

9.0 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The main objective of the EMP is to outline and to ensure that the mitigating measures recommended in the EIA report are incorporated into the final project planning and implemented on the ground. Normally, an EMP will require the project proponent and the implementing body to undertake the following actions and responsibilities.

- a.) Allocate administrative responsibilities for planning and management of environmental requirements;
- b.) Responsibility to execute mitigating measures by the project manager and the contractors. A detailed method statement of each type of work, a detailed listing of every type of vessels and boats used in the reclamation works and a detailed listing of every personnel e.g. Project Director, Project Manager, Safety Officer, Environmental Officer, Site Supervisor, Resident Engineer & Inspector-of-Works (IOW) must be shown in the EMP. All licenses, approvals and certificates must also be shown in the EMP;
- c.) Implement monitoring and audit programme to check the effectiveness of the mitigating measures and to modify or further improve to redress the impacts;
- d.) Appoint relevant expertise or consultants to assist if in-house capability is not available;
- e.) Ensure that the recommended mitigating measures are incorporated in the reclamation activities, contract documents and works via a method statement of each type of works; and
- f.) Allocate adequate budget for implementing the EMP.

An EMP shall consist of an Environmental Monitoring Programme, Environmental Management Unit and Emergency Response Plan. The main function of these components is to allocate the responsibility of each party for planning, monitoring and undertaking the mitigating measures proposed during and after the reclamation works.

9.1 Environmental Monitoring Programme

The following paragraphs consist of the proposed monitoring programme before and during the reclamation phase as well as after completion of the reclamation works.

9.1.1 Pre-Reclamation Phase

Shoreline monitoring has to be conducted prior to the start of the reclamation works as required by the DID (refer to the Hydraulic Study approval conditions as attached in **Appendix V**). The results of this exercise will be the baseline data which will be used as an indication to determine the effectiveness of the mitigation measures implemented during the construction phase later.

9.1.2 During Reclamation Phase

i. Marine Water Quality Monitoring

The samples to be taken depend very much on the work area. It is suggested that marine water samples to be taken only at the area where there are works on-going. One grab sample should be taken by the project proponent for every 100m of working area, inside and outside of the silt curtain. The frequency of the water quality monitoring is suggested to be once a month throughout the construction period. The samples taken should be sent for analysis by an accredited laboratory and the results should be submitted to the DOE Melaka for information and record. The parameters tested should include those listed in the Marine Water Quality Standards (MWQS) i.e. pH, salinity, temperature, dissolved oxygen, turbidity, total suspended solid, oil and

grease, mercury, cadmium, chromium, copper, arsenic, lead, zinc, cyanide, ammoniacal nitrogen, nitrate, phosphate and faecal coliform.

ii. *River Water Quality Monitoring*

River water quality sampling is proposed to be conducted monthly at the locations shown in **Figure 9.1**. The parameters to be tested shall be in accordance to the Interim National Water Quality Standards (INWQS).

iii. *Air Quality Monitoring*

Air quality monitoring for Total Suspended Particulate (TSP) is preferably to be conducted within the vicinity of the site, which can closely represent the project site as shown in **Figure 9.1**. Sampling works is proposed to be taken at quarterly interval or earlier should it be required by the DOE. The results must be submitted to the DOE for record and information.

iv. *Noise Level Monitoring*

Noise level monitoring is proposed to be carried out at quarterly interval or more frequent should it required by the DOE. Parameters should include L_{eq} , L_{max} , L_{min} and L_n to be measured continuously for 24 hours. **Figure 9.1** indicates the proposed locations for noise level measurement.


v. *Periodic Shoreline Monitoring*


As required by the DID in the Hydraulic Study approval, periodic shoreline monitoring shall be carried out every three (3) months throughout the construction period.



Legend

 Air Quality Sampling Station

 River Water Quality Sampling Station

 Noise Level Sampling Station

vi. *Biological Monitoring*

The biological monitoring would enable primary and secondary productivity of the area to be measured as well as provide additional insight into the interpretation of the water quality data. Biological monitoring is proposed to be carried out at quarterly during the reclamation phase. Upon completion, the biological monitoring shall be continuously monitored for at least another two quarters. The parameters investigated would be the density and diversity of phytoplankton, zooplankton, macrobenthos and fish fauna. The sampling stations for the biological monitoring would coincide with the EIA study. However, the location of the sampling stations within the reclamation footprint is expected to change progressively according to the new reclaimed shoreline. The new sampling stations shall be located about 50m from the new reclamation coastline. The primary benchmarks would be no significant decrease in primary, secondary and benthic productivity as well as fish fauna at the study area.

vii. *Fisheries Monitoring*

Continuous consultation with the local fishermen on any deleterious effect or losses is recommended. Monitoring of fisheries activities shall be carried out quarterly during the reclamation phase. Upon completion, fisheries monitoring shall be continuously monitored for at least another two quarters. Fisheries monitoring shall examine landings in terms of volume and speciation. This shall be undertaken through interviews with selected fishermen as well as data collected from the Department of Fisheries. This is to establish causes and enable remedial action to be taken at the earliest possible.

9.1.3 Post Reclamation Phase

Based on the Hydraulic Study approval conditions, shoreline monitoring is required to be carried out every six (6) months after the project completion. The monitoring can be discontinued if the survey profile is found to be stable for three (3) years after completion of the project (subject to agreement by the DID).

9.2 Environmental Management Unit (EMU)

The EMU proposed is shown in **Figure 9.2**. The functions of the EMU are to:

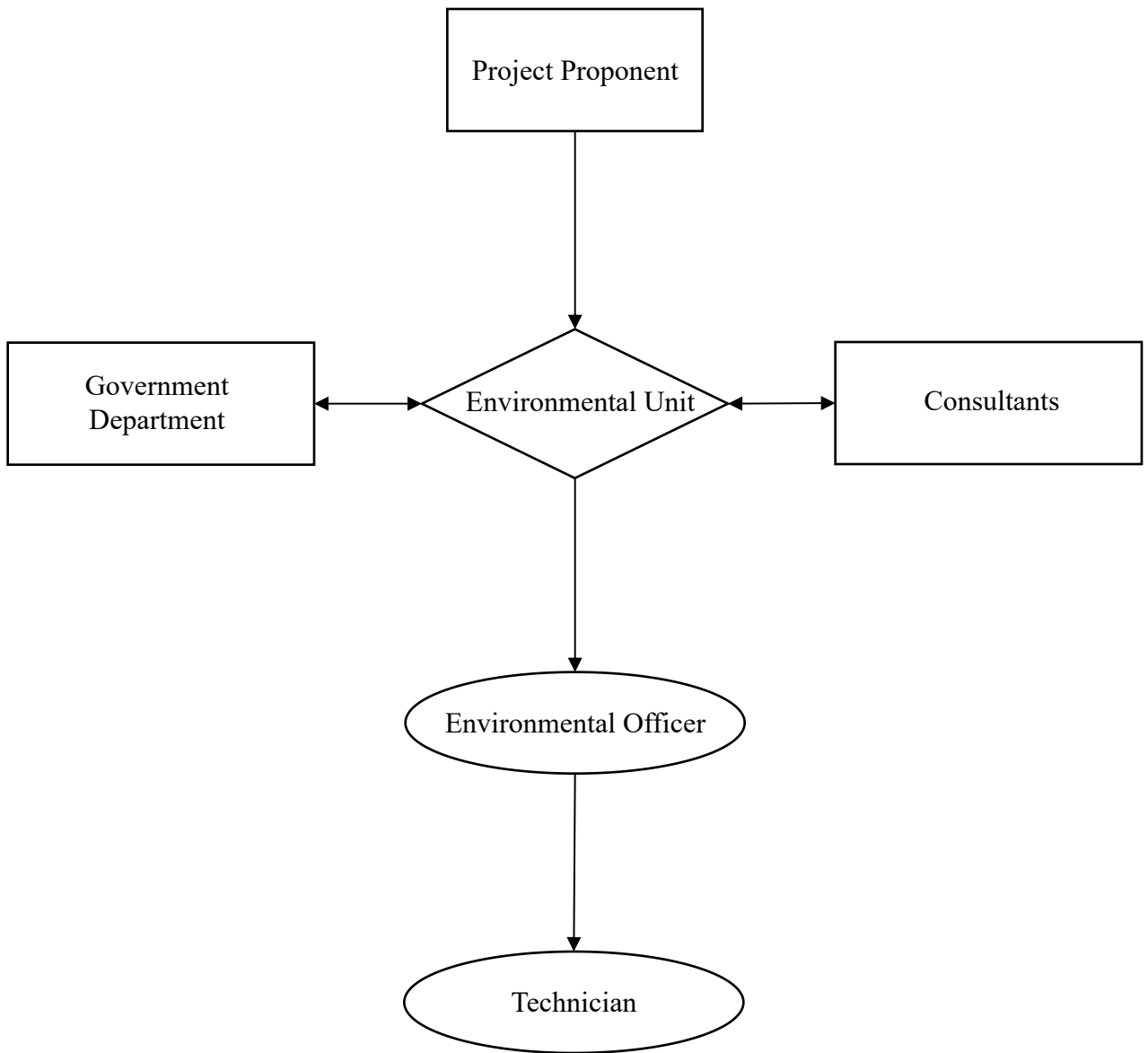
- i. Implement all the mitigating measures proposed throughout the reclamation and post reclamation phases of the project.
- ii. Carry out environmental audit.
- iii. Advise the project proponent on all matters pertaining to the environment.
- iv. Review project operation from time to time in order to keep ahead of all statutory requirements.
- v. Liaise with authorities on issues concerning pollution from the proposed development.

Environmental Officer

An environmental officer is a person who must be conversant with environment related practices and principles. The environmental officer will also be responsible for all the activities of the Environmental Management Plan. The environmental officer will normally be assisted by a technician. The technician of the Environmental Management Unit will assist the environmental officer, especially in sampling, carrying out pollution survey, reporting and any standard office work.

Environmental Audit

Environmental audit is proposed to be carried out at quarterly interval during construction phase and conclude after full completion of the project. Environmental audit will provide an 'early warning' and ensure the environmental problems are



detected as well as confined in the early stage before it reaches the epidemic proportion.

9.3 Emergency Response Plan (ERP)

Despite an organization's best efforts, the possibility of accidents and other emergency situations still exist. Emergency Response Plan (ERP) is an action plan to reduce, prevent or minimise the environmental impact when an unexpected situation takes place, or the recommended mitigation does not function accordingly. An effective ERP should have the following:

- i. good system, administration and management to achieve excellent safety performance;
- ii. efficient planning of facilities, design and operating standards to reduce potential accidents in the workplace;
- iii. emergency preparedness and response procedure to prevent accidents and to ensure safety of workers;
- iv. safety drill to familiarise the workforce with sequence of actions, handling of safety equipment and evacuation procedures in the event of accident;
- v. provision of safety guidelines, fire-fighting and rescue / team services; and
- vi. liaison and networking with other rescue teams.

The standard operating procedure for dredging and reclamation operation is provided in the report for such items as vessel collision, general provision, safety, first aid, oil spill, fire / explosion on board, anchor dragging, anchor chain breakage, stranding/grounding, engine/steering failure, and man overboard. The ERP for the

project is detailed in **Appendix IV** and will be further enumerated in the EMP following the approval of the EIA of this project as standard procedure.

9.4 Safety Plan (Standard Operating Procedure)

This Safety Plan is prepared particularly for vessels involved in the project. This plan provides a layout of the vessel, the location of all safety appliances (e.g. fire extinguishers, life jackets, life rafts and first aid boxes) on board the vessel. All personnel are required to be familiar with the safety plan. The safety plan is posted at several locations on board the vessel frequented by the crew (e.g. the mess room, corridor and staircase).

9.4.1 General Provisions

For the safety of workers during the project phases, it is recommended that the workers/crew members be equipped with the following:

1. Hard hats and safety shoes
2. Safety glasses
3. Protective gloves and hearing protection

9.4.2 First Aid

First aid equipment (bandages, medication and disinfectants) etc. must be available in the main vessel. A list of crew members with valid first-aid certificate should be posted on notice boards at strategic locations on the vessel.

9.4.3 Specific Vessel Emergency Instructions

Vessel Collision

Vessel collision may be between two (2) large vessels, a vessel with tug boat, fishing vessel, supply vessel and other floating transportation. Vessel collision represents one

of the most dangerous hazards often causing heavy casualties and involve high cost to people, property, the environment and harbour stakeholders. Despite all the maritime regulations, port regulations and marine authorities in concert with the International Maritime Organization's efforts such as Traffic Separation Scheme, AIS and VTS, and Marine Electronic Highway, marine accidents still occur but are primarily due to human error. It is therefore incumbent on licensing organizations, maritime authorities, training institutions to ensure competency of mariners and safe ships populate the seas.

When vessel collision occurs, the officer of the watch will immediately take several actions as follows:

1. Stop all engine.
2. Inform the master of the vessel who will take command of the situation.
3. The crew will assess the damage to the vessel and injuries to the crew.
4. Take action to secure the vessel and provide medical attention to the crew.
5. Report the accident to the harbour master.
6. Take action to provide assistance to the other ship and her crew.
7. Perform the necessary duties of good seamanship to ensure that no further damage to life and property will ensue.

Oil Spill

In the event of any oil products spilled into the sea or any oil slick is observed, the master must be notified immediately so that the necessary actions can be taken. The vessel master is responsible for the compliance and execution of the Shipboard oil Pollution Emergency Plan and for the vessel to be equipped with pollution prevention equipment appropriate for the clean-up of minor oil spills.

Fire / Explosion on Board

General rules and procedures for firefighting should be placed in prominent places aboard the vessel. When the fire alarm sounds, the crew - except for the fire crew shall assemble according to the master list. The master or designated fire officer will be in command of the fire squad in the superstructure and on deck while the chief

engineer will be in command of the fire squad in the engine room and surrounding rooms.

In the event of fire is detected, the action to be carried out by the crew should be as follows:

1. Sound the fire alarm
2. Inform the master and the engine room
3. Fire squad to:
 - i. Establish communications
 - ii. Check for missing or injured crew
 - iii. Notify all on the fire location
4. If in engine room fire, prepare for engine failure:
 - i. Determine the class of fire
 - ii. Extinguishing agent
 - iii. Appropriate extinguishing attack
 - iv. How to prevent the spread of fire
5. Close down ventilation fans, all doors including watertight doors and skylights
6. Switch on deck lighting at night.

Stranding or Grounding

In the event of a stranding or grounding of the vessel, the vessel master should immediately order to stop all operation and to immediately choose all necessary means to ensure safety of the vessel and her crew. Actions to be carried out by the crew should be as follows:

1. Stop engines
2. Inform the Master actions to be carried out are as follows
3. Sound the general emergency alarm
4. Close all watertight doors, if fitted
5. Show lights /shapes and commence any appropriate sound signals
6. Switch on deck lighting at night
7. Check for hull damage
8. Sound bilges and tanks

9. Determine which way is deep water and nature of the sea bottom.
10. Attempt to extricate vessel if the hull is sound.

Engine or Steering Failure

This vessel is considered "not under command" and should sound the appropriate sound or shapes and lights in accordance with the COLREG 1972. The actions to be carried out are as follows:

1. Inform the master
2. Prepare for anchoring if in shallow water
3. Commence sound signalling.

In the event of a steering failure:

1. Inform engine room
2. Engage emergency steering
3. Take all way off vessel
4. Prepare engine for manoeuvring
5. Decide if ongoing activities must be suspended.

Man Overboard

People working in exposed situation where there is a risk of falling into the water should be required to wear safety harnesses, lifelines or life jackets. The procedure for recovery should be as follows:

1. Release of lifebuoy nearest to the man in the water.
2. Keep the man in sight as long as possible and raise the alarm "MAN OVERBOARD"
3. Inform the bridge
4. Master or Officer on duty announces "MAN OVERBOARD" over the address system and gives location.
5. Stop engines
6. Use search lights at night to keep man in sight

7. Commence safe recovery action to retrieve the man
8. Lower a workboat with an appointed crew.

Be careful with the man overboard as he may be injured or have ingested plenty of water. Administer first aid and initiate the medical emergency procedure.