9.0 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This EMP will be revised and re-submitted to DOE as a separate document for approval once the EIA has been approved.

9.1 Introduction

An Environmental Management Plan (EMP) describes the processes that an organization will follow to maximize its compliance and minimize harm to the environment. This plan also helps an organization map its progress toward achieving continual improvements.

The following provides the basic framework and objectives necessary for the effective environmental management of the proposed pipeline. In this regard, as a minimum, the scope of an EMP encompasses the following:

a. Identification of the key potential impacts that are to be monitored;
b. Development of an environmental monitoring and audit program to serve as an early detection system; and
c. Formulation of the reporting format and implementation of proper mitigating measures.

Each organization is unique and, as a result, so is the EMP. The level of detail and length of an EMP will vary depending on the type of organization, the complexity of its processes and the maturity of the organization in understanding its environmental responsibilities. Regardless of the organization's situation, all environmental plans created must include the following elements:

a. Environmental Awareness and Training;
b. Budget;
c. Environmental Regulations and Standards; and
d. Environmental Monitoring and Audit Programme

9.2 Environmental Mainstreaming

Self-regulation has been adopted by the DOE as a long-term goal to be achieved and a culture to be inculcated within the regulated sectors through mainstreaming of environmental agenda. Environmental mainstreaming has been integrated into all the recent regulations of the DOE. This approach to pollution control will results in improved environmental image of the companies, increase public acceptability of projects, optimal operation of pollution control systems (PCSs), prevention of PCS failures, cost savings in PCS operation, systematic management of performance monitoring data and improved regulatory compliance on a sustained basis. The mainstreaming elements which are required to be implemented are environmental policy, competent person, performance monitoring (PM), environmental performance monitoring committee (EPMC), environmental regulatory compliance monitoring committee (ERCMC), record

keeping, data analysis and interpretation, discharge monitoring as well as reporting and communication.

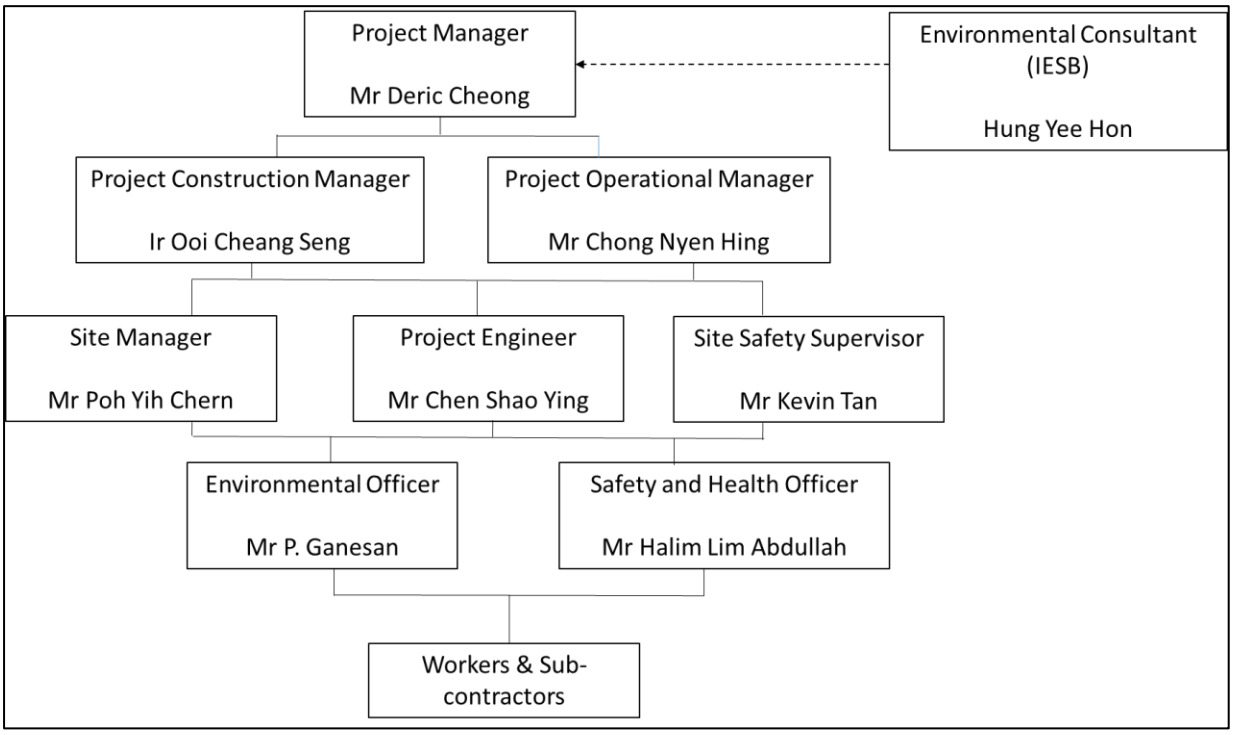
The EIA procedure, a preventive strategy of the DOE also needs to embrace the environmental mainstreaming and self-regulation goal in order to enhance its effectiveness in mitigating the adverse impacts from development projects on the environment at every stage of the EIA procedure. Self-regulation culture in EIAs means that the Project Proponent will be charged with full responsibility and accountability for taking environmental friendly options and instituting effective pollution prevention and mitigation measures (P2M2) and self-demonstration of regulatory compliance of the EIA procedure at all stages of project implementation.

9.3 Organization Structure

This chapter will review the roles of the various members of Awan Plasma Sdn Bhd's Project Team with a particular focus on those personnel who have environmental management responsibilities, and who will play key roles in the implementation and monitoring of the various components of the EMP.

The organization structure of Awan Plasma Sdn Bhd's Environmental Management Team for the operation of the project is shown in **Figure 9-1** while the roles and responsibilities of personnel responsible for environmental management are provided in more detail in sub-sections below:

Figure 9-1 Organization Structure of Awan Plasma Sdn Bhd's Environmental Management Team



9.3.1 Roles and Responsibilities

Key roles and responsibilities of Awan Plasma Sdn Bhd's Environmental Management Team are briefly discussed in sub-sections below while the name and contact details of each key roles are tabulated in **Table 9-1**.

9.3.1.1 Project Proponent

The Project Proponent (PP) is not only legally responsible for ensuring regulatory compliance, but is the driver for mainstreaming the environmental agenda in all stages of project implementation. The major roles and responsibilities of the Project Proponent include the following:

- Formulating an Environmental Policy (EP) of the company with respect to the EIA project, which shall be communicated to the stakeholders, consultants, contractors and other parties involved in the project planning and implementation.
- Establishing an organizational structure which clearly shows the emplacement of a Registered EIA Consultant and an Environmental Officer (EO), where they are charged with specific responsibilities to ensure environmental aspects are taken into consideration, and pollution prevention and mitigation measures (P2M2) are integrated into every stage of project planning and implementation.
- Allocating sufficient funds for all steps in the EIA process and every stage of project planning and implementation with itemized budget required for water quality monitoring, air quality and noise monitoring, for comprehensive site survey and investigation of the specific existing site conditions, for implementation of Environmental Management Plan (EMP) including temporary pollution prevention and mitigation measures (P2M2). P2M2 shall be those which can be described as state of the art technologies, best available technologies (BATs), or industry best practices.
- Appointing an Environmental Officer (EO), at the stage of post submission of EIA Report to be charged with responsibilities to execute environmental quality control and performance monitoring functions during the construction and operation phases of the project implementation.
- Establishing a project Environmental Management Team (EMT) to monitor the environmental performance, effectiveness of pollution prevention and mitigation measures (P2M2), and status of regulatory compliance of the project. The EMT shall be represented by all relevant parties involved in project implementation and chaired by a senior member representing the Project Proponent. The chairman who shall be formally appointed by the Project Proponent shall be responsible for ensuring the decisions of the meeting are responsibly executed.
- Ensuring the Environmental Management Plan (EMP) including temporary and permanent pollution prevention and mitigation measures (P2M2) are implemented and maintained according to industry's best practices.

9.3.1.2 Project Manager

The responsibilities of the Project Manager shall include, but are not limited to:

- Overall responsibility to ensure that the project site is managed in compliance with the EIA, EMP, EIA approval conditions and all applicable legislative requirements;
- Establishing an overall Health, Safety & Environment (HSE) direction on-site and shall be accountable for ensuring that the team on-site are provided with safe, secure and environmentally sound working environment;
- Ensure all supervisory and management staff are aware and understand their responsibilities under this EMP; and
- Ensure that appropriate and adequate resources are allocated to allow for the effective implementation of the EMP.

9.3.1.3 Project Engineer

The job scope of appointed project engineer are as follows :

- Determines project specifications and confirms product performance by designing and conducting tests;
- Determines project schedule by studying project plan and specifications; calculating time requirements; sequencing project elements;
- Maintains project schedule by monitoring project progress; coordinating activities; resolving problems;
- Controls project plan by reviewing design, specifications, and plan and schedule changes; recommending actions;
- Prepares project status reports by collecting, analyzing, and summarizing information and trends; recommending actions; and
- Maintains safe and clean working environment by enforcing procedures, rules, and regulations.

9.3.1.4 Site/Construction Manager

The main responsibilities of Awan Plasma Sdn Bhd's Site Manager shall include, but are not limited to:

- Assisting Project Manager in managing and implementing company policies, objectives and programs pertaining to environmental matters;
- Coordinating overall environmental management matters at the project site and communicating/liaising with authorities (e.g. Department of Environment (DOE), Marine Department, etc.) regarding environmental issues;
- Translating environmental management requirements as specify in EMP to onsite implementation;

- Handling environmental-related enquiries/ complaints from the public;
- Ensuring investigations of all environment incidents are reviewed, corrective and preventive actions implemented in accordance with current regulatory requirements and reports are submitted to relevant parties on time;
- Responsible for briefing all new staff on requirements, procedures and implementation of the Environmental Management Plan;
- Monitor the status and effectiveness of all existing environmental mitigation measures and institute preventive and corrective measures for continual improvement; and
- Setting up and coordinating the implementation of environmental programs, including monitoring of the plan's environmental performance.

9.3.1.5 Site HSE Manager

The Site HSE Manager has the overall HSE responsibility during the execution of the work on the work site. He is also the coordinator with regard to safe cooperation of all companies at construction site during construction. He has the duty to ensure that the HSE requirements are implemented in accordance with this project-specific HSE Program Site.

In general this encompasses the following tasks :

- Forwarding the requirements to all the disciplines and involved parties.
- Instructing new employees and ensuring the instruction of the contractors and employees by their superior on the local and project-specific health and safety precautions, health and environmental measures, alarm and contingency plans and required response in the case of emergency alarms;
- Preparing the monthly HSE report and HSE Coordination Plan;
- Implementing the safety measures defined in the Risk Assessment Construction Site for company's personnel;
- Coordinating the interfaces with respect to HSE aspects;
- Compiling a list of all First Aider and other required HSE support functions and making it available to all people at site;
- Monitoring the adherence to the HSE requirements; organising regular meetings to discuss HSE issues; performing regular construction site inspections along with the recording of HSE issues.;
- Taking responsibility for reporting and investigation of incidents and accidents of company's personnel, external employees and of contractor's personnel;
- Implementing and operating the waste management plan, including observing environmental regulations and requirements;and
- Participate in audits, inspections and safety walks.

9.3.1.6 Safety and Health Officer

Safety and Health Officers will assist the Site HSE Manager in his duties and tasks by liaising / working directly with field supervisors, craft and workers. They have the duty to monitor personnel during the works and to check defined measures and support the supervisors. They must report problems regarding HSE to Site HSE Manager immediately.

9.3.1.7 Environmental Officer (EO)

An EO shall be appointed by the Contractor to oversee the implementation the EMP at the Project site and adhere to the Project Proponent's safety, health and environmental policy. The Environmental Officer (EO) is the main project personnel responsible for ensuring regulatory compliance at the project implementation stage (post submission of EIA Report). The roles and core duties of the EO shall include, but not limited, to the following:

- Implementing the environmental management plan (EMP), and installing the temporary and permanent pollution prevention and mitigation measures (P2M2);
- Preparing Environmental Performance Monitoring Document (EPMD);
- Performing or supervising the conduct of performance monitoring (PM) program as specified in the EPMD;
- Preparing Performance Monitoring Report (PMR);
- Communicating the status of environmental regulatory compliance of the project during construction and operation phases to the Project proponent;
- Inventories a detailed record of major upset conditions encountered, if any, for the duration of the project construction and operation phases ; and
- Acting as an environmental advisor to the Project Proponent in advising him to undertake additional efforts, if any, to further ensure effective implementation environmental management plan (EMP) including temporary pollution prevention and mitigation measures (P2M2) on a sustained basis.

9.3.1.8 Contractors

Contractors must establish, provide and implement their own HSE Plan valid for their scope of work to assure commitment throughout all levels within the organisation concerning a full compliance of legal requirements. Contractor's for the reclamation and construction site activities must comprise as a minimum the following aspects and documents :

- HSE policy, showing commitment to Health, Safety and Environmental Protection;
- Organisation chart showing HSE responsibilities and HSE organisation at site;
- Training and individual qualification including records of regularly conducted safety training and evidence of special qualifications for personnel performing specialised tasks;
- Detailed work instructions for contractor's scope of work;
- Emergency response including a project specific emergency response plan; and
- Organisation of tools & equipment certification and inspection process including relevant inspection records.

9.3.1.9 Waste Service Contractors

The Waste Service Contractors shall be responsible for :

- Securing valid licenses and permits with regard to services provided to Awan Plasma Sdn Bhd;
- Maintaining legal compliance status of waste disposal services, including those of sub-contractors;
- Transportation, storage and disposal of waste in compliance with Malaysian regulations and standards requirements;
- Be responsible for safety of its personnel performing waste services;
- Providing Awan Plasma Sdn Bhd.with documentation confirming receipt and destruction of waste; and
- Reporting non-conformance and incidents related to waste services provided.

9.3.1.10 First Aider

A First Aider is a person who provides first aid in case of an accident. First Aider must be trained appropriately (e.g. according to local regulations or if not existing any recognised standard).

9.3.1.11 Environmental Consultant and Accredited Laboratory

An Environmental Consultant will be engaged to support the EMP implementation on-site. Their major responsibilities are as below:

- Conducting the environmental monitoring program specific in the EMP and assessing the effectiveness of the mitigation measures on-site;
- Advising the project proponent on the review of the EMP or the monitoring program according to the work progress on-site; and
- Supporting and advising the Project Team on issues which may arise during the implementation of the EMP.

A laboratory accredited by the Department of Standards, Malaysia under the *Skim Akreditasi Makmal Malaysia (SAMM)* will be appointed to carry out the water quality (seawater and effluent discharge), ambient air quality and noise level monitoring of the project.

Table 9-1 Name and Contact Details of each Key Roles of Awan Plasma Sdn. Bhd's Environmental Management Team

Roles	Contact Person	Contact Details
Awan Plasma Sdn Bhd Unit 2F-6, 2nd Floor, Tower 1 @ PFCC, Jalan Puteri 1/2, Bandar Puteri, 47100 Puchong, Selangor Tel : +60-3-8051 7335 Facsimile: +60-3-8051 6779		
Project Manager	Mr Deric Cheong	Mobile No : +6019 241 4566
Project Construction Manager	Ir Ooi Cheang Seng	Mobile No :+60192186612
Project Operational Manager	Mr. Chong Nyen Hing	Mobile No :+6016 975 8667
Site Manager	Mr. Poh Yih Chern	Mobile No:+6012 563 7717
Project Engineer	Mr. Chen Shao Ying	Mobile No:+6016 675 0217
Environmental Officer	Mr. P. Ganesan	Mobile No:+ 6016 973 0153
Site Safety Supervisor	Mr. Kevin Tan	Mobile No :+ 60169 347 1111
Safety and Health Officer	Mr. Halim Lim Abdullah	Mobile No :+ 6019 222 7523
Samudera Wibawa Sdn. Bhd. 2B-9, Jalan Kesidang 3/6 Melaka Mall off Jalan Tun Perak, 75300 Melaka		
Construction Services Contractor	Ms Ruby Chin	Mobile No :+6016 229 3044
Integrated Envirotech Sdn. Bhd No. 32-2, Jalan Setiawangsa 11A, Taman Setiawangsa, 54200 Kuala Lumpur Tel: +603-4256 6623, Facsimile: +603-4251 9623		
Environmental Consultant	Hung Yee Hon	Mobile No : +6012 205 6680
Alchemy Laboratory & Services Sdn. Bhd. 326b, 1st Floor, Lot 2520, Jalan Hiliran, Mukim Losong, 20300 Kuala Terengganu, Terengganu.		
Manager	Mr. Hiew Yeh Yuen	Office No.: +609 622 4166

Roles	Contact Person	Contact Details
Chemvi Laboratory Sdn Bhd No : 22A, Jalan Sungai Jeluh 32/192, Nouvelle Kemuning Industrial Park, Bukit Rimau, Section 32, 40460 Shah Alam, Selangor Darul Ehsan		
Manager	Mr Indran A/L Thasarany	Office No.: +603 5525 3505

9.4 Environmental Reporting, Monitoring and Auditing

9.4.1 HSE Meeting and Report

This report must contain a complete status of all HSE Program activities include a presentation of the status of identified HSE hazards and significant HSE aspects. Preventive measures, which have been initiated, or implemented, must be briefly described. Adherence to the requirements for use of personal protective equipment must be assessed. Non conformity and corrective actions must be reported in the monthly HSE Report. Non conformity must be rectified and corrective actions must be implemented immediately. HSE must be a permanent subject and the first topic within all regular meetings. Meetings must be scheduled as **Table 9-2.**

Table 9-2 List of HSE Meeting to be Carry Out throughout the Project Operation

Items	Frequency	Attendees	Topic/Agenda
Kick off Meeting	Once before the start of work	• Project Manager • Construction Manager • Site Manager • Site HSE Manager	• Site HSE responsibilities • Site HSE Management System
Coordination Meeting	Daily before start of work	• Site Manager • Construction Manager • Site HSE Manager • HSE Officer • Further personnel on demand	• Coordination on work of the day • Information on the basis of the coordination plan • HSE measures
Toolbox Meeting (Contractor)	Weekly and on demand	• Construction Manager • Site HSE Manager • HSE Officer • Contractor Personnel	• HSE findings
HSE Meeting	Daily to weekly	• Site Manager • Site HSE Manager • Construction Manager • Site Supervisor • Further personnel on demand	• HSE findings, measures, special incidents
HSE Kick Off	Regularly	• Newcomers on site	• HSE Philosophy • HSE tasks and duties

9.4.2 Final Construction and Commissioning Report

The report should contain lagging indicators and assessment of safety performance of all contractors and sub-contractors. In brief, this report must include the comments on :

- Effectiveness of the HSE Program.
- Problems which were not anticipated – how they were overcome and recommended future approach.
- Successful positive aspects that should be considered for future activities
- Any damage to equipment and recommendations for how to avoid similar damage in future activities.
- Suggested work routine improvement.
- Incidents

9.4.3 Incident Reporting and Investigation

All environmental incidents and near misses occurring at work places during project implementation period shall be reported immediately to Awan Plasma Sdn Bhd Site Manager and its representatives at site. All these incidents / occurrences shall be documented and timely investigated by Contractors and their Subcontractors.

When onsite, Contractor's representative shall carry out the initial investigation in conjunction with the Contractor's HSE Officer (s). The Contractor's Site Manager is responsible for ensuring that appropriate investigation is conducted and closed out actions as necessary.

Onsite and all personnel should be made aware of the incidents and actions to prevent re-occurrence. Any resulting Environmental / HSE Alerts, produced by Contractor & their Subcontractors, shall be shared with all parties onsite to prevent re-occurrence of similar events.

Examples of incident that might occur are as follows :

- Unsafe Working Conditions or Practices
- Near Misses
- First Aid Cases
- Medical Treatment Cases
- Restricted Work Cases
- Lost Time Injuries
- Fatalities
- Occupational Illnesses and Diseases
- Commuting Accidents
- Environmental Incidents
- Damages to Property
- Major Incidents

9.4.4 Safety Walks

The implementation of all requirements, procedures and measures on site will be checked by regular safety walks. All Safety Walks must be documented appropriately.

Table 9-3 Schedule of Safety Walk On-Site

Inspection	Frequency	Participant	Focus on
Safety Walk	Each day on site	• Site HSE Manager	Inspection on construction site safety measures work permits
Safety Walk (per contractor)	Daily	• HSE Manager or safety officer	
Management Safety Walk	Weekly	• Project Manager • Site HSE Manager • Construction Manager • HSE Manager • Further personnel on demand	Inspection of construction site

9.4.5 Environmental Monitoring

Environmental Monitoring Program is an essential tool for early detection on any changes on the environmental quality during the implementation of the Project. The environmental monitoring provides feedback about the actual environmental impacts of a project. Monitoring results serve as an early warning or an indication to the success of mitigation measures in protecting the environment. They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes.

The objectives of the environmental monitoring programme is to assess the short and long term environmental effects associated with the prescribed activity; verify the environmental impact predicted in the EIA report; and act as an early indication of adverse environmental impact. With such early indication, appropriate remedial actions should be carried out to prevent unacceptable impacts or any further deterioration on the environment.

Environmental monitoring comprises three types of monitoring, namely: Performance Monitoring (PM), Compliance Monitoring (CM), and Impact monitoring (IM).

9.4.6 Environmental Auditing

There will be two types of environmental auditing; internal and external/third party audit. The main objective of both audits is to ensure compliance to the EIA approval conditions and contractual requirements.

Internal audit is audit carried out by the Contractor regularly to ensure that the Contractor comply with all the environmental requirements.

External/ third party environmental audit is made a mandatory requirement when the EQA 1974 was amended to include provisions for EIA studies. Thus, Section 34A (7) requires that an audit be conducted to ensure all conditions attached to the EIA approval letter are complied with accordingly. Third party environmental auditor should be conducted by an auditor who registered with the DOE. Based on the audit findings, the Project Proponent or Contractor is responsible to take all the necessary actions to correct any non-conformity at their own cost.

The objective of environmental audit is to monitor the compliance status of the Project as well as effectiveness of control measures. In general, Environmental Audit shall cover the following:

- Compliance to all monitoring requirements as imposed by the DOE.
- Compliance to all standards, criteria and guidelines imposed by DOE and other authorities.
- Compliance to all proposed plans submitted to relevant government departments.
- Compliance to mitigation measures.
- Compliance to any other conditions imposed by the government agencies.

9.5 Training Requirements

9.5.1 Environmental Awareness Training

Environmental-related training will be established to enhance the understanding of all personnel involved in the project pertaining to environment protection. Environmental-related training shall be provided to all managers, supervisors and key environmental personnel. Training requirements of all personnel involved in the project will be identified based on job specific. It is vital all personnel are adequately trained to perform their designated tasks to an acceptable standard. The proposed environmental training plan outlined for this project is as tabulated in **Table 9-4.**

Table 9-4 Proposed Training Program

Training Program	Training Summary	Target Participants	Frequency	Trainer
On-site Environmental Management Training	• EIA conditions of approval and EMP requirements. • Environmental awareness • BMPs applicable for the project	All new staff	Prior start work	Environmental Manager
		All site staff	Yearly	
Environmental laws and regulations	Training on the environmental regulations, which including any changes and new requirements.	Environmental Management Team	Yearly	Internal/Out source
Waste Management Training	The training will detail out the waste management pertinent to project site.	All site staff	Yearly	Internal/Out source
Hazardous Materials Management Training	The training will detail out the hazardous materials management pertinent to project site.	Workers involved in hazardous material handling	Yearly	Internal/Out source
Emergency preparedness training	The training will detail out the Emergency Response Plan (ERP) and procedures prepared for the project	Workers involved in the ERP	Yearly	Internal/Out source
Drills	Drills for emergency	All workers	Yearly	Internal/Out source

9.5.2 HSE Training and Awareness

All employees shall undergo general environmental awareness training and any training as required by his/her scope of work. The main objective is to ensure the employees are aware of the EMP and understand their responsibilities. Special attention must be drawn on personnel carrying out activities that require qualifying trainings either for certification, qualification or authorisation purposes as stipulated by local regulations. These qualifying trainings ensure that employees have acquired the required competencies to perform their activities.

Contractor shall ensure all staff has attended the Malaysian Construction Industrial Development Board (CIDB) "Green Card" course before arriving on the Project site for site HSSE inductions. Qualifying training for the construction and operation are required for following activities (non-exhaustive list) :

- Crane operations only by certified operators
- Forklift operations only by certified operators
- Mobile construction site equipment operations only by qualified operators
- Work on electrical equipment only by an authorised electrical technician
- Scaffolding work supervised by competent persons
- Excavation work supervised by competent persons
- Inspections of tools, equipment only by competent persons
- Welding only by qualified welders
- First aider must be certified

9.6 Environmental Requirements

9.6.1 EIA Approval Conditions

This section will be updated once the EIA approved by the DOE, Putrajaya.

9.6.2 LD-P2M2 Document

This proposed project only intend to do coastal reclamation of 120 acres, thus there will be no LD-P2M2 document prepared for the EMP.

9.6.3 Pollution Prevention and Mitigation Measures (P2M2) to be Implemented

This EMP is developed taking into consideration potentially significant impacts which may occur during the each phases of the project, along with the mitigation measures to reduce and manage these impacts to ALARP levels. The "Pollution Prevention and Mitigation Measures to be Implemented" for the project are summarised in **Table 9-5**.

Table 9-5 Pollution Prevention and Mitigation Measures to be Implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
Site Preparation Phase				
1	Air	• Reduce air quality due to the dust generated during the carrying out of site preparation. • Impact on air quality due to emission from the exhausts of moving vehicles constituting SO2 and CO.	• Provision should be made for water sprays to be available for use when dusts are being generated or at times of strong wind. • Tyre washing facility is to be installed at all entrances to public roads or at points when the trucks leave the working site. Where possible, main road within the working site should be paved or overlain with aggregate prior to the start of construction works. • Truck speed on unpaved roads or open spaces is to be limited to 20 km/h within the project area, unless sufficiently wetted to prevent dust generation.	All P2M2 will be implemented
2	Noise	• Noise emission from the vehicles and machinery	• Machineries and equipment used during the site preparation should be fitted with effective exhaust silencers. • Whenever possible, the level of noise should be minimized at all time so that it would not disturb the nearby people • Regular maintenance for all machineries involved in the Project	All P2M2 will be implemented
3	Waste Management	• Generation of minimal amount of debris and rubbish	• All solid wastes generated from must be disposed of at the local authority approved landfill, i.e. Sungai Udang Sanitary Landfill. • Open burning of waste is prohibited.	All P2M2 will be implemented
Sand Mining and Transportation				
1.	Hydrodynamic	• Suspension and redistribution of finer sediments will lead to temporary increase in turbidity and alteration of sediment particle distribution. • This will cause loss in benthic and bottom feeding organisms.	• Minimising the reclamation period to the shortest period possible. • Anchoring at only pre-determined locations and based on the approved anchor pattern.	All P2M2 will be implemented
2	Water Quality	• These activities will cause an increase in turbidity due to increase in Total Suspended Solid (TSS) concentration • Accidental spillage of fine materials or oils along the way may occur which will cause sea water pollution. • Water pollution due to the discharge of bilge water from ship/sand carrier, fuel oil sludge and oily ballast water from fuel tanks .	• The increase in turbidity can be reduced significantly with proper dredging technology and a correct handling of machineries. • Standard of Operation Procedure for the Transportation of fill material should be in place. • Limit the speed of sand carrier during the transportation to avoid spills and the sand carrier should not be overloaded. • Conduct regular maintenance of oil separator of the sand carrier in order to maintain its design treatment capability and also to prevent breakdown of the oil separator. • Oily wastes shall be treated and disposed accordingly to avoid seawater pollution. • The contractors shall ensure that their vessels are equipped with slop tanks (if applicable). The wastes collected shall be disposed at approved premises onshore. • Non-biodegradable wastes shall not be flushed together with the sewage but should be compacted and stored before disposal onshore. • Emergency response and contingency plans to be put in place for response in emergency cases.	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
3	Noise	• Underwater noise due to propellers and thrusters will also be generated by vessels	• Restricting working hours to daytime only. • Maintenance of all vehicles and machinery to ensure good working condition and reducing possible noise emission. • Shut down engine/machinery when not in use. • Machinery emitting high noise levels should be installed with suitable noise absorbent materials and shall be sited within an enclosure.	All P2M2 will be implemented
4	Marine Traffic	• Vessel collisions, groundings and other accidents and interference with other maritime and marine-based activities (fishing).	• The mobilization route must be planned to avoid fishing areas and shipping lanes where possible. • All installation vessel and barge must have adequate navigational equipment to provide sufficient warning to approaching vessels. • Vessel collisions, groundings and other accidents can be avoided through implementation of navigational safety practices which include the enforcement of safety zones, use of radar, routine surveillance, installation of navigation safety beacons. • All vessel and barge should be sufficiently lighted up so that they are visible in poor weather condition and at night. • Notify the Melaka Marine Department on the project's activities so that 'Notice to Mariners' could be issued to prohibit mariners including fishermen from encroaching into the project site.	All P2M2 will be implemented
5	Waste Management	• Generation of general rubbish, perishable food waste as well as scheduled waste from the sand carrier. • Generation of ballast water	• Direct discharge of any kind of wastes (including sewage) from the sand carrier and other supporting vehicles are not allowed. • All wastes generated during the transportation of fill material should be transported back to nearshore. • Wastes are to be disposed of by licensed contractors to municipal landfill (i.e. Sungai Udang Sanitary Landfill) approved by the local authority. • All scheduled wastes generated are to be managed according to the Environmental Quality (Scheduled Wastes) Regulation, 2005.	All P2M2 will be implemented
Reclamation				
1.	Hydrodynamic	• Change in the pattern of maximum and mean current speed at and around the project site, which will have a significant impact on morphological changes around the project site. • Change in water level and wave pattern around the project site. • Impact on erosion and deposition change around the project site.	• A continuous monitoring is needed at some specific locations nearby the project site.	All P2M2 will be implemented
2.	Sediment Spill	• Increase in TSS levels in the seawater is expected to contribute to the increased suspended solids in the receiving watercourses which subsequently affect the marine water quality of Straits of Melaka.	• Silt curtain are able to control the dispersion of turbid water by diverting the flow under the curtain, thereby minimizing turbidity in the upper layer of the water column outside the silt curtain. • If the silt curtains were found ineffective, it is recommended that rock bund shall be constructed in order to contain the spread of the sediment concentrations.	All P2M2 will be implemented
3.	Sungai Lereh	• Impact on erosion and deposition change • Impact on backwater		All P2M2 will be implemented
4.	Water Quality	• During the reclamation phase, there is an increase in TSS levels in the seawater due to the sand filling activities.	Installation of silt curtains must be made mandatory so that the re-suspended bottom materials would be contained within the project area. Other proposed mitigation measures include:	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
		• The increase of surface runoff on the exposed land, especially during the heavy downpour is also expected to contribute to the increased suspended solids in the receiving watercourses which subsequently affect the marine water quality of Straits of Melaka. • Besides, any accidental spilling from the sand carrier and other associated vehicles/machineries may also cause water pollution in the receiving water bodies i.e. Straits of Melaka. • Discharge of sewage/waste water from the project site	• No direct discharge of untreated sewage and sullage into the waterways from the sand carrier and other vehicles. • Regular checking and maintenance on the silt curtains. • Reclamation is to be done within the approved area only and to be carried out in phases. • Conduct periodic water quality during reclamation where water samples shall be collected as proposed in EMP report. • Construct dykes, bunds, culverts to control the runoff from the reclaimed area.	
5.	Air Quality	• Dust generated during the carrying out of site preparation. • Emission from the exhausts of moving vehicles constituting SO_2 and CO.	• Equipment and machineries are in good repair and can operate efficiently to prevent carry through of elevated levels of hydrocarbons from engine operation. • The barges and workboats are contracted from third party. Incorporate clauses into the contract on the need to regularly maintain the engine to achieve high combustion efficiency and conform to the MARPOL 73/78 Annex V1 or other applicable standards to the vessel class requirements.	All P2M2 will be implemented
6.	Noise Levels	• High noise generating equipment or machinery cause disturbance onto the sensitive receptors.	• Machinery emitting high noise shall be sited within an enclosure to reduce noise pollution. • Barges/workboats are contracted from third party. Incorporate clauses into the contract on the need to regularly maintain the engine to achieve low noise production. • Restricting working hours to daytime. • Shutdown machineries when not in use.	All P2M2 will be implemented
7.	Marine Environment	• The marine habitats are permanently lost where land is reclaimed from the sea. • Adverse effects on coastal and near shore marine habitats as well as species occurring in these habitats.	• Ensure minimum seabed disruption and dispersion of sand. • Phased reclamation to allow marine animals to move away from the proposed site. • The reclamation period should be optimized to reduce the reclamation time; thus re-colonization or re-establishment of new communities will occur faster. • Reduction of vessel speeds, implementation of marine navigation management plan to reduce impact of noise and vibration to marine animals. • Workers to be educated and trained with regard to protected and threatened species. • Restricted corridors of working. Works are prohibited from the designated boundaries. • Anchors should be placed at pre-determined locations (anchor pattern plan) to minimize the risk of anchors dragging which could smother the benthic organisms. • Strict adherence to safety standards should be enforced and provision of safe working conditions should be made at all times during reclamation activities.	All P2M2 will be implemented
8.	Fisheries	• Fishing activities of the local fishermen will be interrupted by the noise and disturbances associated with the reclamation activities.	• A dialogue or meeting involving representatives from the affected fishermen and other related agencies (Fisheries Department, Lembaga Kemajuan Ikan Malaysia, Persatuan Nelayan) is recommended to assess the damage and to agree on the quantum of compensation. • The project proponent has committed and contributed of RM 3,177,600.00 for fishermen compensation and 'Tabung Ekonomi Nelayan'. Hence, the proposed mitigation for fisheries issue is DOF to use the allocation money to implement the propose mitigation as per DOF suggestion.	All P2M2 will be implemented
9	Marine Traffic	• Potential of collisions, groundings and other accidents during the reclamation.	• The mobilization route must be planned to avoid fishing areas and shipping lanes where possible.	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
			• All installation vessel and barge must have adequate navigational equipment to provide sufficient warning to approaching vessels. • Implementation of navigational safety practices which include the enforcement of safety zones, use of radar, routine surveillance, installation of navigation safety beacons. • All vessel and barge should be sufficiently lighted up so that they are visible in poor weather condition and at night. • Notify the Melaka Marine Department on the project's activities so that 'Notice to Mariners' could be issued to prohibit mariners including fishermen from approaching into the project site.	
10	Waste Management	• Generation of construction debris, solid waste and scheduled wastes	• Direct discharge of any kind of wastes from the sand carrier and other supporting vehicles are not allowed. • All wastes generated during the transportation of fill material should be transported back to nearshore for disposal only. • Regular training for staff on the safe handling of equipment, spill prevention and response procedures and proper clean-up for hazardous materials to ensure adequate level of awareness of the environmental sensitivity of the environmental components among contractors undertaking construction (as well as during maintenance and repair operations). • Scheduled wastes and construction wastes generated during reclamation should be temporary stored at the designated zones. The wastes stored within these designated zones will be segregated according to type. • For construction wastes, they should be reused and recycled as much as practically possible prior being disposed of by licensed contractors.	
Construction of Revetment				
1.	Water Quality	• Improper handling of fuel on site may lead to spillage of chemicals and oils to nearby watercourses, polluting the receiving streams. • Any accidental spilling of these materials may be carried into the receiving water bodies, causing potential water pollution. • Placement of the rock revetment will also cause resuspension of the bottom material resulting in increase in turbidity. • Discharge of sewage/waste water from the base camp	• Proper operating procedures should be established to reduce excessive re-suspension of bottom materials when placing rock materials. • No direct discharge of untreated sewage and sullage into the waterways. • To provide adequate temporary sanitary facilities, which are located away from watercourses. • All waste water generated from the project site must be treated in the sewage treatment system before it is discharged into sea. • Carry out regular preventive maintenance on the sewage treatment system to ensure its capability is always maintained. • Construct dykes, bunds, culverts to control the surface runoff from the reclaimed area. • Conduct periodic water quality during this phase where water samples shall be collected as proposed in EMP report.	All P2M2 will be implemented
2.	Air Quality	• Dust may be generated when strong winds blow across exposed surfaces or areas where fine materials are to be found. • Emissions such as fumes and dust from construction equipment may cause occasional nuisance within the construction sites but not outside of them.	• Provision should be made for water sprays to be available for use when dusts are being generated or at times of strong wind. • Tyre washing facility is to be installed at all entrances to public roads or at points when the trucks leave the working site. Where possible, main road within the working site should be paved or overlain with aggregate prior to the start of construction works. • Truck speed on unpaved roads or open spaces is to be limited to 20 km/h within the project area, unless sufficiently wetted to prevent dust generation. • Truck loads such as sand, aggregate, cement, soil and other materials transported to the construction site should be covered. • Open burning is prohibited; instead all vegetation and construction wastes are to be disposed of at nearest inert waste landfill by licensed contractor	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
			• Construction equipment are to be kept in good repair and operate efficiently to prevent carry through of elevated levels of hydrocarbons from engine operation.	
3.	Noise Level	• Noise generation is expected from construction activities will cause disturbance onto the sensitive receptors.	• Restricting working hours to daytime only. • Maintenance of all vehicles and machinery to ensure good working condition and reducing possible noise emission. • Shut down engine/machinery when not in use. • Establish hoarding and maintain vegetation belt along the terminal boundary. • Suitable noise absorbent materials should be installed on machinery that produces high noise levels. Machinery emitting high noise shall be sited within an enclosure to reduce the noise impact; and • Speed limit for heavy vehicles is imposed on site.	All P2M2 will be implemented
4.	Marine Environment	• The placement of the rock bunds will most likely annihilate the benthic population of the area	• To minimize the impacts on the benthos population, the revetment shall be positioned as proposed using the proposed engineering method to avoid the least damage possible. • Restricted corridors of working. Works are prohibited from the designated boundaries. • The works have to be scheduled in phases. The disturbances will be limited to certain areas at one time. • The reclamation period should be optimized to reduce the reclamation time; thus re-colonization or re-establishment of new communities will occur faster. • Strict adherence to safety standards should be enforced and provision of safe working conditions should be made at all times during reclamation activities. •	All P2M2 will be implemented
5.	Land Traffic	• Occasional traffic congestion at the approach to the site, most likely at the junction to enter the project site; • Traffic accident due to increased volume of traffic traveling along the roads; • Potential damage to the public roads; • Noise and vibration caused by the movement of heavy vehicles; and • Air pollution due to movement of and exhaust emission by heavy vehicles along the road.	• It is therefore considerate to plan, schedule and control of heavy vehicle trips, especially during the peak hours, so as to minimize the adverse traffic impact. • Working vehicle movements within the site do not contribute to traffic impact on the road network. However, to avoid unnecessary accident, it is desirable to plan, schedule and control the deployment and operation of working vehicles for smooth and unhindered traffic movements within the site. • For the sake of environmental control, it is necessary to direct all vehicles entering or exiting from the site to pass through a wash trough to clean their tires and to receive a water jet spray to remove dust particles on them.	All P2M2 will be implemented
6.	Socio-Economic	• There is the possibility that the presence of heavy vehicles carrying construction materials plying the main access road can hinder or endanger other road users in the vicinity of the project site. • The public will have to bear with recurrent noise pollution during the construction of revetment. • Minor impact on aesthetics is expected from the presence due to construction, work activities. • Visiting anglers suffer a loss of satisfaction since their favourite angling site will be disturbed.	**<u>Mitigation Measure for Job and Business Opportunities to Local Communities</u>** • For the project to be relevant to the local communities, it should have deployed the local community in the work force and have some ratio for the local community recruitment. • To ensure that local content is included, contracting tenders would have to be included as one of the prerequisites for tender award • It is proposed that a meeting between the local fishermen association units, the state fishermen's association, LKIM and other related agencies with the Project Proponent be held. **<u>Mitigation Measure for Livelihood</u>** • The community fear of losing their livelihood especially among the fishermen should not be overlooked or unheeded. Some forms of compensation, where applicable, should be considered and worked out with the affected parties through their representatives and should be settled accordingly and amicably.	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
		• Improper management of sanitary facilities such as sewage and solid waste may affect the general health of workers. • Potential benefit of the proposed project to the local population is the generation of employment and business opportunities.	• To facilitate grievance resolution particularly among the fishing communities, representatives each from the local Persatuan Nelayan Units within the zone of impacts (5 km) be employed by the Project Proponent during the reclamation duration to liaise between the fishing community with the developer directly. • As a measure of Goodwill, the developer should consider the initial compensation to fishermen affected to not only licensed fishermen immediately off the coast of project site but also other fishermen from other Persatuan Nelayan Units nearby using the proposed reclamation area for their fishing activity. • Whatever compensation decision should base on several considerations, such as genuinely, the type of inconveniences faced, frequency and the paying agency should also be considered. **<u>Mitigation Measure for Safety</u>** • "Safety First" should always be stressed upon. Hence, workers ought to be exposed to proper work ethics and trained to be always on the alert. They are required to wear personal protective equipment (PPE) including safety googles and masks, overalls and safety shoes. The contractor need to observe this strictly to reduce industrial accident and the like. • Transport operators should be more considerate and always observe safe driving at all time and the activities should be carried out during non-peak hours. • Safety precautions should also consider effects upon local fishing communities. Hence, no reclamation work should be undertaken at night to avoid destruction of fishing nets and any risk to human lives. **<u>Mitigation Measures on Tranquility and Aesthetics</u>** • The activities that could cause nuisance to the public such as noise pollution emitted from dredging boats, heavy machinery and piling works should be avoided or minimized. Schedule of work time should be accommodative to the needs of the people.	
7.	Occupational health and safety	• Accidents can occur during the course of the site clearing and construction activities. • Accidents resulting in fatality or injury can occur from the use of hand tools and power tools, as well as vehicle movement and lifting operation. • Construction workers are exposed to the sun and heat during daytime	• All construction workers will be properly trained and informed with respect to potential hazards and risks associated with the works. • All construction workers should be provided with proper personal protective and safety equipment such as hard hats, goggles, well-insulated safety boots, proper work gloves and safety belts, to prevent falls and hit by falling objects. • Lifting equipment should be used to prevent ergonomic problems associated with manual handling. Training on proper techniques in manual handling including lifting, carrying, pushing and pulling will need to be given to workers to reduce musculo-skeletal disorders. • To reduce exposure to noise during construction activities, quieter equipment should be used, and workers should be provided with hearing protection devices. • Record all accidents, near misses, unsafe acts and bodily potential hazardous situation. • Construction activities should only be carried out during daytime. • All construction personnel must pass a medical examination prior to being engaged, both as a fitness for work assessment as well as a baseline for monitoring any deterioration or changes in health status. • Ensure that all necessary first aid measures and fire prevention measures are provided on site. • An Emergency Response Team along with supporting rescue services are on standby to respond to any safety incidents during the construction phase.	All P2M2 will be implemented
8.	Waste Management	• Generation of construction debris, solid waste and scheduled wastes	<u>Scheduled Wastes</u>	All P2M2 will be implemented

No.	Aspect	Potentially Significant Environmental Impacts	Pollution Prevention and Mitigation Measures Recommended in EIA Report	P2M2 to be Implemented
		• Improper management of domestic waste could lead to proliferation of disease vectors as well as degradation of aesthetic value.	• Scheduled wastes should be managed according to the Environmental Quality (Scheduled Wastes) Regulation, 2005 and to be disposed of by DOE licensed contractor only. • Maintenance of vehicles and machinery should only be undertaken at workshops and places where there are facilities for collection of such wastes. • Regular training for staff on the safe handling of equipment, spill prevention and response procedures and proper clean-up for hazardous materials to ensure adequate level of awareness of the environmental sensitivity of the environmental components among contractors undertaking construction (as well as during maintenance and repair operations). • Scheduled wastes and construction wastes generated during reclamation stage should be temporary stored at the designated zones. The wastes stored within these designated zones will be segregated according to type. <u>Construction Wastes</u> • For construction wastes, they should be reused and recycled as much as practically possible prior being disposed of by licensed contractors to Dengkil Inert Waste Landfill. • Construction waste should be temporary stockpiled within the designated storage area for the waste. • Open burning of construction and solid waste is prohibited. <u>Solid Wastes</u> • Construction area and worker camp should be kept clean at all time. Maintain high quality of housekeeping and the requirements shall be included in the contract document for the contractors. • Solid waste should be stored in containers of sufficient capacity (preferably covered) and be collected regularly by a licensed contractor. As Solid Waste and Public Cleansing Management Act 2007 (Act 672) is enforced in the State of Melaka, the Project Proponent/contractors should ensure that waste segregation at source is implemented on-site. • Sufficient number of waste bins to be provided at the worker camp, site office and at strategic locations to minimize littering and encourage proper disposal. • No open burning of solid wastes shall be carried out at any time. • All solid wastes from the site must be regularly removed and disposed of to the municipal landfill (i.e. Sungai Udang Sanitary Landfill) approved by the local authority by licensed contractors.	

9.6.4 Water Pollution Control

9.6.4.1 Seawater Quality Monitoring

Monitoring on seawater quality is proposed for the reclamation and construction phases to monitor the compliance of the project with the respective Malaysia standards. Monthly Seawater Quality Monitoring Program is proposed in the Impact Monitoring Programme (refer **Table 9-8**).

Seawater samples will be collected around the project area at two water depths level (surface and bottom). The data obtained will be compared against the Class II of the Marine Water Quality Criteria and Standard (MWQCS). The proposed sampling locations are tabulated in **Table 9-6** and are further presented in **Figure 9-3.**

Table 9-6 Proposed Sampling Locations for Seawater Quality Monitoring

Sampling Station	Latitude	Longitude
SW-1	2° 13' 10.0080" N	102° 10' 20.3038" E
SW-2	2° 12' 35.7153" N	102° 10' 20.2982" E
SW-3	2° 12' 39.6500" N	102° 11' 20.6333" E
SW-4	2° 13' 04.5349" N	102° 11' 22.1461" E
SW-5	2° 12' 38.7575" N	102° 09' 33.8414" E
SW-6	2° 12' 13.5771" N	102° 10' 15.7229" E
SW-7	2° 11' 57.7730" N	102° 11' 05.8439" E
SW-8	2°11'40.7800" N	102°10'09.5700" E

9.6.4.2 Marine Biology Monitoring

Monitoring for marine biology components such as chlorophyll a, phytoplankton, zooplankton and macrobenthos are being proposed in the Impact Monitoring Programme (refer **Table 9-8).**

9.6.4.3 Coastal Monitoring

Coastal monitoring program one of the component that required by Drainage and Irrigation Department (DID) for reclamation work. This proposed monitoring program are important to draw a mitigation measures if needed after the reclamation works. Proposed shoreline monitoring works are based on reclamation project condition. Land survey and bathymetry survey are the main component for coastal monitoring program. However 18 months duration of jetty upgrading works required monitoring works as per JPS requirement.

This monitoring process required to ensure there is no changes in surrounding coastal environment due to the reclamation works. The survey lines are designed in two different intervals such as 100 meter intervals and 200 meter intervals.

Erosion and deposition pattern of the coastal morphology need to be monitored using topographical and hydrographic survey.

Random survey plan line is proposed throughout the monitoring period as per drawn in **Figure 9-2**. Monitoring period, at three months interval survey should be executed during the dredging and reclamation work at the project site and every 6 months for 3 years period after completion of reclamation work. This programme can be summarized as in **Table 9-7** below.

Figure 9-2 Proposed Monitoring Survey Line after Reclamation Work

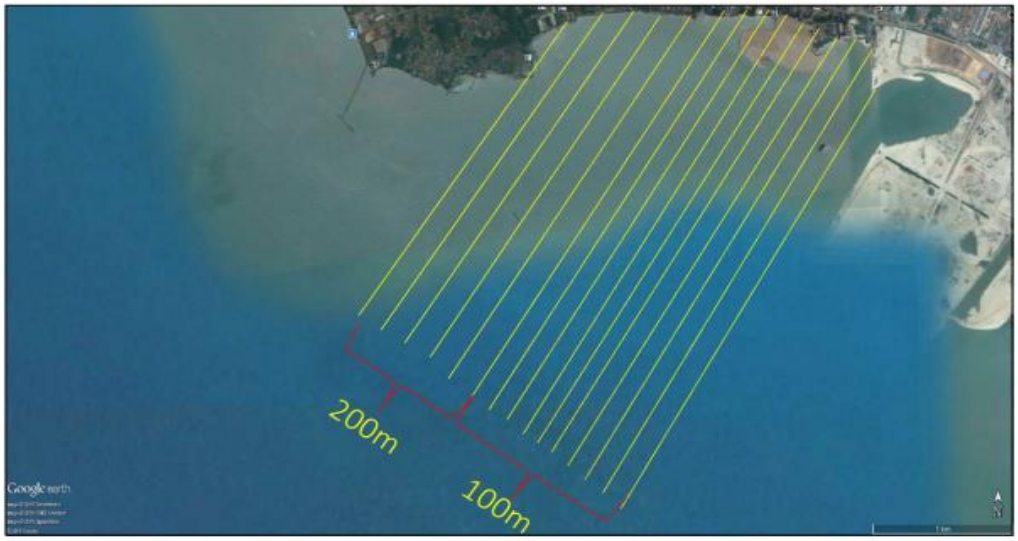


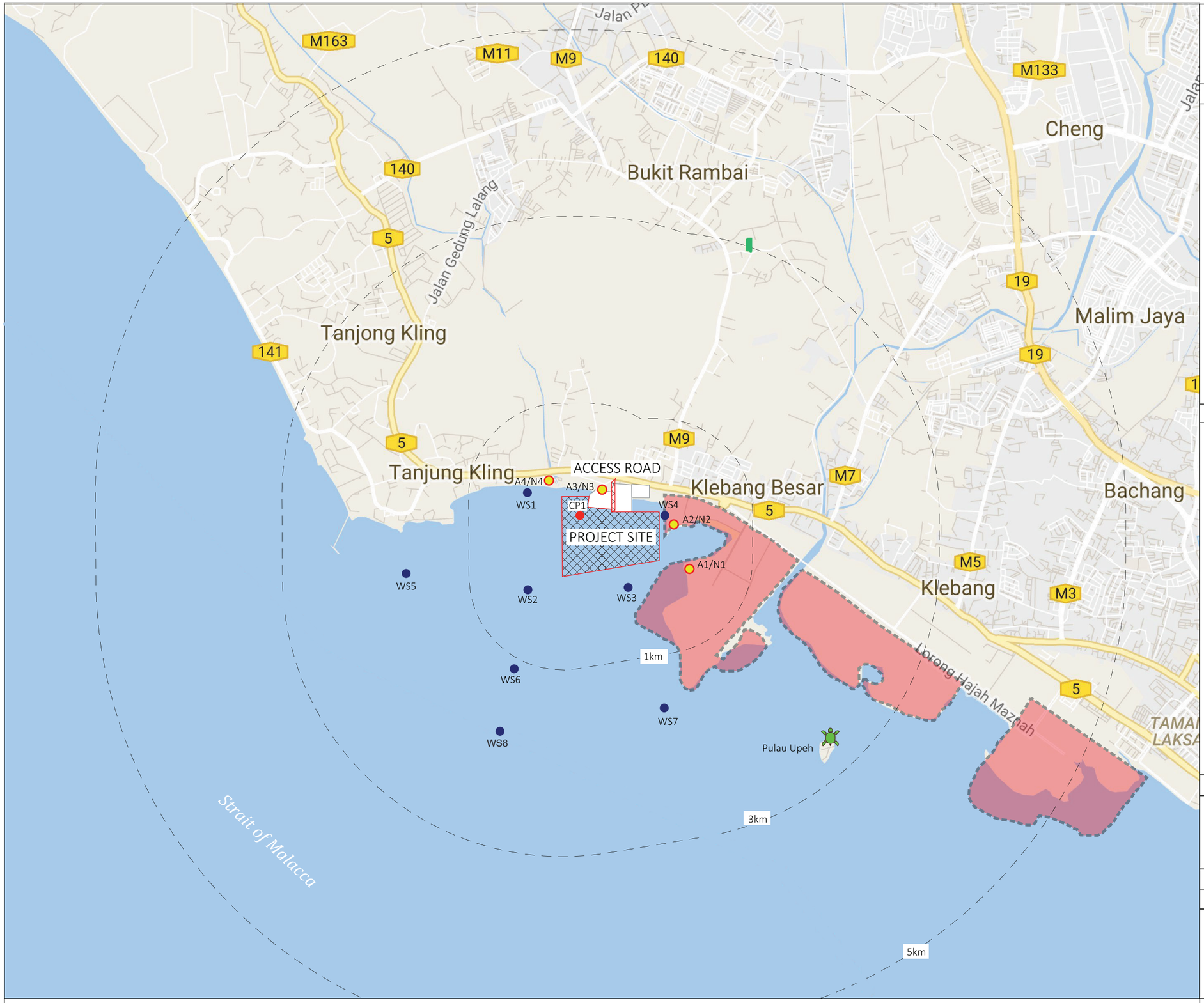
Table 9-7 Shoreline Monitoring Work Programme

Items	Duration
Shoreline Monitoring work 1	Before reclamation works
Shoreline Monitoring work 2	During reclamation works
Shoreline Monitoring work 3	After completion of reclamation works
Shoreline Monitoring work 4	6 months After completion of reclamation works
Shoreline Monitoring work 5	12 months After completion of reclamation works
Shoreline Monitoring work 6	18 months After completion of reclamation works
Shoreline Monitoring work 7	24 months After completion of reclamation works
Shoreline Monitoring work 8	30 months After completion of reclamation works
Shoreline Monitoring work 9	36 months After completion of reclamation works

Table 9-8 Proposed Impact Monitoring throughout the project activities

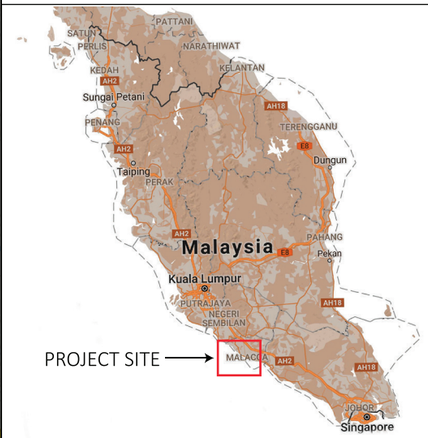
Component	No. of Point	Parameter	Duration of Monitoring	Frequency of Monitoring	Limit	Reporting Frequency
Seawater	8	• pH • Temperature • Turbidity • Conductivity • Salinity • Dissolved Oxygen • Total Suspended Solids • Oil & Grease • Nitrogen (Ammonina) • Nitrogen (Nitrite) • Nitrogen (Nitrate) • Phosphate • Fecal Coliform • Heavy Metals • Mercury • Phenol (µg/L) • Tributyltin (µg/L) • Polynuclear Aromatic Hydrocarbon	Water sample taken at 2 depths (top and bottom)	Monthly	Class II of the Marine Water Quality Criteria and Standard (MWQCS).	Monthly
Air	4	• NO_2 • SO_2 • CO • PM2.5 • PM10	24 hours	Monthly	Malaysian Ambient Air Quality Standard, 2013.	Monthly
Noise	4	• Leq • L10 • L50	24 hours	Monthly	Planning Guidelines for Environmental Noise Limits and Control, 2007	Monthly

Component	No. of Point	Parameter	Duration of Monitoring	Frequency of Monitoring	Limit	Reporting Frequency
		• L90 • Lmax • Lmin				
Marine Biology	8	• Chlorophyll a • Phytoplankton • Zooplankton • Macrobenthos	-	Quarterly	NA	Quarterly



N

OVERVIEW



LEGEND

- Project Site
- Forest
- Water Bodies
- Proposed Coral Survey
- Sampling Station
- Air/Noise Sampling Station
- Turtle Landing Site
- Existing reclamation projects

0 1.5 3 4.5

Kilometers

PROJECTION PARAMETERS

Notes

1. Projection parameters are in Geographical/WGS84
2. Image source : Google

Rev	#	Drawing by	Date
00	1	MAF	3/8/2016

Figure 9.3: Proposed Sampling Station for EMP Monitoring

INTEGRATED ENVIROTECH

A3

9.6.4.4 Material and Waste Management Plan

9.6.4.4.1 Temporary Sullage

- Construction site is to be provided with temporary toilets for workers during the day to ensure that all sewage is treated to the required health standards.
- Sewage must be treated in the sewage treatment system before it is discharged into sea and regular preventive maintenance on the sewage treatment system will be carried out to ensure its capability is always maintained.

9.6.4.4.2 Raw Materials

- A temporary area in project site will be used up near the Project site to store the materials for construction such as pipes, valves and fittings. It will be an open area with roofing and concrete slab with fence surrounding.
- Provide adequate number of waste bins at strategic locations around the site office and work areas.

9.6.4.4.3 Solid Waste

For the proposed project, solid waste is mainly food packaging generated by the workers on-site. In considering that only a maximum of 80 workers during the peak of construction period, minimal amount of domestic waste is predicted and the recommendations for the management of this type of waste are:

- Sufficient waste bins should be provided and strategically located at the works areas.
- Good housekeeping practice should be emphasized on-site.
- Forewarn workers against littering and dumping of wastes materials indiscriminately.
- Wastes for final disposal should be disposed of in a landfill / disposal site approved by the local authorities, i.e. Sungai Udang Sanitary Landfill.

9.6.4.4.4 Construction Waste

Minimal amount construction wastes, which consists of wood, plastic, scrap metal, pipes and steel is expected from the project. The best management practices of these wastes are as below:

- Steel, metal scraps, which could be reuse should be collected and sold to recycler.
- Open burning of the demolition debris at the site premises is strictly prohibited.

- Wastes for final disposal should be disposed of in a landfill / disposal site approved by the local authorities, i.e. Dengkil Inert Waste Landfill by licensed contractor.

9.6.4.4.5 Open Burning

Open burning of all types of wastes at the project site is strictly prohibited.

9.6.4.4.6 Scheduled Waste Management

- Scheduled wastes shall be managed and handled in accordance with the Environmental Quality (Scheduled Waste) Regulation 2005.
- An appropriate container should be selected according to the characteristics of the scheduled waste. The characteristic of scheduled waste shall be compatible with the type of material used for the container to prevent any reaction which will deteriorate the container.
- Containers of scheduled waste shall be clearly labelled in accordance with the Third Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005.
- Containers containing scheduled waste shall always be closed at all-time except when it is necessary to add or remove the scheduled waste.
- Scheduled waste shall be stored in a sheltered or roofed area with concrete flooring, free of cracks and gaps.
- Spill kit is recommended to be located at oil and chemical storage area.
- The scheduled waste storage area shall be fenced-in and regarded as restricted area. Adequate signage should be put up clearly and visible with the word “DANGER” and “SCHEDULED WASTE STORAGE”.
- There should be separate compartments for different groups of incompatible wastes.
- Waste inventory must be updated and submitted to DOE every three months as stipulated under the Fifth Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005.
- The quantity of scheduled waste accumulated on-site shall not exceed 20 tonnes (unless granted by DOE) within 180 days or less after its generation as stipulated under the Environmental Quality (Scheduled Wastes) Regulations 2005.
- Proper documentation of Consignment Notes as required under the Sixth Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005 is to be diligently completed by all parties concerned (e.g. waste generator, transporter, licensed promise operator, etc.).
- Disposal of scheduled waste shall be via a licensed waste collector. Scheduled waste shall be disposed to a facility licensed to receive waste.
- Scheduled waste handlers shall wear proper PPE at all times. The waste handlers shall be well informed of proper handling of scheduled waste, including its safety requirements and emergency procedures.

- Inspection of the stored containers shall be carried out on weekly basis. Standard inspection checklist shall be prepared.
- An ERP of accidental spillage shall be prepared.

9.6.4.5 Control of Oil and Grease

Any oil or grease spills from the vehicles or machinery should be cleaned up as soon as possible to prevent oil contamination.

9.6.4.5.1 Oil and Grease Control Plan

- Conduct regular maintenance of oil separator in order to maintain its design treatment capability and also to prevent breakdown of the oil separator.
- Oily wastes shall be treated and disposed accordingly to avoid seawater pollution.
- The contractors shall ensure that their vessels are equipped with slop tanks (if applicable).
- The wastes collected shall be disposed at approved premises onshore.
- Emergency response and contingency plans to be put in place for response in emergency cases.

9.6.5 Control of Air Pollution and Noise

9.6.5.1 Air Pollution Control Monitoring

No air pollution control system (APCS) is expected to be installed for the project, therefore, for this reclamation project, only **Impact Monitoring Program** (IM). The proposed locations for air quality sampling are tabulated in **Table 9-9** depicted in **Figure 9-3** and the results will be compared with the Malaysian Ambient Air Quality Standard, 2013.

The IM of air pollution control monitoring during reclamation and construction phases is provided in **Table 9-8** respectively.

Table 9-9 Proposed Sampling Locations for Ambient Air and Noise Levels

Point	Coordinate
A1/N1	2°12'42.74"N 102°11'16.47"E
A2/N2	2°13'2.90"N 102°11'19.27"E
A3/N3	2°13'13.12"N 102°10'50.98"E
A4/N4	2°13'16.68"N 102°10'29.73"E

9.6.5.1.1 Air Pollution Control

- Provision should be made for water sprays to be available for use when dusts are being generated or at times of strong wind.
- Tyre washing facility is to be installed at all entrances to public roads or at points when the trucks leave the working site. Where possible, main road within the working site should be paved or overlain with aggregate prior to the start of construction works.
- Truck speed on unpaved roads or open spaces is to be limited to 20 km/h within the project area, unless sufficiently wetted to prevent dust generation.
- Truck loads such as sand, aggregate, cement, soil and other materials transported to the construction site should be covered.
- Open burning is prohibited; instead all vegetation and construction wastes are to be disposed of at the nearest inert waste dumpsite.
- Construction equipment are to be kept in good repair and operate efficiently to prevent carry through of elevated levels of hydrocarbons from engine operation.
- Quarterly ambient air monitoring to be carried out.

9.6.5.2 Noise Pollution Control Monitoring

Noise pollution control monitoring consists of Impact Monitoring (IM) of boundary noise level monitoring. The IM of noise pollution control monitoring is provided in **Table 9-8.**

9.6.5.2.1 Noise Pollution Control

- Restricting working hours to daytime only.
- Maintenance of all vehicles and machinery to ensure good working condition and reducing possible noise emission.
- Shut down engine/machinery when not in use.
- Speed limit for heavy vehicles is imposed on site.
- Suitable noise absorbent materials should be installed on machinery that produces high noise levels.
- Machinery emitting high noise shall be sited within an enclosure to reduce the noise impact.

9.7 Emergency Response Plan (ERP)

For the reclamation and construction phase of the project, an ERP will be established. This ERP will need to be reviewed from time to time to assess the need to increase emergency response resources to cater for the requirements of the proposed project. The ERP should also be updated accordingly to address all potential emergencies during all phases of the project. The project proponent shall ensure that all personnel are well informed and trained in the procedures in the event of an emergency, and that the ERP is readily accessible to personnel.

9.7.1 Objective

Objective of having an ERP is to guide the project in a safe, timely, and effective response to incidents that threaten the plant area and public health, safety, or welfare. It is also intended to promote coordination among project owner, local, private public and state responders. It is can also to be used for the training of involved personnel in improving the level of emergency preparedness.

The objectives of having an ERP are to ensure that immediate and appropriate actions are directed towards any emergency which interrupts normal safe working conditions of the proposed activities so that :

- Risk and problems arising are dealt immediately without delay.
- Emergency incident is contained and kept under control and does not spread to adjacent facilities.
- Minimize loss of life or injuries, property damage, environmental impairment and business interruption in the immediate and more distant environment of the proposed Project.

- Provide the basis for training and emergency preparedness for all personnel involved.

9.7.2 General ERP Guidelines

The followings are the general principles in the management of any unforeseen incidents:

- Preserve life, health and safety of emergency responders, employees and the public and minimize risks to the property
- Contain and / or control the release of pollutants
- Identify the cause of the incident and the source of environmental hazards
- Collect and preserve evidence

9.7.3 ERP Management Measures

Subcontractor's considerations regarding the response to environmental emergencies must include :

- List of appropriate pollution prevention equipment.
- Maintenance regime for equipment
- Environmental training records for staff.
- Identification of potential locations and circumstances of environmental incidents.
- Out of hours contact number for key personnel.
- Details of staff responsibilities for contacting authorities.
- Details of staff responsibilities for co-ordination of response to environmental incidents.
- In the event of an environmental emergency or incident, immediate action should be taken to prevent any pollutants from spreading.
- Reporting and investigating environmental incidents.
- Regularly checking that the contents of the spillage kits held on site are complete. Spillage kits are ideal for dealing with spillages the content must depend on the project, but they may contain: oil-absorbent granules, "pigs" or "sausages", floating booms, absorbent materials, polythene sheeting, and polythene sacks. They should be stored in a marked bag or wheelie bin in a well-signposted location. It is best if they are stored near to where they may be needed. Buckets of sand, earth, straw bales and rags are good for cleaning up small spillages.
- Appropriate training must be provided in the use of the spillage kits.

9.7.4 Health Assessment

Pre-employment and Pre-placement health assessments as well as any other necessary or required medical examinations must be organised by contractor themselves according to local legislation or the requirements defined in this program and its referenced procedures.

Each contractor is responsible for ensuring that their employees are fit for work and have undergone the necessary medical examinations required for their work according to local legislation with additional consideration to communicable diseases.

9.7.5 Management of Fatigue

Contractor Management should assess and take steps to control all risks to the health and safety of their employees; this includes assessing working time arrangements.

Risk assessment should consider the following:

- Night working and changing from one shift to another(e.g. nights to days)
- Length of shift including any overtime
- Length and quality of rest breaks during the shift
- Rest breaks between shifts and the amount and quality of sleep taken
- Type of work - try to schedule safety critical tasks, tedious work or work that needs close concentration to avoid known high error periods
- Bio-rhythms (working with or against your 'body clock')
- The environment - mainly temperature and lighting – effect on drowsiness
- Individual preferences and suitability of certain people for shift work
- Training and raising awareness among shift workers, and their families, supervisors and managers on the signs and problems of fatigue and it's interaction with sleep patterns, nutrition and effects on social life
- Contingency plans if a crew member is absent (don't overload everyone else)
- Monitoring of employees for signs of fatigue, particularly on safety critical work
- Examining accidents and incidents for evidence of fatigue.
- Programmes that help employees to identify if they are at risk from sleep apnoea.

9.7.6 First Aid

HSE Manager has to compile a list of all First Aiders and make it available for all people on site. In the case of hazardous works with significant or high risk are carried out where no emergency kit is close-by an additional first aid kit must be present.

Emergency facilities must be organised by each party if not otherwise specified. Special facilities such as eye showers and emergency showers must be available if required by risk assessment or job safety analyses (e.g. handling of hazardous chemicals). These emergency facilities must be ready for use at any time. First-Aid kits must be easily accessible on site and in non-stationary site facilities.

9.7.7 Site Hazards Identification and Emergency Classification

The Emergency Response Plan must cover different types of potential incidents that may endanger human life, material or environment integrity and where immediate action is required.

The potential accidents that may cause unexpected emergencies at site during the construction and commissioning phase are as follows :

- Fire and / or Explosion involving hazardous and non-hazardous substances.
- Oil or chemical spill
- Gas or chemical release (from process vessel, storage tanks, ship).
- Natural Disaster (Severe thunder storm weather, flood, typhoon, disease outbreak).
- Civil commotion such as riot, strike, bomb threat and terrorism.
- Building or structural (storage tank, vessel, reformer, regenerator, etc.) collapses or product line leakage.
- Road Accident and Traffic with the vehicles inside onsite
- Plant or machinery incident (collapse of crane, overturning/ sinking of construction machinery)
- Personnel injury or medical condition due to any kind of work related incident or condition
- Personnel injury or medical condition due to any kind of non-work related incident or condition

The plan must cover procedures regarding the above mentioned subjects. Additionally an Emergency Telephone List must be prepared to give an easy and quick overview on emergency telephone numbers and responsible departments in an event of an emergency situation.

9.7.8 Potential Emergencies Scenarios

The environmental emergencies that could occur at the Project site are:

- Siltation
- Flooding
- Leakage and Spillage of Oil Products
- Fire at construction site
- Fatal accident, injury and chemical spillages

Figure 9-4 Flow Chart in Event of Flood

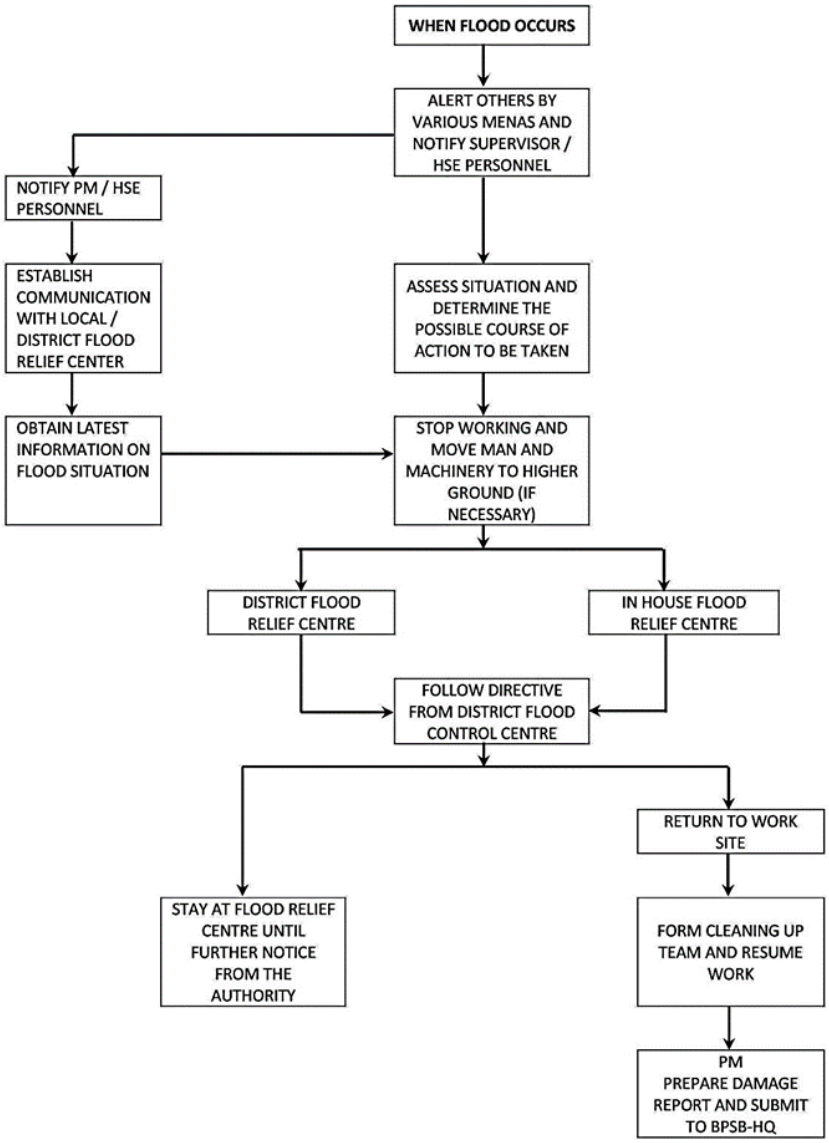


Figure 9-5 Flow Chart in Event of Fire/Explosion

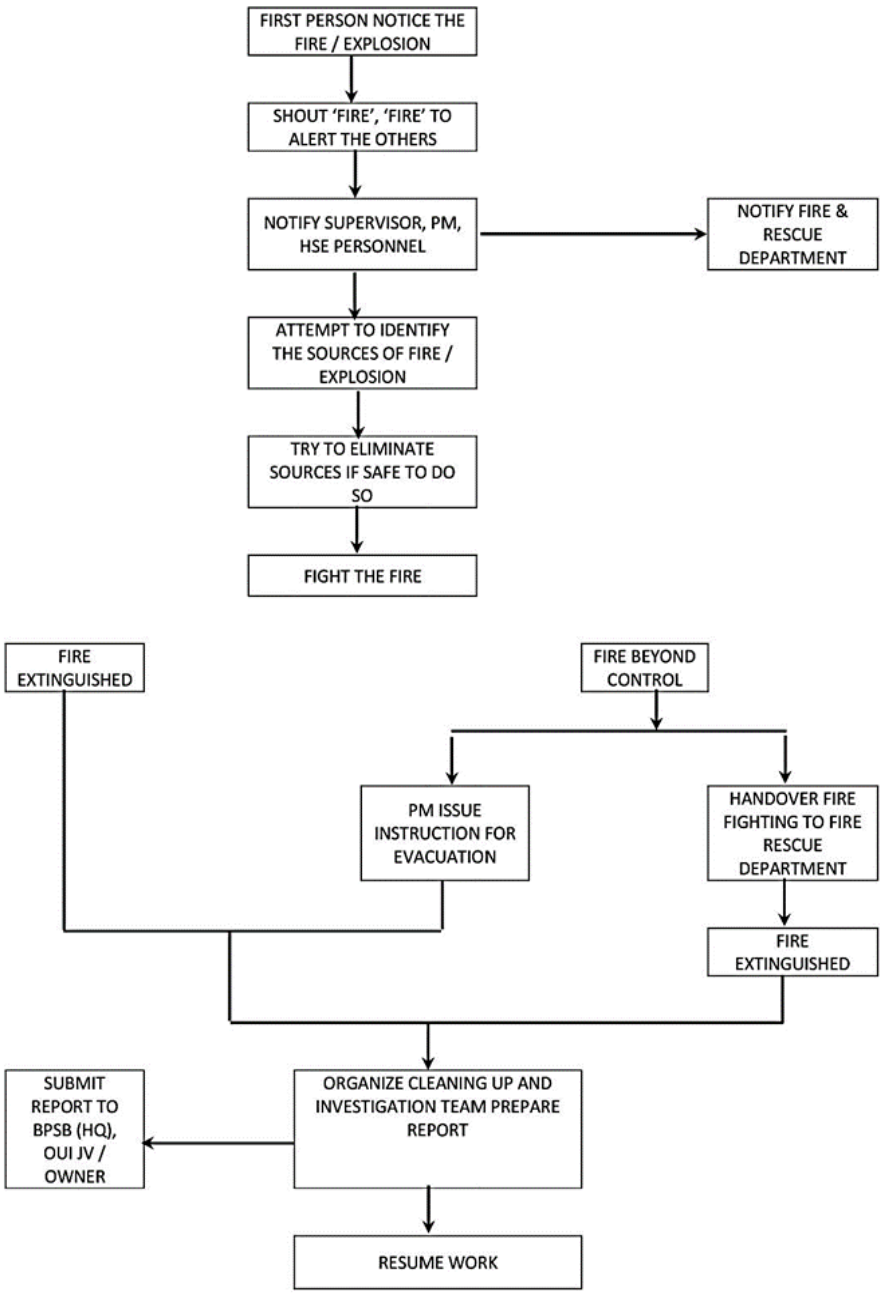
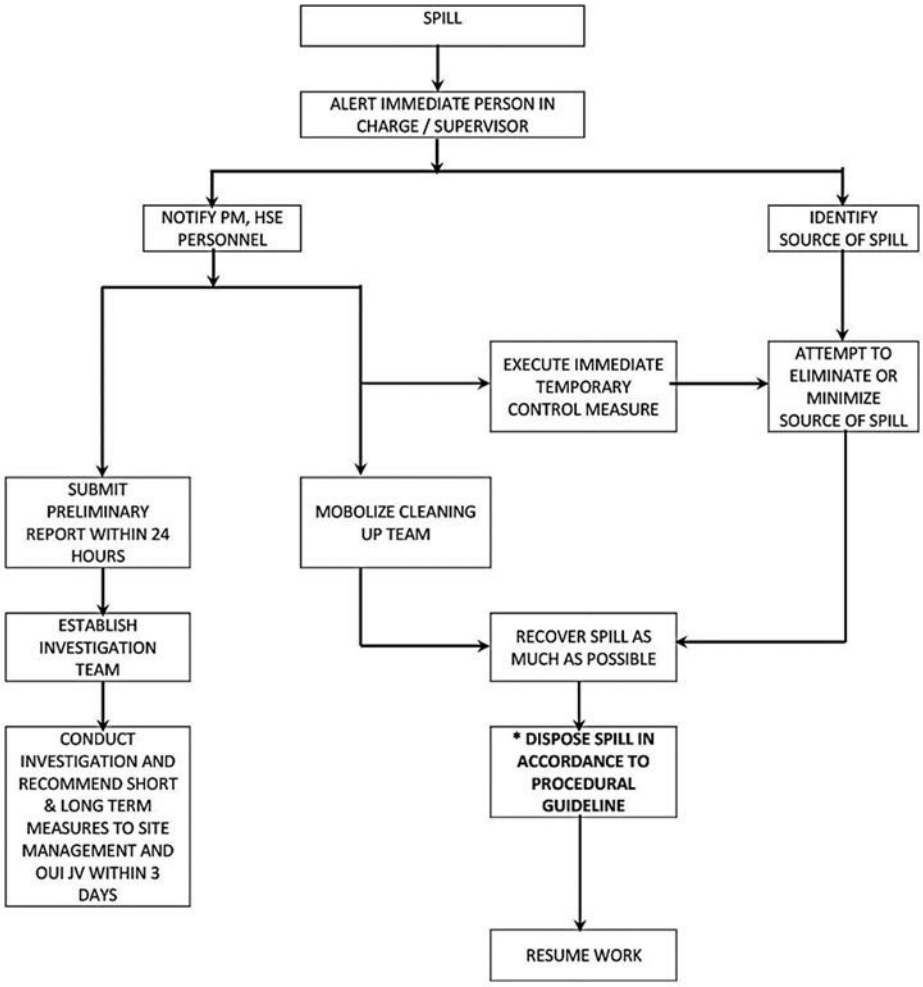


Figure 9-6 Flow chart in event of Chemical Spill



*Registered and authorized toxic / scheduled waste disposal company by DOE should be engaged to perform removal and disposal operation.

9.8 Emergency Evacuation Plan

The Emergency Evacuation Plan must give an overview of those components :

- Location of assembly areas
- Escape routes
- Location of medical stations
- Location of fire response units
- Location of first aid stations
- Location of fire extinguishers
- Location of rescue equipment
- Location of safety / eye shower
- Alarm signals
- Information about routine test alarms

9.8.1 Emergency Notification

Emergency situation is reported by employees or witness to Supervisor of Contractor. If the situation is under control, the trained employee or witness may fight the fire or conduct First Aid treatment to the victims. Then the Supervisor will report the incident to the coordinator of Emergency situation. The coordinator shall come immediately to the location of incident to coordinate the Emergency Response Team and First Aid & Medical Evacuation Team in handling the situation.

9.8.2 Emergency Equipment and Facilities

If local emergency responders are not available, every contractor must keep ready rescue and emergency equipment readily available to rescue its own employees. Necessary equipment should include:

- Temporary Lightings
- Escape routes as identified in plot plan, staircases, ladders and road routes for external emergency vehicles. All external emergency vehicles will be accompanied by a member of the security team from the main gate, who will give clear instruction and direction to the incident location. Driver of emergency vehicle (ambulance) will be taken for a site tour with his vehicle on a weekly basis to ensure he is familiar with current common access
- Emergency response room nominated and equipped with telephones, fax, computer, and telephone numbers for all internal and external emergency response including detailed reporting procedures with telephone/email and fax numbers of reporting chain and full set of site drawings.
- Site First Aid room with medical equipment, as required (e.g. resuscitation equipment, stretcher and wheel chair).
- Ambulance
- Emergency Siren

- Emergency Assembly Points
- Loud Hailer
- Rescue lifting devices
- Rescue harnesses
- Rescue loops
- Descender devices

9.8.3 Site Emergency Response Plan

The Site Emergency Response Plan (ERP) will be continually reviewed through consultation with different discipline zone managers as the project advances. Areas that will be continually monitored and evaluated are:

- The levels of risk associated with potential hazards identified, especially environmental risks and personnel risks
- Details of control measures and responses, action and evacuation process according to the defined levels of emergency with specific step-by-step instructions.
- Emergency Response Team and the specific roles and responsibilities of the key members.
- Layout Plan of the site with location of emergency equipment and facilities, evacuation or escape routes and assembly points.
- Identification and location of hazardous materials, if any
- Contact numbers of key people including the authorities and external agencies.
- Evacuation guidelines
- Important records, data and equipment to be protected and relocated
- Communication policy with external agencies, authorities and reporters
- Tentative schedule of practice drills, ERP briefings and orientation.

Every personnel shall comply with all the rules, instructions and orders given as part of the implementation of this Site Emergency Response Plan, as instructed by Site Manager and Site HSE Manager.

9.8.4 Emergency Practice Exercise/Drill

Emergency practice exercises / drills shall be carried out at least once every 3 months and or after any significant event (e.g. an near miss or an accident or a high potential environmental incident). However the frequency may be more frequent (e.g. monthly) dependent upon the mode and peak of the construction and commissioning activities as well as the rotation of personnel onsite.

Necessary preparations shall be made to ensure that the emergency simulation of a selected "accident or environmental incident ” is performed successfully. A briefing (a desk top exercise) should be held to all relevant parties prior to the execution of the emergency simulation at site.

Attendance and headcount shall be recorded by Assembly Point Warden to ensure all the personnel are accounted for. All practice drills shall be recorded and reported officially to the Emergency Commander to assess the entire simulated event and the effectiveness of the ERP and ERT organization. Accordingly, the ERP shall be updated to address any weaknesses as documented in the practice drills report. Emergency drill will be evaluated and report issued detailing areas of improvement and sequence of events.

9.8.5 Emergency Contact Details

In the event of an emergency, the relevant agencies should be contacted. The emergency contact numbers are shown in **Table 9-10.**

The Site HSE Manager is requested to ensure that an Emergency Response Plan is available at the site office, in accordance with the minimum requirements as set out in this procedure. Additional requirements from the specific contract of a project shall be adopted appropriately.

For continuous improvement purposes, this procedure must be clearly communicate to all project personnel. The following activities should be considered:

- Review the procedure with the contractor and their Sub-subcontractors and new workers to ensure that it covers their activities adequately
- Clarify the procedure with suppliers to ensure that it covers any hazards that the storage or delivery of their material might create.
- Review new work areas during project phase with all parties to identify new hazards or significant changes in site condition
- The Site Emergency Response Procedure (this document) which is applied throughout the project works must continually undergo review and revision and must be in line at all times with the Project Emergency Response Procedure.

9.8.6 Medical Emergency

In a medical emergency the aim is to maximize patient care to any injured person. The major difficulty is that there is potentially a balance of risk to be considered. If patient care is delayed then the condition may deteriorate. Alternatively premature movement before stabilization of the patient may also cause deterioration in condition. This balance of risk depends upon:

- The nature and severity of the injury
- The present condition of the patient
- The availability of local medical treatment
- The remoteness of appropriate specialized medical facilities

These can only be assessed by the Medical expert at the scene, but the following strategy will be considered. Where injuries are relatively mild, then initial treatment by a Paramedics, with reference to doctor for initial assessment and further treatment. Where injuries are severe, initial first aid is important; particularly in ensuring breathing airway remain open, any bleeding is staunched and neck/spine injuries are immobilized. Depending on extent of injuries, the injured person would be sent to the nearest clinic or hospitals. At all times consideration must be given to relative and families of the injured person, particularly by informing promptly and humanely, in order to avoid additional distress, and maintaining confidentiality until next of kin have been informed.

Table 9-10 List of Relevant External Authorities to be Contacted/Notified During Emergency

Agency	Hotlines	Contact No	Person In-Charge
FIRE STATION			
Fire and Rescue Station (Jalan Kubu Baru)	999	06-283 8481	-
POLICE STATION			
Police Station (Melaka Tengah)	999	06--2833384	-
Police Station HQ (Melaka Tengah)		06-284 2222	-
HOSPITAL/MEDICAL CENTRE			
Melaka General Hospital	999	06-289 2344	-
Mahkota Medical Centre		06-285 2999	-
Klinik Kesihatan Klebang Besar		06-3154144	-
Klinik Al' Azhim Klebang		06-2847582	-
AWAN PLASMA SDN BHD EMERGENCY MANAGEMENT PLAN TEAM			
Project Manager	-	019 241 4566	Deric Cheong
Site Manager	-	012 563 7717	Poh Yih Chen
Construction Manager	-	019 218 6612	Ooi Cheang Seng
HSE Officer	-	019 222 7523	Halim Lim Abdullah