

CHAPTER 8

CHAPTER 8: ENVIRONMENTAL MANAGEMENT PLAN

This chapter describes the framework for the preparation of the Environmental Management Plan (EMP) for the Project. The EMP is required to provide a structure in the management of various potential environmental issues that may arise during the implementation of the Project. It also includes an Environmental Contingency Plan (ECP) to provide prompt and adequate response procedures in time of emergencies for protection of the environment.

8.1 OBJECTIVE OF THE EMP

Environmental Management Plan (EMP) is a living document that aims to facilitate planning, control, monitoring, remediation and enforcement to ensure that environmental requirements are complied with during Project implementation.

8.2 PREPARATION OF EMP

Following the approval of the PEIA Report by the DOE, an EMP should be prepared in accordance to the *Guidance Document for Preparation and Submission of EMP* issued by the DOE and submitted by the Project Proponent to the DOE prior to commencement of works on-site.

The EMP should include statement of policy, organisational structure, the Project implementation programme, monitoring programmes, specific mitigation measures, emergency response plan, etc. It will be the tool and point of reference for the Project Proponent and the main contractor, their representatives and sub-contractors; to manage any environmental issues that may arise and to comply with the approval conditions and relevant standards, rules and regulations.

The EMP is to be reviewed and updated for any material changes during the course of the Project implementation and for inclusion of additional mitigation measures to ensure compliance with relevant environmental requirements.

8.3 ENVIRONMENTAL POLICY

A policy statement on environmental management and protection is required to be provided in the EMP. The environmental policy statement conceptualises the Project Proponent's aims and commitments towards the spirit of environmental protection and management based on the environmental requirements, legislations and guidelines.

8.4 ORGANISATION STRUCTURE

8.4.1 ORGANISATION STRUCTURE

During the implementation of the Project, commitment from the top management of the organisation is crucial to ensure the success of the recommended environmental management and protection programmes. **Figure 8.4.1** shows the suggested environmental management organisational chart and line of communication for the Project.

8.4.2 ROLES AND RESPONSIBILITIES

The roles and responsibilities of each party involved in the Project are outlined below:

A. Jabatan Kerja Raya

Being the Project Proponent, Jabatan Kerja Raya (JKR) should oversee and monitor the overall environmental management and performance carried out by the main contractor during the construction stage.

Environmental Consultant should be appointed to oversee the planning and administration of the environmental management of the Project so that it complies with all the pertinent environmental requirements. Adequate budget and resources should be allocated for the implementation of environmental management and protection requirements.

B. Main Contractor and Environmental Officer

During the construction stage, the main contractor should allocate sufficient resources for the implementation of the EMP and meeting of other environmental requirements.

The main contractor shall appoint qualified Environmental Officer(s) to execute the programmes outlined in the EMP. He/ She should be based on-site to monitor and ensure that the activities carried out by the workers and sub-contractors are in compliance with the environmental requirements. The environmental officer has to work closely with the environmental consultant to ensure that no major adverse environmental impacts occur, and if any, should be addressed immediately.

The duties and responsibilities of the environmental officer, amongst others, include:

- i. To execute environmental protection and mitigation measures, environmental monitoring programmes, as well as plan and supervise the installation and maintenance of Best Management Practices (BMP);
- ii. Record and maintain updated inventory and records of environmental protection and management activities;
- iii. Secure the necessary written approvals and permits from relevant environmental authorities;

- iv. Liaise and consult with various environmental parties i.e. the DOE, auditor, consultant and sub-contractors on environmental issues;
- v. Participate in the environmental audit process;
- vi. Coordinate with all relevant parties to resolve any environmental issues; and
- vii. Conduct environmental training and awareness programmes.

C. Environmental Consultant

The environmental consultant should provide their expertise and advice to the Project Proponent and main contractor for overall environmental management. The environmental consultant's responsibilities are:

- i. Identify and prepare environmental management plan and protection programmes;
- ii. Participate and conduct periodic site inspections and compliance exercises to evaluate the status of environmental performance and compliance;
- iii. Provide recommendations and comments on prevailing environmental management and protection measures; and
- iv. Review and update the EMP to reflect the current issues and development.

D. Third Party Environmental Auditor

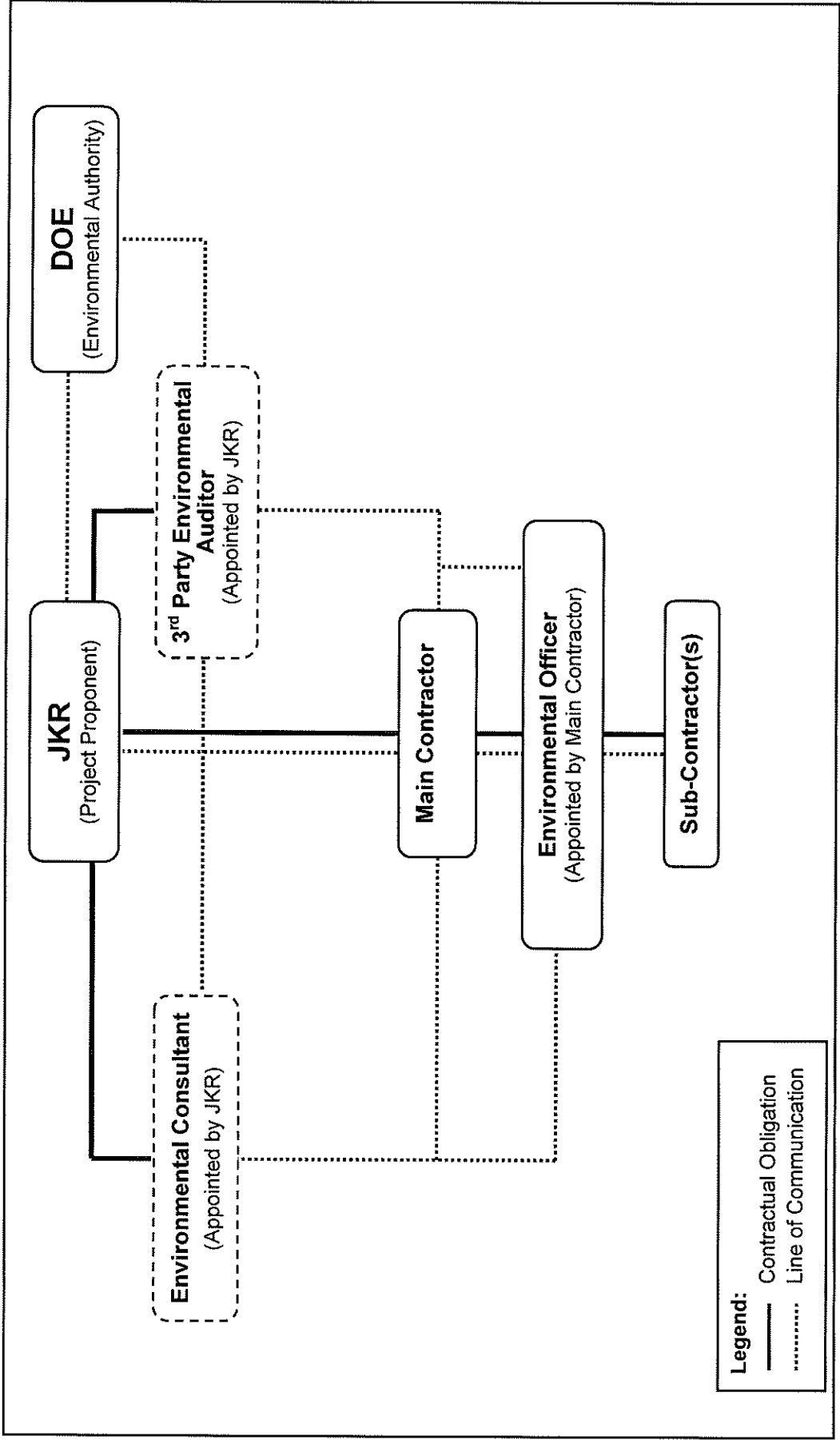
Pursuant to Section 33A of the Environmental Quality Act 1974, the DOE may prescribe the requirement for the conduct of environmental audit by a third party environmental auditor. The environmental auditor should be registered under the DOE's *Environmental Auditor Registration Scheme* and possess valid registration as a *Certified Erosion Sediment and Storm Water Inspector (CESSWI)*.

The third party environmental audit should be conducted at a frequency to be specified by the DOE, and undertaken in accordance to the requirements of the DOE's *Environmental Audit Guidance Manual Edition 1/2011*.

8.5 BUDGET AND COST

The Project Proponent and main contractor must allocate sufficient budget and resources for the execution of the EMP and associated programmes to prevent degradation of the environment due to insufficient funds and lack of resources.

Figure 8.4.1: Proposed Organisational Structure for Environmental Management



8.6 ENVIRONMENTAL MANAGEMENT AND PROTECTION

8.6.1 TERMS AND CONDITIONS OF EIA APPROVAL

The Terms and Conditions of EIA Report Approval will be issued by the DOE. This, together with other written approvals from relevant government agencies, must be incorporated in the EMP. Actions should be taken to ensure that requirements of these terms and conditions are complied with during the Project implementation stage.

8.6.2 AIR AND NOISE POLLUTION CONTROL

A. Air Quality Monitoring

During the construction stage, air quality monitoring should be conducted at the location identified during the PEIA study. Two monitoring locations have been identified and recommended for air quality monitoring. Descriptions of the locations are shown in **Table 8.6.1**. The recommended air quality monitoring parameters are TSP, PM₁₀, SO₂, NO₂ and CO. The monitoring exercise should be conducted monthly or based on the frequency stipulated by the DOE.

B. Noise Monitoring

Noise monitoring is recommended to be conducted during the construction stage. Monitoring locations for the noise level monitoring are similar to the locations for air quality monitoring stations shown in **Table 8.6.1**. Parameters for noise monitoring are L_{Aeq}, L₁₀, L₉₀, L_{min} and L_{max}. The monitoring exercise should be conducted monthly or based on the frequency stipulated by the DOE.

Table 8.6.1: Proposed Location for Air Quality and Noise Monitoring

Station	Location	GPS Coordinates		Justification for selection
		Latitude	Longitude	
AQ1 / N1	Felda Lepar Utara	N 03° 54' 04.8"	E 102° 48' 39.2"	Gauging impact to receptors at Felda Lepar Utara.
AQ2 / N2	Kuala Kenau	N 03° 55' 55.9"	E 103° 02' 58.8"	Gauging impact to receptors at Sungai Lembing.

Note: AQ = Air quality monitoring station; N = Noise level monitoring station.

8.6.3 WATER POLLUTION CONTROL

A. Water Quality Monitoring

Water quality monitoring is recommended to be conducted during the construction stage at the baseline monitoring stations. Descriptions of these monitoring stations are presented in **Table 8.6.2**. The monitoring exercise should be conducted monthly or based on the frequency stipulated by the DOE.

The recommended parameters to be monitored and analysed are shown in **Table 8.6.3**. The water quality results should be compared with the *Class II* limit of the NWQS. The sample collection, handling and preservation should be conducted in accordance with the protocols described in the *Standard Methods for Examination of Water and Wastewater APHA, AWWA, WPCF (2005) 21st Edition*.

Table 8.6.2: Locations and Coordinates for River Water Quality Sampling

Station	Location	Coordinates		Justification for selection
		Latitude	Longitude	
WQ1	Sg. Kenau	N 03° 55' 59.4"	E 103° 02' 57.5"	To monitor water quality of Sg. Kenau before confluence with Sg. Kuantan
WQ2	Sg. Kuantan	N 03° 58' 01.6"	E 103° 01' 15.3"	To monitor water quality of Sg. Kuantan upstream of Sg. Jin Orang Asli settlement.
WQ3	Sg. Kuantan	N 03° 56' 31.4"	E 102° 58' 14.4"	To monitor water quality of Sg. Kuantan after confluence with Sg. Keliu.
WQ4	Sg. Kuantan	N 03° 55' 17.6"	E 102° 57' 29.9"	To monitor water quality of Sg. Kuantan downstream to its confluence with Sg. Berapit
WQ5	Sg. Lepar	N 03° 53' 30.3"	E 102° 46' 09.4"	To monitor water quality of Sg. Lepar downstream to the Project activity and Felda Lepar Utara settlements.
WQ6	Sg. Lepar	N 03° 55' 20.9"	E 102° 48' 58.8"	To monitor water quality of Sg. Lepar downstream to the Project activity and upstream to Felda Lepar Utara settlements.
WQ7	Sg. Kuantan	N 03° 56' 01.8"	E 103° 02' 59.8"	To monitor water quality of Sg. Kuantan downstream to the Project activity and before confluence with Sg. Kenau.

Table 8.6.3: Parameters for River Water Quality Sampling

Station	Parameters	Class IIA, NWQS	
WQ1 to WQ7	<i>In-situ</i>	Temperature	Normal +2°C
		pH	6.0 – 9.0 °C
		Dissolved Oxygen	5 – 7 mg/l
		Salinity	1,000 ppm
		Conductivity	1,000 µS/cm
	Grab sample	Biochemical oxygen demand	3 mg/l
		Chemical oxygen demand	25 mg/l
		Total suspended solids	50 mg/l
		<i>E. coli</i>	-
		Oil and grease	0.04 mg/l, free from visible film sheen
		Ammoniacal nitrogen	0.3 mg/l

B. Sediment Discharges

Drainage and surface runoff at the construction site should be properly managed and controlled. This is to ensure that sediment delivery to receiving waterways are minimised. Best Management practice (BMP) for control of sediment, such as silt traps and sediment basins, should be installed in accordance to the Erosion and Sediment Control Plan (ESCP). The BMPs should be installed prior to earthwork and are to be monitored and maintained regularly to ensure their effectiveness.

Sediment sampling (parameter: Total suspended solids, TSS) from discharge points of these BMPs should be undertaken monthly or based on the frequency stipulated by the DOE. The result should be compared with the Class II limit of the NWQS or other limit to be prescribed by the DOE.

C. Temporary Sullage and Sewage Treatment Facility

During the construction stage, sullage and sewage will be generated by the workers at the construction site. This shall be treated by installation of a temporary sullage and sewage treatment facility; which should be designed and built in accordance to the requirement of the Sewerage Services Department.

The discharged wastewater and sewage should be monitored monthly or based on the frequency stipulated by the DOE, and the discharge quality must comply with the limits (Table 8.6.4) stipulated as Standard A, Second Schedule of *Environmental Quality (Sewage) Regulations 2009*.

Table 8.6.4: Standard A Limits of Sewage Discharge Quality

Parameter	Standard A limits
Temperature	40 °C
pH	6.0 – 9.0
Biochemical oxygen demand, at 20 °C	20 mg/l
Chemical oxygen demand	120 mg/l
Suspended solids	50 mg/l
Oil and grease	5.0 mg/l
Ammoniacal Nitrogen (enclosed water body)	5.0 mg/l
Ammoniacal Nitrogen (river)	10.0 mg/l
Nitrate Nitrogen (river)	20.0 mg/l
Nitrate Nitrogen (enclosed water body)	10.0 mg/l
Phosphorous (enclosed water body)	5.0 mg/l

Source: Standard A, Second Schedule of *Environmental Quality (Sewage) Regulations 2009*

8.6.4 EROSION AND SEDIMENT CONTROL

The Project will involve land clearing and soil disturbing activities during the construction stage. The Preparation of Erosion and Sediment Control Plan (ESCP) in accordance to the Terms and Conditions of EIA Report Approval is required to tackle soil erosion, runoff and sedimentation that may arise during the construction stage. The ESCP is generally prepared in accordance with the guidelines published by the Department of Irrigation and Drainage (DID) i.e. *Guideline for Erosion and Sediment Control in Malaysia, 2010*.

A Professional Engineer (PE) who is also a *Certified Professional in Erosion and Sediment Control (CPESC)* should be appointed to prepare the ESCP. In addition, a *Certified Erosion Sediment and Storm Water Inspector (CESSWI)* should be appointed to oversee the implementation of the approved ESCP during the construction period. Monitoring and inspection of the implemented ESCP is recommended to be conducted bi-weekly during the construction stage of the Project.

8.6.5 WILDLIFE MANAGEMENT

A. Wildlife Management Plan (WMP)

A detailed WMP should be prepared to ensure proper and timely implementation of the mitigation measures recommended in the EIA. The preparation and implementation of the WMP may be undertaken collaboratively with the PERHILITAN.

The WMP shall include roles and responsibilities, standard operating procedures, monitoring, awareness training, communication and liaison, recording and reporting as well as other measures for wildlife management. The WMP shall specifically cover the species of key concern in detail and be periodically updated.

B. Wildlife Monitoring

Due to the potential significant adverse impacts on wildlife, monitoring is essential to ensure the proposed mitigation measures are effective. It is recommended that wildlife monitoring should be carried out during the construction and operational stages as follows. These exercises can be undertaken jointly with the PERHILITAN.

i. Construction Stage

- Record all encounters, sightings, road kills, etc. in the wildlife record book. This should be carried out by nominated personnel on site throughout the construction stage.
- Conduct monthly surveys along the road alignment and surrounding RCBFR to determine the presence of wildlife in the area, their abundance and their movement patterns.

ii. Operational Stage

- Conduct bi-monthly surveys along the RCBFR stretch to identify crossing points used by large mammals particularly Elephants and Seladang. Surveys will primarily follow the road alignment with additional transects along rivers and streams. This data will be useful for accurate siting of wildlife crossing signage.
- Carry out a camera trapping programme at selected underpass crossings (bridges or viaducts) for a period of two years to verify the effectiveness of the underpass crossing design. The data obtained will provide insight into the effectiveness of wildlife underpasses/ overpasses and for future road design.

8.6.6 MATERIALS AND WASTES MANAGEMENT

A. Raw Material and Stockpiles

Raw materials, i.e. chemical, fuel, lubricant, stockpiles, etc. kept within the Project site during the construction stage should be managed according the requirements of the DOE.

B. Solid Wastes

Solid wastes (i.e. domestic and construction wastes, spoil materials) disposal areas should be provided at the Project site during the implementation of the Project. Alternatively, these wastes may be disposed of at any off-site disposal site that is approved by the Local Authority; but a proper waste reception facility should be provided.

Good housekeeping practices should be adopted at work areas and workers' camps.

C. Scheduled Wastes

Scheduled wastes such as spent lubricating oil (SW305) and spent hydraulic oil (SW306) will be generated at workshops as well as machinery servicing and maintenance areas. These wastes need to be handled, stored and disposed of according to the requirements of *Environmental Quality (Scheduled Wastes) Regulations 2005*.

D. Open burning

Open burning to dispose of any wastes and materials should be prohibited at all times.

8.6.7 COMPLIANCE INSPECTION

Routine internal environmental compliance inspection should be conducted by the Project's environmental consultant. The main objectives of this compliance inspection are:

- i. To function as a performance appraisal tool on the effectiveness of the pollution controls and mitigation measures implemented by the main contractor, so that any

shortfall detected or observed could be rectified as soon as possible to prevent or avoid further deterioration of the environment;

- ii. To check that criteria and standards for environmental performances are being adhered to during the construction stage; and
- iii. To inform the Project Proponent on the environmental compliance status of the Project.

8.6.8 REPORTING REQUIREMENTS

The EMP shall also prescribe the reporting requirements as stipulated by the DOE in the Terms and Conditions of PEIA Report Approval. The frequency of submission will also be stipulated therein. Provisionally, the following reports will need to be submitted to the DOE:

- i. Report on Work Progress – as per DOE's BORANG EIA 1-08;
- ii. Report on EIA Compliance – as per DOE's BORANG EIA 2-08;
- iii. Environmental Monitoring Report – covering the monitoring of air quality, noise level and river water quality as well as any other monitoring programmes that may be prescribed by the DOE.
- iv. Sediment Sampling Report – covering the sampling of total suspended solids from discharge points of silt trap/ sediment retention pond.
- v. Third Party Environmental Audit Report – covering the environmental audit conducted in accordance to the requirements of the DOE's *Environmental Audit Guidance Manual Edition 1/2011*.

8.6.9 TRAINING REQUIREMENT

The Project Proponent and the main contractor should provide environmental training and awareness programmes for all levels of Project implementation personnel. The training programmes should be designed to cater for the different personnel's background and knowledge; as well as to cover the environmental issues that may arise at site. The frequency, timing, duration and target group should be identified, planned and circulated to the head of each division/ department so that they are aware of the training programmes.

Records of training shall be updated and maintained.

8.7 ENVIRONMENTAL CONTINGENCY PLAN (ECP)

The EMP shall also prescribe a contingency plan to address emergency situations that may pose risk, hazard or adverse consequences to the environment. The types of emergency situations that may occur, amongst others, include:

- Leakage or spillage of oil, chemicals or hazardous substances;
- Discharge of water pollutants or contaminants;
- Emission of air pollutants;
- Slope failure or landslide; and
- Workplace accident affecting human life (this is usually addressed under the Emergency Response Plan prepared in compliance with the general intent and objects of the *Occupational Safety and Health Act 1994* and *Factories and Machinery Act 1967*).

This ECP provides a framework for implementing a contingency response policy, and a concise reference of the necessary actions to be taken for such situations. It also defines the command and accountability structure of the response team as well as ensuring the availability of trained key personnel with the appropriate equipment to deal with emergency situations.

The ECP should include but is not limited to the following elements:

A. Policy

This represents a statement on commitments towards the spirit of response to environmental contingency situations and provisions of resources required, in line with environmental and legislative requirements.

B. Emergency Response Team (ERT)

The organisation should provide a clear line of command from the top (i.e. leader of the emergency response team) to the designated teams such as fire fighting team, medical team, security team and logistics team.

C. Roles and Responsibilities of ERT Members

Roles and responsibilities of each individual forming the ERT must be clearly defined in order to ensure that all possible types of responses have adequate resources and trained manpower. Defined roles and responsibilities will also prevent any overlapping of duties between designated ERT members.

D. First Aid

The First Aid Team members should ideally be personnel with basic knowledge of first aid and cardiopulmonary resuscitation (CPR) procedures. In an emergency event, the First Aid Team will be required to provide immediate first aid to injured persons while waiting for the arrival of the ambulance, depending on necessity.

E. Alarm and Information Provision

All alarm annunciation methods and types should be established and communicated. This is essential as each alarm signals (audio/ visual) should represent different types of emergencies and emergency responses requirement.

F. Incident Action Plans (IAP)

IAP specific to particular vulnerable locations within the work area should be established. The IAPs will include key information pertaining to an emergency scenario (e.g. hazardous material properties, hazard distances, etc.) and the appropriate emergency response actions and equipments (response strategies/ tactics, fire fighting facilities, etc.). A summarised example of IAPs is shown in **Table 8.6.5**. The example of IAPs and their relevant response actions stated therein are not exhaustive.

Table 8.6.5: Summarised Example of Incident Action Plans

Emergency Categories/ Procedures	Response Team	Response Action
Leakage/ Spillage of oil, chemicals, or hazardous substances.	Spillage Response Team (SRT)	<ul style="list-style-type: none"> • Leakage/ spillage containment • Application of cleaners • Removal of contaminated soils • Contact relevant authorities • Investigation on causes of leakage/ spillage; etc.
Discharge of water pollutants or contaminants.	Pollution Discharge Response Team (PDRT)	<ul style="list-style-type: none"> • Containment of discharged pollutant • Application of pollutant removal mechanism • Contact relevant authorities • Investigation on causes of discharge/ emission; etc.
Emission of air pollutants.		
Slope failure or landslide.	Slope Failure Response Team (SFRT)	<ul style="list-style-type: none"> • Evacuation of workers/ nearby receptors • Containment of loose soil • Application of temporary control measures • Contact relevant authorities • Investigation on causes of erosion; etc.
Workplace accidents.	Workplace Accidents Response Team (WART)	<ul style="list-style-type: none"> • Ascertain the extent of injuries • Provide first aid treatment as necessary • Move victim(s) to a safer place upon approval by medical personnel • Contact relevant authorities • Investigation on causes of accidents; etc.

G. Incident Logging and Recording

An incident logging and recoding system should be developed. The means of logging and recoding can be achieved via an incident logging and recording checklist/ form.

H. Notification of External Agencies and Call Out Procedures

Proper call out procedures should be established. This is vital in order to communicate all necessary details with accurate, precise and valuable information in a short span of time.

I. Co-ordination with Emergency Services

It is essential for the Project Proponent to identify the local/ external emergency services available. This would be beneficial during major emergencies which are beyond the capability of the ERT at the work area. Contact information of some external agencies whose assistance may be required during emergency includes, but are not limited to, the following:

Agency	Contact Number
<u>Police Station</u>	
<i>IPD Sungai Lembing</i>	09-541 1222
<i>Pondok Polis Lepar Utara 4</i>	09-474 1716
<u>Hospital</u>	
<i>Jerantut</i>	09-266 3333
<i>Klinik Kesihatan Lepar Utara 3</i>	09-4741794
<i>Klinik Kesihatan Lepar Utara 4</i>	09-474 1523
<u>Jabatan Bomba dan Penyelamat</u>	
<i>Jerantut</i>	09-266 3444 / 222 2444
<i>Maran</i>	09-477 1444
<u>Department of Occupational Safety and Health, Pahang</u>	09-513 2906 / 513 2834
<u>Department of Environment, Pahang</u>	09-516 5211

J. Reporting and Investigation of Incidents

Proper investigation and reporting procedures should be established in order to identify the root causes of accidents and incidents. Preventive and mitigation measures should then be introduced to eliminate the possibility of occurrence of the identified root cause.

K. ECP Maintenance

The ECP should be maintained and updated as and when there are new information available, changes in the organisation and introduction of a new system or hazardous substance to the site.