact	Impact status	Extent	Duration	Intensity	Probability	Degree of confidence	Significance (without mitigation/ enhancement)	Significance (with mitigation/ enhancement)
Disruption of migration and breeding patterns of birds	Negative	Local international	Permanent	Medium	Highly probable	Medium-high	Low	Low



Table 4: Framework for management of the EMP

The framework is composed of sub-tables, as follows:

Table 4.1: General Namport procedures

Table 4.2: Namport environmental and safety systems

Table 4.3: General site preparation and management

Table 4.4: Construction of the causeway

Table 4.5: Dredging and reclamation

Table 4.6: Construction of quay, revetment, new terminal buildings and facilities, and site closure.

Table 4.7: Operation of the terminal

Table 4.8: Noise

Table 4.9: Traffic

Where The Contractor develops different action plans and control measures in the Noise and Traffic Management Plans from those in Tables 4.8 and 4.9, they should achieve the same mitigation outcomes.

Table 4.1: General Namport procedures

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
1.1 General Namport Procedures	<ul style="list-style-type: none"> Implementation of the ISO 14001 environmental management policy and procedure 	<ul style="list-style-type: none"> Improved environmental management and awareness 	<ul style="list-style-type: none"> Define roles and authorities of staff members (and any specialist consultants) responsible for implementation of the various facets of this EMP. Address training needs of staff required to implement specialised aspects of the EMP. Maintain records of plans, decisions, data collected, communications made, emergency responses, etc., which document the implementation of the EMP. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> Internal communication about the EMP 	<ul style="list-style-type: none"> Improved environmental management and awareness 	<ul style="list-style-type: none"> All personnel are made aware of the contents of Namport's Environmental Policy Statement. All personnel who are in a position to make decisions or take actions that will influence environmental protection and management are made aware of the contents, and their respective responsibilities for implementation, of the EMP. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> Instructions to all staff, including contractors 	<ul style="list-style-type: none"> Improved environmental management and awareness 	<ul style="list-style-type: none"> Provide instructions and appropriate training to all staff about aspects of the EMP that affect their specific work, including oil pollution prevention and clean-up, and general waste management. Prior to working in the area, all contractors undergo an environmental and safety induction. Incorporate environmental aspects and management interventions applicable to particular outsourced tasks into contracts and performance appraisals to improve environmental awareness and performance, and specify penalties for non-compliance. Report all environmental incidents, as specified in the Company Procedures. 	Namport: Environmental Manager

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
	<ul style="list-style-type: none"> EMP Monitoring 	<ul style="list-style-type: none"> Improved environmental management and awareness 	<ul style="list-style-type: none"> Undertake EMP monitoring on a continuous basis by using Namport's ISO 14001 Environmental Management System. Undertake regular formal EMP performance assessments to check progress in meeting the objectives and targets of this EMP. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> EMP Amendments 	<ul style="list-style-type: none"> Improved environmental management and awareness 	<ul style="list-style-type: none"> On an ongoing basis, assess the applicability of actions and activities required by the EMP; identify and address all new environmental issues arising from changed operations and/or communications with interested parties, through amendments to the EMP if/where necessary. Amend and revise this EMP, if required, and submit to the Ministry of Environment and Tourism (Directorate: Environmental Affairs) for approval. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> Communications with stakeholders 	<ul style="list-style-type: none"> Improved stakeholder relationships 	<ul style="list-style-type: none"> The public shall be kept informed about environmental performance during construction and operations. Maintain an up-to-date I&AP database. Maintain open communication with the relevant stakeholders, addressing any issues of concerns that may arise, maintain records of communications, and where relevant, address their needs. 	Namport: Environmental Manager

Table 4.2: Namport environmental and safety systems

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
2.1 Namport environmental and safety systems	<ul style="list-style-type: none"> Maintain ISO 14001 environmental management system 	<ul style="list-style-type: none"> Improved environmental management 	<ul style="list-style-type: none"> Define roles and authorities of staff members (and any specialist consultants) responsible for implementation of the various facets of this EMP. Ensure that all requirements of Namport's ISO14001 EMS are met, including compliance with legislation, environmental awareness training, environmental monitoring, waste management and pollution control. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> Integration of environmental management 	<ul style="list-style-type: none"> Improved environmental management 	<ul style="list-style-type: none"> All personnel are made aware of the contents of Namport's Environmental Policy Statement. Include environmental management through all phases of the strategic expansion of the container terminal. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> Maintain safety management 	<ul style="list-style-type: none"> Improved health and safety 	<ul style="list-style-type: none"> Provide instructions and appropriate training to all staff about safety aspects of their specific work. Maintain high safety standards onboard each dredge vessel. 	Namport: Environmental Manager
	<ul style="list-style-type: none"> International safety management (ISM) code for safe operation of dredge vessels and for pollution prevention 	<ul style="list-style-type: none"> Improved health and safety 	<ul style="list-style-type: none"> Ensure compliance by the contractor vessel with the International Maritime Organisation's International Safety Management (ISM) Code developed for the proper development, implementation and assessment of safety and pollution prevention management in accordance with good practice. Ensure that the required external assessments of compliance to the ISM Code are conducted. Submit certificates of compliance with Environmental Performance Reports to the EMC. 	Namport: Environmental Manager

Table 4.3: General site preparation and management

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
3.1 Construction site demarcated – living areas, ablution facilities, eating areas and provision of water.	<ul style="list-style-type: none"> Waste and water use 	<ul style="list-style-type: none"> Uncontrolled waste generation and water use Surface water runoff 	<ul style="list-style-type: none"> The Contractor shall ensure that all plant, labour and materials remain within the boundaries of the site, unless otherwise agreed in writing with Namport. A site plan that shows the location of fuel supplies, stockpile sites, offices, vehicle parking, access points, delivery dock/embayments, equipment cleaning areas and laydown area, as well as the location of accommodation for construction personnel, shall be provided for approval by Namport. With the exception of security personnel, construction personnel shall not be housed on the site. The Contractor shall supply security personnel with adequate sanitation, water and refuse collection facilities, and facilities for cooking and heating. All other personnel housed in facilities that comply with the health and safety standards of the Walvis Bay municipality The Contractor shall provide the necessary ablution facilities and eating areas for all site personnel, and provide construction, drinking and washing water for all staff. A Management Sub-Plan shall be provided by The Contractor that deals with the location, servicing and maintenance, and spillage control for these facilities. 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
3.2 Emergency procedures	<ul style="list-style-type: none"> • Fire • Harmful materials 	<ul style="list-style-type: none"> • Unplanned fires • Unplanned spillage of harmful materials 	<ul style="list-style-type: none"> • The Contractor shall provide a Management Sub-Plan on emergency procedures for the site. This shall include, but not be limited to: <ul style="list-style-type: none"> - The location of emergency equipment; - Parties responsible for their maintenance; - How regularly the equipment is checked to ensure that it is in good working order; - Who shall be notified in the event of an emergency; - The size of spills that emergency procedures are able to contain; - Where and how spill material shall be disposed of. 	The Contractor
3.3 Emergency advisory procedures.	<ul style="list-style-type: none"> • Potentially damaging incidents to the environment 	<ul style="list-style-type: none"> • Unplanned negative impacts on the environment 	<ul style="list-style-type: none"> • The Contractor shall provide a Management Sub-Plan for an emergency advisory procedure on site. This shall be approved by Namport before any operations that may cause damage to the environment are commenced. 	The Contractor

Table 4.4: Construction of the causeway

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
4.1 Movement of construction personnel and equipment	<ul style="list-style-type: none"> Vehicle movements 	<ul style="list-style-type: none"> Vehicle movement in the railway area Traffic delays on public roads 	<ul style="list-style-type: none"> Develop and implement a Management Plan for vehicle movements on site and on public roads. This shall include: <ul style="list-style-type: none"> A system of access control for all heavy vehicles that transport rock and sand that avoids stoppages at the entrance gates and public roads near the entrances shall be instituted by Namport, e.g., access card or large windscreen disc. Quarry operations and transport of rock fill shall comply with Namport's ISO 14001 environmental management system. A system of public transport to the port shall be implemented. 	The Contractor
	<ul style="list-style-type: none"> Noise generation 	<ul style="list-style-type: none"> Noise from delivery vehicles, moving and operation of equipment on site. 	<ul style="list-style-type: none"> Develop and implement a Management Plan for reducing noise levels in the port and on the public roads. This shall include: <ul style="list-style-type: none"> Construction vehicles shall use routes through the industrial areas of the town as much as possible at night, and the 5th Road entrance not used continuously during night time construction. Vehicles shall have low noise emissions and comply with the Namibian Road Traffic Regulations for noise level emissions. Vehicles, machinery and equipment used on site shall be regularly maintained. 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
4.2 Materials handling and storage	<ul style="list-style-type: none"> • Fuel and lubricant storage; hazardous materials and chemicals • Dust spillage 	<ul style="list-style-type: none"> • Spillage of fuels, lubricants, hazardous and chemicals. • Generation and spillage of dust 	<ul style="list-style-type: none"> • Develop and implement a Management Sub-Plan for storage, handling, servicing and maintenance, disposal, and spillage and control procedures for fuels, lubricants and chemicals. This shall include: <ul style="list-style-type: none"> - No fuels shall be stored on the site for heavy vehicles that transport rock and sand. These shall refuel outside port boundaries. - Fuels required for use by construction vehicles and equipment shall be stored in a central depot at the construction site at a location agreed upon by Namport. - Namport shall be provided with a list and location of all petroleum, lubricant, chemical (including concrete and cement), harmful and hazardous substances and materials on site. - Details shall be provided on training and education about the proper use, handling and disposal of these substances. • Develop and implement Method Statements for dust suppression on site and for trucks in transit that transport rock and sand. 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
4.3 Solid waste and waste water management	<ul style="list-style-type: none"> • Solid waste • Waste water 	<ul style="list-style-type: none"> • Generation of solid waste • Water pollution from chemicals, concrete washouts 	<ul style="list-style-type: none"> • Develop and implement a Management Sub-Plan for waste control and removal that shall incorporate reduction, recycling, re-use and disposal of waste where appropriate. • Implement the Management Sub-Plan for storage, handling, servicing and maintenance, disposal, and spillage and control procedures for fuels, lubricants and chemicals. This shall include: <ul style="list-style-type: none"> - Trucks delivering rock, cement or sand shall not be washed on the site. All washing operations shall take place off-site at a location where waste water can be disposed of in an acceptable manner. - Washouts shall be at designated concrete washout areas. - Water used for washout shall be recycled and stored on site. 	The Contractor

Table 4.5: Dredging and reclamation

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
5.1 Mobilisation of vessel	<ul style="list-style-type: none"> Discharge to water 	<ul style="list-style-type: none"> Pollution of surrounding waters 	<ul style="list-style-type: none"> Ballast water shall be exchanged 12 nautical miles off shore 	The Contractor
	<ul style="list-style-type: none"> Introduction of exotic marine organisms 	<ul style="list-style-type: none"> Loss of biodiversity 	<ul style="list-style-type: none"> Quarantine inspection undertaken. Ballast water exchange as per IMO rules. Marine expert shall inspect vessels prior to mobilisation. Dredge vessel shall arrive with non-fouled hulls. 	The Contractor
5.2 Vessel movement	<ul style="list-style-type: none"> Interaction with other vessels Disturbance of marine mammals 	<ul style="list-style-type: none"> Risk of collisions Risk of collision with whales 	<ul style="list-style-type: none"> Develop and implements a Management Sub-Plan on how interaction with other vessels in the port shall be managed. This shall include the following: <ul style="list-style-type: none"> Other potential user groups (maritime authorities, fishing industry) in the area shall be notified in writing, providing particulars regarding the location, nature and extent of such operations. Sightings of and interactions with other vessels shall be recorded to note potential conflicts over rights of passage and access to resources. Exclusion zones shall be clearly marked, using light buoys and/or radar reflectors. Disturbance of whales shall be avoided; vessels shall not approach within 300 m of a whale whilst underway (particularly during dredging). If a whale surfaces within this distance of the vessel when at anchor, or during discharging of dredged sediments, the vessel shall remain stationary until the whale has moved to a distance 300 m away. 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
	<ul style="list-style-type: none"> Oil spill 	<ul style="list-style-type: none"> Pollution of surrounding waters 	<ul style="list-style-type: none"> In the event of an oil spill: <ul style="list-style-type: none"> > The Shipboard Oil Spill Emergency Response Manual procedure shall be followed. > Oil bunkering and refuelling of contracted dredgers shall be undertaken under controlled conditions in port only. > Waste management practices within Namport's EMS shall be in place and enforced on all contracted vessels. 	The Contractor
5.2 Operation of dredging and related vessels and equipment	<ul style="list-style-type: none"> Noise from 24 hour dredging operations Waste oil or bilge water spill during handling, grease from pipes Fuel spills during refuelling, burst hydraulic hoses Waste generation 	<ul style="list-style-type: none"> Noise above ambient levels Water pollution Water pollution Water pollution 	<ul style="list-style-type: none"> Develop and implement a Noise & Vibration Management Sub-Plan that covers noise from the dredge vessels. Develop and implement a Water Management Sub-Plan Shipboard Oil Spill Emergency Response Manual procedure shall be followed. Oil bunkering and refuelling of contracted dredgers shall be undertaken under controlled conditions in port only Develop and implement a Waste Management Sub-Plan 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
5.3 Plume movement	<ul style="list-style-type: none"> Suspended sediments in the water column 	<ul style="list-style-type: none"> Water pollution from raised turbidity levels 	<ul style="list-style-type: none"> Develop and implement a Management Sub-Plan for reducing suspended sediment concentrations in the water column. This shall include the following: <ul style="list-style-type: none"> Appropriate dredging technology is in place to reduce the generation of suspended sediments. Determine the risk of exceeding water quality guidelines in the tailings/overspill plume from information about the sediment type from vibrocore logs. Visual observations of the plumes. Real-time monitoring of turbidity at selected sites is implemented, to indicate when concentrations of suspended sediment in the water are too high. Corrective actions that respond to results of real-time monitoring are developed and implemented. Prior to, during and after dredging activities - water sampling and analysis in sensitive areas. 	<p>The Contractor Onboard Environmental Monitor/ECO</p>
	<ul style="list-style-type: none"> Hydrogen sulphide gas and bad odours 		<ul style="list-style-type: none"> Develop and implement a Management Sub-Plan on minimizing risks from H₂S emissions that shall include the following: <ul style="list-style-type: none"> Obtain information about sediment type from vibrocore logs, and determine if there is any risk of H₂S gas escaping in specific areas. Monitor on-board air quality during dredging operations. Sudden releases of gas shall be anticipated by preventive measures such as availability of gas masks on the deck, and first aid shall be designed to accommodate these occurrences. During dredge operations, measures are in place to prevent gasses from entering engine rooms and the bridge when a large eruption is encountered. Inform residents of Walvis Bay of dredging schedules. 	<p>The Contractor Onboard Environmental Monitors</p>

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
5.4 Reclamation strategy	<ul style="list-style-type: none"> Noise from 24 hour dredging operations Movement of sediments that contain heavy metal contaminants Generation of dust and sand 	<ul style="list-style-type: none"> Increased noise levels. Pollution from contaminants Wind-blown dust and sand creates a nuisance for residents 	<ul style="list-style-type: none"> Implement the Noise & Vibration Management Sub-Plan that covers noise from the dredge vessels. Appropriate disposal of sediments that contain heavy metal contaminants. Implement Dust Suppression Method Statement to reduce wind-blown dust and sand when reclamation is above water. 	The Contractor
5.5 Disposal of dredge spoil	<ul style="list-style-type: none"> Disturbance of bottom sediments by new spoil 	<ul style="list-style-type: none"> Mobilisation of sediments that contain heavy metal contaminants 	<ul style="list-style-type: none"> All dredged material shall be unloaded at approved disposal sites and in accordance with conditions stipulated in the approvals for these sites The Management Sub-Plan for disposal of spoil at the approved offshore site shall include the following liaison with MFMR on their existing monitoring programme; 	The Contractor

Table 4.6: Construction of quay, revetment, new terminal buildings and facilities, and site closure

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
6.1 Treatment/compaction of reclamation 6.2 Construction of quay and operational zone 6.3 Construction of buildings and facilities, internal roads and railway lines 6.4 Installation of equipment 6.5 Finishing off, Site closure	<ul style="list-style-type: none"> • Vehicle movements • Noise generation • Fuel and lubricant storage • Hazardous materials and chemicals • Dust and sand generation • Solid waste • Waste water 	<ul style="list-style-type: none"> • Vehicle movement in rail area • Traffic delays on public roads • Noise from delivery vehicles and moving of equipment on site • Noise from piling • Spillage of fuels, lubricants and chemicals • Spillage of hazardous materials and chemicals • Wind-blown dust and sand are a nuisance for residents • Generation of solid waste • Water pollution from chemicals, concrete washouts 	<ul style="list-style-type: none"> • Implement a Management Plan that addresses the following issues, described in the Action Plans for construction of the causeway <ul style="list-style-type: none"> - Movement of construction personnel and equipment - Materials handling and storage - Solid waste and waste water management - Safety and emergency procedures - Site closure 	<p>The Contractor</p>

Table 4.7: Operations

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
7.1 Solid waste and waste water management	<ul style="list-style-type: none"> Solid waste Waste water 	<ul style="list-style-type: none"> Generation of solid waste Water pollution from chemicals, concrete washouts 	<ul style="list-style-type: none"> Management in terms of the port EMS. 	Namport
7.2 Materials handling and storage	<ul style="list-style-type: none"> Fuel and lubricant storage; hazardous materials and chemicals 	<ul style="list-style-type: none"> Spillage of fuels, lubricants, hazardous and chemicals. 	<ul style="list-style-type: none"> Management in terms of the port EMS. 	Namport
7.3 Movement of containers and equipment	<ul style="list-style-type: none"> Education and transfer of skills 	<ul style="list-style-type: none"> Preference given to Walvis Bay residents and Namibians Skills transfer and capacity building for Namibians 	<ul style="list-style-type: none"> Where appropriate, practicable and reasonable, give preference to Walvis Bay residents and Namibians when recruiting operators for cargo and container handling. Establish skills development programmes to transfer scarce skills and build capacity of Namibians. 	Namport
	<ul style="list-style-type: none"> Vehicle movements 	<ul style="list-style-type: none"> Vehicle movement in the port and on public roads Traffic delays on public roads Impact on road infrastructure and road safety 	<ul style="list-style-type: none"> Management in terms of the port EMS for movement of heavy vehicles and equipment on site and on public roads. This shall include: <ul style="list-style-type: none"> A system of access control for all container trucks that avoids stoppages at the entrance gates and public roads near the entrances. Use of routes that lower the impact on road safety. Measures that address driver training and vehicle safety. A system of public transport to the port. 	Namport

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
	<ul style="list-style-type: none"> Noise generation 	<ul style="list-style-type: none"> Noise from container trucks, moving and operation of equipment on site. 	<ul style="list-style-type: none"> Management in terms of the port EMS for reducing noise levels in the port and on the public roads. This shall include: <ul style="list-style-type: none"> Heavy vehicles use routes through the industrial areas of the town as much as possible. Vehicles comply with the Namibian Road Traffic Regulations for noise level emissions. Vehicles, machinery and equipment used on site shall be regularly maintained. Ensuring that staff are trained in operational techniques that avoids excessively rough handling of the spreaders is limited and that containers are not "dropped" onto the ground, especially when empty. A sound barrier constructed between the port and 5th Road and the port and Atlantic Street to reduce truck noise along the internal transport route. Where there are gaps in the barrier to facilitate traffic access, the open portion should have an overlapping interior barrier. Another alternative is to lower the new road below normal street level, so that vehicle and road noise is contained within the lowered roadway. 	Namport
7.4 Impact of new terminal on the function of the bay and the lagoon.	<ul style="list-style-type: none"> Reduction of tidal refreshment rate 	<ul style="list-style-type: none"> Cumulative impact on migration and breeding patterns of birds 	<ul style="list-style-type: none"> In consultation with the Coastal and Environmental Trust, Namibia, monitor intertidal predator species by commissioning regular bird counts of an indicator species, for example, the Grey Plover. 	Namport

Table 4.8: Noise

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
7.1 Construction noise	<ul style="list-style-type: none"> Noise generation 	<ul style="list-style-type: none"> Noise from noisy equipment 	<ul style="list-style-type: none"> Noise monitoring stations shall be set up – one at the 5th Gate entrance, and one at the southern end of the present container quay. The target for daytime noise levels is the greater of pre-construction traffic noise in the area, or 60 dB(A). Sub-contractors shall not utilize excessively noisy equipment. Any noise disturbance for the general public shall be subject to a cut-off time when there's a northerly wind or the weather is calm. Specific times, e.g., 23h00 - 05h30, shall be by agreement with the Environmental Monitoring Committee. 	The Contractor
		<ul style="list-style-type: none"> Noise from piling 	<ul style="list-style-type: none"> If pile operations are needed, a quieter method such as augur drilling, as opposed to impact pile driving, is preferred. If impact piling is conducted, the impact portion of the piling rig shall be attenuated with a BATNEEC technology or equivalent to decrease the noise, especially during night time activities. Noise level measurements shall be conducted at night to determine its zone of influence as well as the actual efficacy of any attenuation measures to reduce noise emission. 	The Contractor

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
7.2 Cumulative increase in noise from heavy vehicles	<ul style="list-style-type: none"> Noise generation 	<ul style="list-style-type: none"> Noise from vehicles 	<ul style="list-style-type: none"> Heavy vehicles shall use routes through the industrial areas of the town as much as possible at night. Heavy construction vehicles shall not use the 5th Road entrance continuously during night time construction. Vehicles with low noise emissions that comply with the Namibian Road Traffic Regulations for noise level emissions shall be used. The Contractor shall provide Method Statements from transport sub-contractors on how they shall ensure that their trucks have low noise emissions. The use of a rubber absorbent mix with the asphalt shall be considered when constructing or upgrading internal truck routes. 	The Contractor
			<ul style="list-style-type: none"> All level crossings within the port area shall be constructed in such a manner that loose rocks on trucks or containers on trailers do not “bump” when crossing the railway tracks. Namport shall work with the responsible authority to fix the existing railway crossing in 18th Street. A sound barrier shall be constructed between the port and 5th Road and the port and Atlantic Street to reduce the amount of truck noise that will be generated along the internal transport route (Figure 8.2). The exact engineering detail of the sound barrier shall be determined when the detailed road design is complete. Where there are gaps in the barrier to facilitate traffic access, the open portion shall have an overlapping interior barrier. 	Namport
7.3 Public complaints about excessive noise levels	<ul style="list-style-type: none"> Noise generation 	<ul style="list-style-type: none"> Noisy traffic, construction and operational activities 	<ul style="list-style-type: none"> A management procedure shall be put into place for dealing with complaints about noise, and what corrective actions would be taken. 	The Contractor Namport



Figure 8.2: Suggested location for a noise barrier wall. Its engineering detail shall be determined when the internal road design is complete.

Table 4.9: Traffic

Activity	Aspect	Impact Description / Risk Sources	Action Plans and Control Measures	Responsible Person
8.1 Construction activities	<ul style="list-style-type: none"> Vehicle movements on public roads 	<ul style="list-style-type: none"> Impact on traffic conditions Impact on road infrastructure Impact on road safety 	<ul style="list-style-type: none"> The use of public transport (buses and minibus taxis) by staff working in the port shall be encouraged. The Municipality shall be asked by Namport to install traffic signals at the Third Street/13th Road 4-way stop control. An alternative to the installation of traffic signals at the Third Street/Thirteenth Road intersection is to impose a ban on construction trucks using this intersection during the morning and afternoon peak traffic periods, which are 07:00 – 08:30 and 16:00 – 17:30. Overloading of vehicles shall be avoided. This shall be monitored by weighing vehicles before they enter the Port. Truck drivers shall be encouraged to use the alternative route to the B2, namely, C34 behind the dune field, between Walvis Bay and Swakopmund. Properly trained drivers and well maintained vehicles shall be used. Random inspections of vehicles entering and leaving the Port shall be conducted to check that they are in a safe and roadworthy condition. A “glide” onramp at the quarry exit road will improve safety and efficiency for trucks that join the public road after loading up with rocks at the quarry. 	<p>The Contractor Namport</p>

Table 5: Monitoring plan to assess implementation of mitigation measures

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Socio-economic impacts				
During both construction and operations a 'Locals first' policy has to be adopted whereby Namibian Contractors and employees are used as far as possible.	Namport Project Manager and HR Manager.	Where appropriate, practicable and reasonable, preference shall be given during recruitment firstly to Walvis Bay residents, then Namibians followed by International contractors and employees as far as possible.	Review of employee records.	During recruitment.
Foster collaboration with the Municipality with regard to available resources such as water and electricity and increased housing needs.	Namport Project Manager and HR Manager.	Establish forums to facilitate discussion.	Review of minutes.	Quarterly, ongoing process.
Adopt a 'reduce-at source' policy.	HR Manager.	Put policy in place while raising awareness amongst employees.	Water and electricity records. Spot checks.	Regular basis.
Managing the transferring of skills programmes.	HR Manager.	Establish skills transferring programmes. Manage individual development plans.	Review employee records.	Quarterly and as need for new skills arises.

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Continue DOTS programme for TB along with HIV/AIDS programme, link up with NGO's for awareness raising on HIV/AIDS.	HR Department/ Health and Safety Officers.	Continue the availability of the DOTS programme along with HIV/AIDS awareness raising through pamphlets, posters, workshops and campaigns.	Review the implementation of programmes and policies.	Continuously.
Keep Public informed through the media on when dredging will occur, increasing the possibility for the emission of bad odours.	Environmental Manager in collaboration with municipality.	Place notices in newspapers and Bay News.	Align notices with the project schedule. Review the notices placed in newspapers.	Before dredging occurs.
Direct flood lighting away from the town.	Environmental Manager, Contractors.	Direct flood lighting away from the town.	Visually observe direction light form flood lights.	Continuously during Construction.
Traffic Impacts				
Heavy vehicles, including construction vehicles, shall avoid routes running through the town, especially residential areas.	Environmental Manager and Walvis Bay Traffic Department.	Namport and the Walvis Bay traffic department identify routes to be used by heavy vehicles.	Spot Checks.	Continuously.
Namport and Walvis Bay Traffic Department shall investigate the restrictions of movement for heavy vehicles to certain times of the day.	Namport and Walvis Bay Traffic Department.	Investigate safety risks on road between Swakopmund and Walvis Bay. Determine the number of road users on the road under discussion as well as peaks.	Review minutes of discussions and studies conducted.	Continuously, especially before operational phase of the project is commissioned.

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Provision of reliable passenger transport service during construction and operation to encourage high use of buses by workers	Namport	Namport shall check that the staff bus service is provided as per agreement, with the operator	Appointed inspectors shall record buses arrival and departure times at designated pick-up points and count passengers on buses	Once a week on a randomly selected day each week
An alternative to the installation of traffic signals at the Third Street/ Thirteenth Road intersection is to ban construction trucks from using this intersection during peak traffic periods (07:00 – 08:30 and 16:00 – 17:30)	Walvis Bay Traffic Department	Traffic signs on the approaches to the Third Street/ Thirteenth Road intersection indicating that no construction trucks are allowed on these roads during the specified time periods	Traffic law enforcement during specified time periods	Daily
Heavy vehicle safety and overloading checks	Walvis Bay Traffic Department	Traffic enforcement officials to weigh and inspect selected vehicles entering the Port	Municipality to organize use of vehicle weighing equipment at Port gateway	All heavy vehicles passing over weight detector. Selected vehicles to undergo safety inspection daily.
A greater proportion of containers to be transported by rail instead of road	TransNamib and Namport	TransNamib to investigate using more wagons for conveying containers	Namport to record supply of wagons by TransNamib and delivery time between origin and destination of selected container trains	Monitor trains on a daily basis and discuss progress with TransNamib on a monthly basis

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Noise Impacts				
If noise from piling exceeds accepted levels, it shall be restricted to specific times, e.g. not at night between 22h00 and 06h00.	Contractor	Construction schedule shall be designed in such a way that noise from piling is restricted.	Review construction schedule and monitor piling actions. Install noise level meters.	Continuously.
Noise barrier shall be constructed, subject to architectural design and landscaping limit visual impact.	Namport and architects	Consider design.	Review designs.	Before construction of barrier.
Crane operators receive training so that the noise from connecting on to the spreaders and dropping empty containers is minimised.	Namport	Establish skills development programme. Manage individual staff development plans.	Performance management and review of staff.	Quarterly and as a response to the EMC dealing with complaints about noise from container operations.
Ensure that trucks pass through the industrial areas as much as possible, ensure level crossings are upgraded, investigate rubber mixture road surface.	Contractor	Namport and the Walvis Bay traffic department identify routes to be used by heavy vehicles. Investigate measures to reduce container bounce on level crossings and tyre/road noise of heavy vehicles.	Spot checks Measurement of noise levels at identified locations.	Continuously Semi-annually, and as a response to the EMC dealing with complaints about noise from container haulage.

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Turbidity levels at environmentally sensitive receptor sites				
Sensitive areas, that is, salt works intake and aquaculture farms, lagoon entrance and intakes to fish factories, are protected by systems that provide real-time measurements of turbidity. If turbidity due to sediment particulates exceeds critical levels, corrective action shall be taken by the dredging operator. A reference site must be chosen, so that its measurements of elevated turbid levels due to natural causes can be separated from those caused by dredging.	Independent consultant	Deployment of optical backscatter sensor to measure total suspended solids at the reference site and sensitive sites. Measurements at the reference site will show turbidity levels due to natural variations in the environment.	Real-time measurements of turbidity monitored by independent observer	Real-time, continuously during dredging.
Hydrogen sulphide levels				
Release of hydrogen sulphide from dredged sediments, and bad odours.	Contractor	Deployment of on-board air quality instruments.	Measurements of on-board air quality.	Continuously during operations.
Changes in migration and breeding patterns of birds, particularly Red Data species				
Quantify long-term effects of reduction in rate of tidal refreshment of the lagoon on indicator species of intertidal predator species	Namport	Regular bird counts of selected bird species, e.g., Grey Plover	Population size of indicator bird species	Summer and winter every year
Characteristics of dredged material				
Minimise any negative environmental impacts due to dredge operations.	Namport	Take water, mussel and oyster samples at locations designated in the EMP for the disposal site, and bed sediment at dredge locations.	Chemical analysis of samples as required in the EMP approved by DEA_MET for capital dredging.	Before spoil disposal starts, and at regular intervals during dredging, in consultation with MFMR in Walvis Bay.