CHAPTER 9

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

9.1 INTRODUCTION

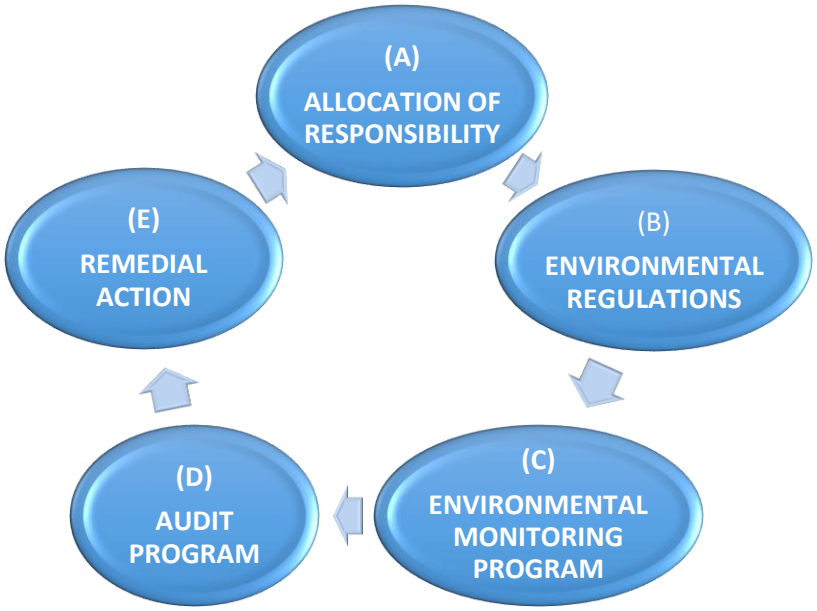
The formulation of the Environmental Management Plan (EMP) is a crucial step to ensure that any adverse impacts to the existing environment can be controlled. The EMP provides a framework for dealing with the pollution risks associated with the project site preparation and operation to ensure that appropriate measures are taken to handle issues that have been identified as significant and most likely to arise throughout the whole development. It functioned as an effective tool to minimize the environmental impacts that are imposed by the development.

The EMP comprises a structured plan for mitigation of predicted environmental impacts, for Environmental Monitoring and Environmental Auditing. It will be then applicable to all contractors and their employees working in the project site.

The objectives of the EMP are as follows:

- To manage the environmental impacts arising during the proposed project activities
- To ensure the effectiveness of environmental protection/conservation measures proposed
- To ensure the project compliance with the overall project environmental objectives

These objectives will be achieved by means of in-place operational controls, environmental monitoring, inspections and auditing activities. The following are specific components of the EMP:



a) Allocation of Responsibility

This section describes all the roles and responsibilities of top level management and officers. They are responsible in managing the environmental issues of the proposed project site. It will cover the responsibilities of project proponent, project developer and project consultant.

b) Environmental Regulations

While in this section, it describes all about the rules and regulations involved, which the project proponent has to abide by pertaining to the project. It will cover water quality, atmospheric emissions, wastewater discharges, noise level, air, solid wastes and landscaping.

c) Environmental Monitoring Program

The main purposes of the environmental monitoring program are:

- To provide a database aligned with any short or long term environmental impacts of the project that can be determined by;
- To provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standard.

d) Audit Program

Audit program represent the efforts of the project proponent with the intention of monitoring the implementation of environmental protection measures by the contractors as specified in the construction specifications and contract documents. An audit checklist shall be developed and distributed. It will be then briefed to the contractors and all personnel that are responsible for the environmental protection activities.

Besides that, an independent specialist group should be engaged to closely monitor the project development for carrying out the audits. In order to attain the good forest management plan, the forest plantation certification is advised to be applied. Forest Certification is a tool that verifies and certifies on-ground implementation of forest management according to a set of predetermined requirements based on an independent assessment on the quality of the forest managed. One of the forest certification in Malaysia is:

MC&I (Forest Plantations)

- The Malaysian Criteria and Indicators for Forest Management Certification (Forest Plantations) or known as MC&I (Forest Plantations) is one of such tool used for assessing forest plantation practices of a designated forest plantation management unit (FMU) for timber certification. There are 10 MC&I principles to be achieved to attain the certification.

e) Remedial Action

Below this section, it is outlined a specific construction activities in the proposed project site and address work specifications and codes, and adherence to specific work practices and ethics to avoid or minimize any damage and interference to watercourses or drainage systems, utilities, structures, roads or other properties, public or private vehicular or pedestrian access, and trees or any exclusive areas such as graves, monuments, altars etc.

9.2 MAINSTREAMING OF ENVIRONMENTAL AGENDA AND SELF-REGULATION CULTURE

Self-regulation has been adopted by the Department of Environment (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. On a wider perspective, self-regulation which complements the existing command and control approach of the DOE would result in cultivating environmental ownership and excellence in environmental commitment from the regulated sectors.

This section is dedicated to the discussion of the roles, functions and core duties of the various players involved in a development project: the Project Proponent, the EIA Consultant, and the Environmental Officer (EO). The project organization charts are presented in **Chapter 1 Figure 1.1.1**. The organization chart presents the organization structure and line the responsibility of the key personnel and organization for the environmental management of the project.

9.2.1 General Considerations

Legal responsibility rests on the shoulders of the project proponent hence he shall be totally committed towards ensuring regulatory compliance of his project with the EIA procedure at all stages of project planning and implementation. The project proponent is the key driver for ensuring the success self-regulation approach in environmental management through the mainstreaming of environmental agenda throughout his project implementation phases. The project proponent shall ensure top-down organizational commitment to environmental regulatory compliance to all personnel, at all levels of the organization, including the registered EIA consultant, the EO, the contractors, and other parties involved in the project implementation.

To exercise quality control and ensure regulatory compliance, the following general considerations shall be taken:

a) In a situation where the service of an EIA consultant firm is required, the project Proponent may appoint a DOE-registered EIA consultant firm to provide advice on the EIA procedure and to act on his behalf for communication with the DOE. The consultant firm is composed of EIA team members who are registered with the Department of Environment. The members comprise various EIA subject matter consultants (SMC) who are relevant to the project proposal.

b) During the stage of pre-submission of EIA Report, the project proponent is responsible to ensure a proposed project is screened to determine whether an EIA is necessary, since the project may fall under a 'prescribed activity" classified either under the First Schedule or the Second Schedule of the Environmental Quality (Prescribed Activity) Environmental Impact Assessment Order 2015.

In the course of EIA Report preparation, the project proponent shall take into consideration of the alternatives, demonstrate commitment to ensuring the successful conduct of the EIA study and implementation of measures to mitigate the significant impacts as recommended by the EIA Consultant. This is accomplished by allocating sufficient funds for the above purposes. The funds shall cover the cost required for all activities associated with the EIA study, and preparation and implementation of environmental management plan (EMP) and pollution prevention and mitigation measures (P2M2).

c) In the conduct of EIA study, a comprehensive site survey and investigation of the existing site conditions shall be made to provide crucial data of the study area which are necessary for planning considerations, formulating scope of work, and ensuring effective selection and design of pollution prevention and mitigation measures (P2M2).

d) During project implementation, wherever necessary, consideration shall be made by the Project Proponent to appoint a consultant to supervise the implementation of pollution prevention and mitigation measures (P2M2).

Specific considerations which shall also be taken into account during each stage of project implementation are enumerated below.

9.2.2 Roles and Core Duties of Different Players

A. The Project Proponent

i. Major Roles of Project Proponent

The project site will be managed by Project Developer, Samasuka Sdn. Bhd appointed by Project Proponent, Liput Raya Sdn. Bhd. 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 PP include the following:

a. 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.
b. 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.
c. 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.
d. Appointing an Environmental Officer (EO), at the stage of post submission of EIA Report need to be commit with responsibilities to execute environmental quality

control and performance monitoring functions during the construction and operation phases of the project implementation. Service of an EO can also be obtained from an Environmental Officer Service Provider. Service of EO from EO service provider is allowed during the construction stage only. However, at the operational stage, the Project Proponent shall employ his own EO.

e. Establishing a Project Environmental Performance Monitoring Committee (EPMC) to monitor the environmental performance, effectiveness of pollution prevention and mitigation measures (P2M2), and status of regulatory compliance of the project. The EPMC 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. The EPMC shall meet at a minimum, once in a quarter and the minutes of the meeting shall be maintained.
f. Setting up a "mini laboratory", wherever appropriate, to facilitate the implementation of environmental performance monitoring program. This mini laboratory shall be adequately equipped with relevant resources including staff and portable analytical testing equipment.
g. 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.

ii. The other Roles of Project Proponent

Liput Raya Sdn Bhd as a project proponent will designate a Coordinator who is responsible for environmental matters and will work closely with the environmental consultant and contractor. The Coordinator will report to the PP on a weekly basis.

In the event of a breach of the environmental criteria limit or non-conformances observed on site, the Coordinator will be notified immediately. The Coordinator will proceed to implement the necessary remedial action and formally inform the Project

Proponent on the cause, nature, and extent of breach and the actions taken to rectify the situation. The responsibilities of Liput Raya Sdn Bhd (project proponent) are as follow:

- To ensure that the Contract Documents include provisions for compliance with environmental requirements. The Environmental Quality Act, 1974 and other subsidiary legislation and guidelines shall be used as reference.
- To allocate an adequate budget for implementing the EMP.
- To organize a structure for Environmental Management for the project, with clear defined roles and responsibilities, and reporting mechanism.
- To establish a system to respond promptly to public complaints.
- To review periodically, the overall monitoring program with respect to monitoring locations, frequency, parameters, environmental controls and mitigation measures, and revise if necessary.
- To conduct meetings with the project Proponent and Contractor to review environmental performance of the proposed works and to identify any improvements in working practices to avoid breaches of limit levels.

Project Manager will be responsible for overseeing the construction works and for ensuring that they are undertaken by the Contractors in accordance with the specification and Contractual requirements. The project manager will serve pivotal roles throughout all phases of the project by providing input on matters pertaining to:

- Ensure the correct techniques and methods are applied in all works on site.
- Monitor the Contractor’s compliance with contract specification, including effective implementation and operation of environment mitigation measures and other aspects of the monitoring program.
- Instruct Contractor to follow the agreed protocols or those in the Contract Specification in the event of ascendances or complaints.
- Ensuring the work is within the scope of the contract and other tender condition.

Estate Manager will designate Assistant Estate Manager who shall lead the environmental management team in managing the project and the surrounding environment. He will also have ultimate on-site responsibility for the execution and compliance with the specifications set in the EIA/EMP. The Assistant Estate Manager shall report to the Estate Manager.

Additionally, the relevant contractors shall be responsible in maintaining all plantation area and equipment in good and efficient working order, in compliance with the manufacturer's recommendation. Regular maintenance will help minimize excessive noise and exhaust emissions generated by this machinery. The contractors should use quieter construction methods, if practical and cost-effective.

B. The Environmental Consultant

The Environmental Consultant (the registered EIA Consultant) plays a major role in the preparation of this EIA report and environmental monitoring programs in accordance with the objectives and requirements of the EIA, whilst ensuring compliance with the relevant regulations and standards. The registered EIA Consultant is the key person who is entrusted with the responsibilities for ensuring environmental impacts from a project are correctly identified, assessed, and mitigated. The roles and core duties of the EIA Consultant include the following:

- Preparing the Terms of Reference (TOR) for EIA study of a project proposal.
- Performing quality control (QC) to ensure the quality of EIA Report meets the requirements of DOE and hence, is fit for submission.
- Preparing and defending the EIA Report of a project. Preparing the Environmental Management Plan (EMP).

C. The Environmental Officer

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 include the following:

a) Implementing the environmental management plan (EMP), and installing the temporary and permanent pollution prevention and mitigation measures (P2M2).
b) Preparing Environmental Performance Monitoring Document (EPMD). PMD describes in detail how EIA approval conditions are going to be complied and how performance monitoring of the various pollution prevention and mitigation measures (P2M2) will be conducted to ensure the optimal functionality of the P2M2 is maintained. The details shall include, among others: performance monitoring equipment/instruments, sampling protocols and analysis, monitoring parameters, sampling frequency, preventive and corrective maintenance procedure for the P2M2, discharge compliance, record keeping, etc. EPMD also includes compliance monitoring (CM) and impact monitoring (IM) wherever relevant.
c) Performing or supervising the conduct of performance monitoring (PM) program as specified in the PMD. Preparing Performance Monitoring Report (PMR). PMR discusses the results of the performance monitoring conducted as described in the PMD. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness of the pollution prevention and mitigation measures (P2M2) by making comparison of the performance monitoring parameters with their recommended ranges (or standards). Statistical techniques and graphical presentation of the performance monitoring parameters should be used wherever appropriate. PMR shall also make some definitive conclusions on the overall performance of the P2M2 and suggest improvement measures to be taken if necessary. PMR shall be submitted to the Environmental Performance Monitoring Committee (EPMC) as established by the project proponent for the EIA Project and maintained for the inspection of the DOE officers.

d) Communicating the status of environmental regulatory compliance of the project during construction and operation phases to the project proponent.

e) Maintaining a detailed record of major upset conditions encountered, if any, for the duration of the project construction and operation phases. The date of occurrence, nature and causes of upset conditions, and the corrective actions taken shall be recorded. Upset conditions refer to failures of pollution prevention and mitigation measures (P2M2) which result in noncompliance with the EIA approval conditions or discharge/emission standards, or pollution that affects the immediate neighborhood or seriously threatens the environment or public health and safety.

f) 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 RELATED COMPLIANCE MONITORING (CM)

9.3.1 Water Quality

Classes of water quality for inland surface waters as recommended in the National Water Quality Standards for Malaysia (NWQS) are presented in **Table 9.3.1**, while **Table 9.3.2** shows water classes and its uses.

Table 9.3.1: NWQS for Some Parameters Concern

PARAMETER	CLASSES					
	I	IIA	IIB	III	IV	V
DO (mg/l)	7	5-7	5-7	3-5	3	<1
pH	6.5-9	6.5-9	6.5-9	5-9	5-9	-
BOD5 (mg/l)	8.5	3	3	6	12	>12
COD (mg/l)	10	25	25	50	100	>100
TSS (mg/l)	25	50	50	150	300	300
NH3-N (mg/l)	0.1	0.3	0.3	0.9	2.7	2.7
Turbidity (NTU)	5	50	50	-	-	-
Oil & Grease (mg/l)	Natural levels	40;N	40;N	N	-	-
***E.coli* (count/100 ml)**	10	100	400	500 (20000) a	5000 (20000) a	-

Source: Department of Environment, Malaysia

Note:
TSS : Total suspended solids
NH3-N : Ammonical nitrogen
a : Maximum not to be exceeded
N : Free from visible film, sheen, discolouration and deposits.

Table 9.3.2: Water Classes and its Uses

CLASSES	USES
I	Conservation of natural environment Water Supply I - Practically no treatment necessary Fishery I - Very sensitive aquatic species
IIA	Water Supply II - Conventional treatment Fishery II - Sensitive aquatic species
IIB	Recreational use with body contact
III	Water Supply III - Extensive treatment required. Fishery III - Common, of economic value and tolerant species; livestock drinking
IV	Irrigation
V	None of above

Source: Department of Environment, Malaysia

9.3.2 Air Quality

The Department of Environment (DOE) has adopted some recommended guideline levels (Malaysian Ambient Air Quality Standard 2020) for a number of pollutants including Particulate Matter with the size of less than 10 micron (PM_{10}), Particulate Matter with the size of less than 2.5 micron ($PM_{2.5}$), Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ground Level Ozone (O_3) (**Table 9.3.3**).

Open burning of any waste must be strictly prohibited. Any emission towards the atmosphere needs to comply with new Malaysian Ambient Air Quality Standard 2020. The appropriate signage to this effect must be installed within the project site where applicable and must be clearly visible to all workers. The installation of fuel burning equipment e.g. temporary generator sets is prohibited without prior written approval from the DOE (Regulations 5).

Table 9.3.3: Recommended Malaysian Air Quality Guidelines 2020

POLLUTANT	AVERAGING TIME	AMBIENT AIR QUALITY STANDARD (2020) (g/m3)
Particulate Matter with the size of less than 10 micron (PM10)	1 year 24 hour	40 100
Particulate Matter with the size of less than 2.5 micron (PM2.5)	1 year 24 hour	15 35
Sulphur dioxide (SO2)	1 year 24 hour	250 80
Nitrogen Dioxide (NO2)	1 year 24 hour	280 70
Ground Level Ozone (O3)	1 hour 8 hour	180 100
***Carbon Monoxide (CO)**	1 hour 8 hour	30 10

Source: Department of Environment, Malaysia

Emissions of black smoke from diesel powered vehicles and construction equipment must comply with the emission limits specified under the Environmental Quality (Control of Emissions from Diesel Engines) Regulations 1996.

9.3.3 Ambient Noise

Noise generated during construction phase is governed by The Planning Noise Limits and Control. Protection of site personnel from the effect of excessive exposure to noise falls under the Department of Occupational Health and Safety (DOSH) via the *Factories and Machinery (Noise Exposure) Regulations 1989*. The noise emitted from motor vehicles is controlled under the *Environmental Quality (Motor Vehicle Noise) Regulations 1987*. **Table 9.3.4** presents The Planning Noise Limits and Control.

Table 9.3.4: The Planning Guidelines for Environmental Noise Limits and Control (Schedule 1: Maximum Permissible Sound Level (LAeq) by Receiving Land Use for Planning and New Development)

RECEIVING LAND USE CATEGORY	DAY TIME 7.00 A.M – 10.00 P.M	NIGHT TIME 10.00 P.M – 7.00 A.M
Noise Sensitive Area, Low Density Residential, Institutional (School, Hospital), Worship Areas.	50 dBA	40 dBA
Suburban Residential (Medium Density) Areas, Public Spaces, Parks, Recreational Areas.	55 dBA	45 dBA
Urban Residential (High Density) Areas, Designated Mixed Development Areas (Residential – Commercial)	60 dBA	50 dBA
Commercial Business Zones	65 dBA	55 dBA
Designated Industrial Zones	70 dBA	60 dBA

Source: Department of Environment, Malaysia

9.3.4 Solid Wastes

Solid wastes are controlled by the *Local Government Act 1976* and *Refuse Collection, Removal and Disposal By-laws* under the Act. The Act enables Local Authorities to prohibit deposition of waste in streams, watercourses and public drains (Section 69). The by-laws specify that commercial and industrial waste maybe collected and disposed of on a fee basis prescribed by local authorities. Contravention of the by-laws is an offence.

The Solid Waste and Public Cleansing Management Act 2007 provide and regulate the management of controlled solid waste and public cleansing for the purposes of maintaining proper sanitation and for the matter of incidental. Under section 71 (2) of the Act clearly stated that all controlled solid waste shall be deposited, treated, kept, stored or disposed of only at solid waste management facilities licensed under this Act.

The controlled solid waste means any solid waste falling within any of the following categories:

a. Development solid waste
b. Imported solid waste
c. Public solid waste
d. Solid waste prescribed from time to time.

Project proponent will be responsible for ensuring that solid wastes generated on site shall be the domestic waste (worker's quarters and site offices) are properly stored and then transported and disposed of at approved disposal sites.

9.3.5 Scheduled Wastes Management

The management of scheduled waste generated on the project site will guide following the rules and regulations set in *Environmental Quality (Scheduled Wastes) Regulations 2005*. According to this regulation, scheduled waste can be defined as "any waste falling within the categories of waste listed in the First Schedule".

The Regulation 8 (1) describes the responsibilities of the project proponent which shall ensure that the scheduled wastes generated are properly stored, treated on-site, recovered on-site for material or product from such scheduled wastes or delivered to and received at prescribed premises for treatment, disposal or recovery of material or product from scheduled wastes.

In addition, the Regulation 9 (1) of this Act describes that any scheduled wastes shall be stored in containers which are compatible with the scheduled wastes to be stored, durable and which are able to prevent spillage or leakage of the scheduled wastes into the environment.

These Regulations introduce the "cradle to the grave" waste management concept whereby a historical record is maintained providing documented details of the life-cycle of the waste from its generation through to its ultimate disposal. Specific requirements can be referred at *Environmental Quality Act 1974* under *Environmental Quality (Scheduled Wastes) Regulations 2005.*

9.4 PERFORMANCE MONITORING (PM) PROGRAM

The scope under the proposed monitoring program comprises the following key tasks:

- Site inspection to assess the current progress of construction works on site
- Monitoring of water quality, discharge from silt traps, air quality and noise levels to assess environmental conditions against work progress and intensity
- Analysis of the monitoring results and formulation and recommendations on suitable measures for areas of non-compliance and/or enhancement of environmental quality

Based on the information described, it is recommended that environmental impact monitoring of the project shall be implemented according to the following sampling locations, frequency of sampling and analytical methods.

9.4.1 Air Quality Monitoring

Air quality monitoring is important during the development stage of the project. Basic climatic data should be collected in conjunction with the air quality measurements. This should include ambient conditions during monitoring such as wind speed and direction, temperature and description of the general climatic conditions. This information can assist in the interpretation of the air quality data (e.g. wind speed and direction will assist in determining the degree of air mixing occurring and may help to qualify the importance of any contaminant concentrations that may be detected).

As a minimum requirement, some of the parameters (as per requested by DOE) specified in the DOE's ambient air quality guidelines shall be monitored. All records of monitoring shall be kept and presented to the authorities upon request.

There are three (3) air quality stations at the proposed project site that will be monitored during the development of the project. The locations for air quality monitoring station are as shown in **Chapter 6** (**Table 6.3.11**). The air samples will be collected from a fixed point by drawing the air from the surrounding area through absorbing media via a pre-calibrated portable pump stationed at the fixed points.

Air Quality Monitoring Frequency

Air quality monitoring during the construction phase will be carried out at three (3) locations. A quarterly monitoring frequency is proposed during the construction phase. This is to ensure that dust suppression measures for potentially dusty construction activities; and vehicle movement are implemented. The monitoring exercise will also ensure regular maintenance of construction vehicles and equipment and prevent excessive noxious exhaust emissions.

9.4.2 Water Quality Monitoring

Monitoring is intended to determine compliance with specified procedures and instructions with regards to environmental quality control. It is imperative that the project proponent monitor the results of the water quality monitoring closely, especially during the project development phase, and to take corrective actions whenever and wherever deterioration of the water quality occurs which can be ascribed to the project development.

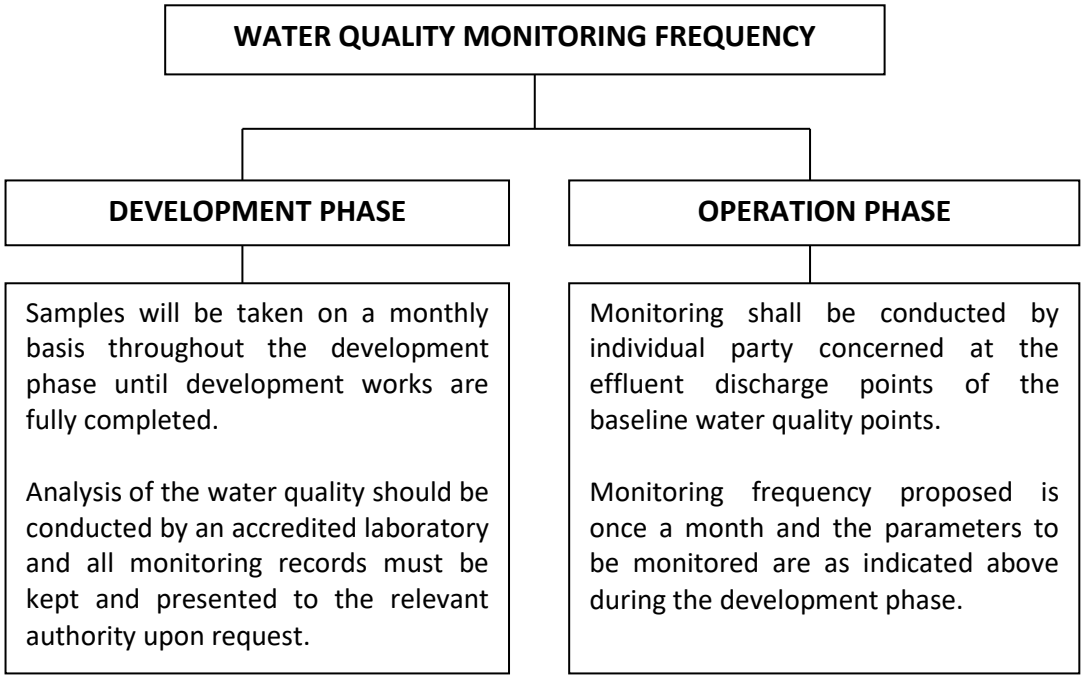
Below are the recommendations for the preservation of water quality in the project area.

- Monitoring of the water quality is carried out at least once a month during land preparation and construction phase and also normal operations and maintenance phase. The water quality sampling stations are as shown in **Figure 6.3.13**, **Chapter 6**.
- The water quality monitoring points should include all of the sampling stations.
- All the stations will be selected based on the following criteria:

1. Potential impacts due to Project development to aquatic environment, water resources and water for human uses
2. Upstream and downstream of potential impact area
3. Upstream of water intake point/water treatment plant

<u>Water Quality Monitoring Frequency</u>

There are two phases involved in water quality monitoring frequency which are development phase and operation phase as shown in **Figure 9.4.1**. Water quality monitoring at twelve (12) locations at the proposed project site will be monitored.



Note: Development Phase: Forest Plantation; Operation Phase: Field Maintenance Phase

Figure 9.4.1: Water Quality Monitoring Program

9.4.3 Noise Level Monitoring

Three noise monitoring stations are proposed in the project site. **Chapter 6** (**Table 6.3.12**) shows the locations of the noise monitoring stations.

Noise Level Monitoring Frequency

Noise monitoring will be carried out three (3) locations at daytime and night time during the development phase. It is proposed that monitoring will be carried out on a quarterly basis during development phase.

9.5 ENVIRONMENTAL AUDIT PROGRAM

The environmental audit program is proposed to track and ensure the enforcement of specified environmental protection and pollution control measures. The audit should be undertaken regularly by the audit team to ensure that the appropriate environmental protection and pollution control mitigation measures are properly implemented. The main points of audit program are:

- Include the general environmental conditions in the vicinity of the site
- The pollution control and mitigation measures within the sites
- Environmental condition outside the site area which is likely to effected, directly or indirectly by site activities

It should also review the environmental condition outside the site area which is likely to effected, directly or indirectly by site activities. The audit team shall make reference to the following information in conducting the audit:

- The EIA approval condition from DOE
- The EIA recommendations on environmental protection and mitigation measures

The audit findings and their associated recommendations on improvements to the environmental protection and mitigation measure shall be submitted to the project proponent for taking immediate action. The contractor shall follow the procedures and time frames stipulated in the environmental audit for the implementation of the mitigation proposal. An action reporting systems shall be implemented to report on any remedial measures implemented subsequence to the environmental audit.

All auditors must be registered with DOE. Auditor for the construction stage should also pose the CESSWI Certificate (competency to inspect and sedimentation control plan).

9.6 REMEDIAL ACTION

As mentioned earlier, the EMP consists of measures that are proposed to mitigate potential adverse impacts through guidelines/procedures to be followed in compliance with the regulations imposed by the authorities.

9.6.1 EMP during Development Phase

The recommended procedures to be followed by the project developer are as listed in **Figure 9.6.1**:

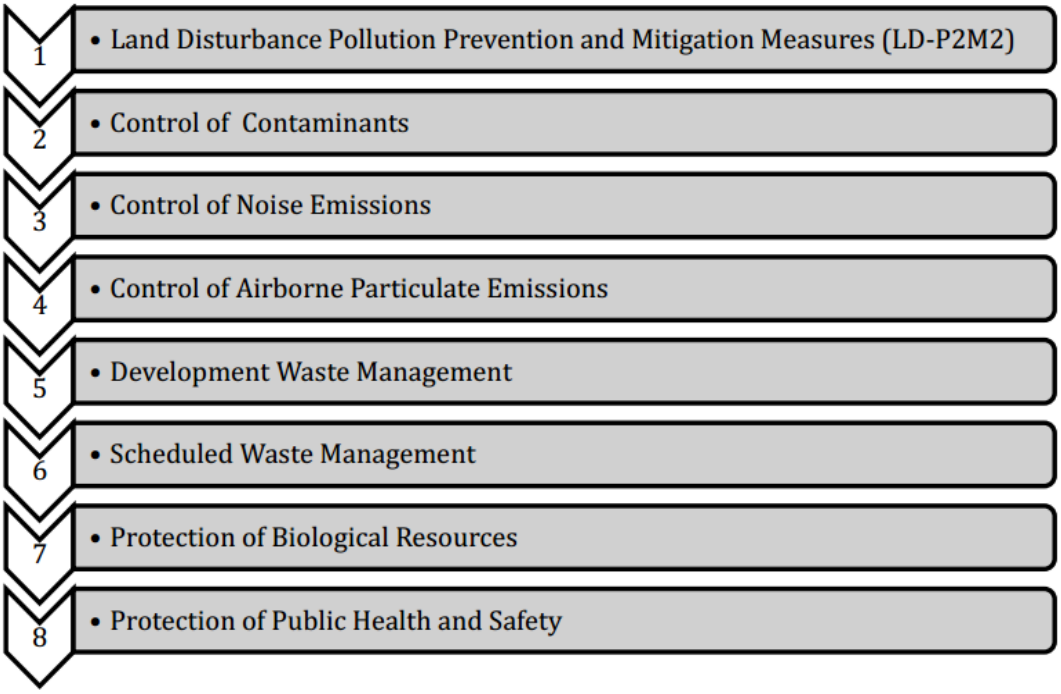


Figure 9.6.1: Eight Elements of EMP during Development Phase

a. Land Disturbance, Pollution Prevention and Mitigation Measures (LD-P2M2)

As part of the design, drawing of LD-P2M2 that will be undertaken during development shall be prepared. These shall be followed the requirement by DOE. The sedimentation measures carried out during the development phase shall at a minimum consist of following:

- The construction of the temporary earth drain, check dam and sedimentation/retention pond within all the drainage basins on site
- The use of silt traps where appropriate
- The use of interim vegetative ground covers in areas where site development have been suspended for a period of more than two months
- Carry out the de-silting works in check dam, silt trap and retention pond regularly

Development activities shall be minimized during days when significant rainfall occurs and a temporary drainage network should be provided. This is to route surface runoff to sediment ponds. Maintenance in term of de-silting sediment from drains and retention ponds is necessary. Re-vegetation of an exposed land should also be carried out as soon as possible.

b. Control of Contaminants

Fuels, lubricants and solvents that are required for establishment machinery must be stored in an orderly procedure within specially designated and clearly marked areas on-site. In addition, the agrochemicals, fertilizers and pest control for the trees growth shall also be placed in the proper place. All liquid containers shall be kept in containment wall to avoid any spillage to any soil or water body. Liquid containers shall be kept in good condition at all times and leaking containers shall be replaced or repaired immediately. Such storage areas shall not be located within 100 meters from any stream, pond or other water body on-site.

None of the following shall be allowed within 100 meters of any stream, pond or other water body on-site:

i. The containers used for storing the contaminant
ii. Storage of construction/establishment equipment not in use
iii. Any equipment maintenance activities

Any spills of fuels, etc. or leakages from equipment will be contained immediately upon detection of the incident.

c. Control of Noise Emissions

The contractor shall comply with The Planning Guidelines for Environmental Noise Limits and Control at residential areas for both day time and night time. To the degree possible, development works which produce high noise levels should be limited to day time hours, with quieter operations to be carried out at night.

The generation of unnecessary noise during construction shall not be permitted (e.g. the unnecessary idling and reviving of engines).

d. Control of Airborne Particulate Emissions

Open burning of cleared vegetation, debris and development waste shall not be allowed unless prior approval is obtained from Director General of Department of Environment. The zero burning technique shall be practiced throughout the project development phase. On-site roads should be sprayed with water mist during times when significant visible dusting occurs due to vehicle movements.

Any soil loads being transported to or from the site shall be securely covered to prevent spillage or dusting. During development activities is being carried out, any paved public road used as access to the site shall be visually inspected, for at least 1 km in each direction from the site entrances and exits, at least 3 times per week for significant accumulations of dirt. Significant accumulations of soil on roadways arising from site related traffic shall be removed as necessary.

Construction vehicles shall be kept free of significant accumulations or dirt (including bodies, undercarriages, and wheels) while on public roadways. Vehicle washing bay should be provided at the exit / entrance points of the site.

e. Development Waste Management

Development wastes will be stockpiled in an orderly procedure at designated locations on-site. Wastes will be removed from the site and disposed off at a licensed facility on a routine basis.

Waste containers and appropriate facilities shall be provided within any construction camps. These facilities shall be serviced and maintained on a frequent and routine basis. The discharge of untreated sewage to existing surface water bodies shall not be permitted.

f. Scheduled Waste Management

The contractors shall ensure that the scheduled wastes generated by them are properly stored. A guideline for packaging, labeling and storage of any scheduled waste in Malaysia published by the Department of Environment (DOE) need to be referred for good practices (**Appendix 13**).

Storage of Scheduled Wastes

Scheduled wastes shall be stored in containers which are compatible with the scheduled waste to be stored, durable and which are able to prevent spillage or leakage of the scheduled wastes to the environment (**Plate 9.6.1** to **Plate 9.6.2**).

Plate 9.6.1: Example of Improper Storage of Scheduled Waste at the Edge of Slope

Areas for the storage of the containers shall be designed, constructed and maintained adequately in accordance with the guidelines to prevent spillage or leakage into the environment. The contractor may store scheduled wastes generated by him for 180 days or less after its generation provided that the quantity of scheduled wastes accumulated on site shall not exceed 20 metric tons.

Plate 9.6.2: Example of Proper Storage of Scheduled Waste Labeling of Scheduled Wastes

The date when the scheduled wastes are first generated, name, address and telephone number of the waste generator shall clearly labeled on the containers that are used to store the scheduled wastes. The containers of the waste shall be clearly labeled in accordance with the types applicable to them as specified in Third Scheduled and mark them with proper code as specified in First Scheduled for identification and warning purposes. It is prohibited to alter all the markings and labels as described in this Act. **Figure 9.6.2** shows the example of proper labeling of scheduled waste.

Figure 9.6.2: Example of Proper Labeling of Scheduled Waste

Disposal of Scheduled Wastes

Any scheduled wastes identified will need to be disposed by a licensed transporter at a recycling facility operated by a licensed scheduled waste contractor. The disposal of scheduled wastes is not considered to be a key issue for this project.

Used oils are classified as scheduled waste under Environmental Quality (Scheduled Wastes) Regulations 2005. Improper management and disposal of used oils can lead to serious contamination of the watercourses. **Plate 9.6.3** shows the storage tanks for waste oil. The capacity of the containment should be 110% of the largest containers stored. The types of oil wastes generated from the maintenance yard are classified and already mentioned in **Chapter 7**.

Plate 9.6.3: Storage Tanks for Waste Oil. The Capacity of the Containment Should be 110% of the Largest Containers Stored

g. Protection of Biological Resources

The site workers shall not be permitted to harm any animal, bird, reptile or amphibian encountered during the project construction phase. However, there are no extinct species recorded within the proposed project site.

h. Protection of Public Health and Safety

A written public health and safety plan shall be prepared and established during the construction phase. The plan constructed in order to mitigate any risk involving the health and safety of the workers and the public within the proposed project site. The plan will be made available for review by the DOE upon request. The plan shall address the followings:

1) Site security during day and night;
2) The proposed storage practices for fuels, solvents and other hazardous materials;
3) The safety practices that will be followed by the drivers of vehicles using adjacent public roads.

9.6.2 EMP During Operational Phase

The guidelines and procedures for the main activities during this phase are as listed below:

a. Waste Management

Prior to handling over to local authority, non-hazardous and domestic solid wastes should be managed properly by ensuring regular collection of wastes. Adequate and strategically located collection areas should be provided. All solid wastes should be disposed off at approved landfill sites.

b. Wildlife Management

The project management will discuss with the authority in any suitable preventing actions and get endorsement from the authority to practice any problem solving solution methods which might infringe the law. Prior to conduct any actions, consultation from the PERHILITAN would be sought.

9.7 WILD BOAR STRATEGY PROGRAMME

The management of wild boar will be executed to prevent the encroachment into the plantation. The plan is necessary, to avoid case of wild boar species creating chaos in the plantation, which involved destroy of trees or loss of lives.

This species is known to damage crops. They uproot large areas of land, eliminating native vegetation and spreading weeds. Once there is a report on wild-boar encroachment, the competent authority has to be notified (e.g. PERHILITAN), and then a response team should be mobilized to the project area. Actions needed for effective programme are;

i. Confirm identification of species/track and sign.
ii. Carry out survey and produce distribution map indicating the location of the species across the site. Include all designated sites on maps produced.
iii. Notification to relevant agencies is required.
iv. Talk to the adjacent land owners and make them aware of the program.
v. Be conscious on health and safety.
vi. Identify disposal options for animals culled during the program.
vii. If applicable ensure all plantation staffs and nearest public are aware of the action plan and report sighting.

A program of wild boar eradication (e.g. hunt and shoot) should only be undertaken by suitably qualified personnel with appropriate firearms. Points to note when undertaken a program of control are;

i. Continual shooting may disperse the animal to new areas.
ii. Dictating a programme for public and personnel safety on site.
iii. Ensure that the hunting team adopt and follow an appropriate code of good practice.
iv. Shooting from stationary vehicles and night hunting with use of lamps is necessary.

Any wildlife conflict encountered in plantation must be immediately reported to PERHILITAN Pahang, or the complaint can be made online or phone call as mentioned in **Chapter 9** – **Subchapter 9.10.3**.

9.8 TAPIR AND SUN BEAR MITIGATION STRATEGY PROGRAM

The adjacent forest area is habited by tapir and sun bear. These animals encroachment are possibly to happen on the project site. In order to cater to the potential problems, the PERHILITAN have to be included in the management of the wildlife of the area.

In addition, tapir mitigation strategy program is an essential for the project site to refer to the Malay Tapir Conservation project which established by PERHILITAN respectively.

Land preparation activities now affect many lowland forest areas. Malaysia is the world's leading exporters of tropical hardwoods, and most of these tropical hardwoods originate in sun bear habitat. As lowland forest habitats become fragmented due to resource extraction and human settlement, it is reasonable to assume that sun bear populations in much of their remaining ranges are now fragmented and in many cases isolated due to human activity.

The proposed component of the tapir and sun bear mitigation strategy program describes as follows:

a. Cooperation with Department of Wildlife and National Parks (DWNP)

   The Project Proponent shall be responsible to cooperate and seek advices with the DWNP on any plans involving the mitigation of encroachment by the tapir and sun bear.

b. Consultation for the construction of Ditch

   For the construction of ditch, the Project Proponent shall consult the DNWP on the best location, material used, effective protection and the cost of implementation.

c. Planning the Contingency Plan

The Project Proponent shall draft a contingency plan in the case of tapir or sun bear creating chaos in the project site.

d. Project Proponent Prevention Action

Any appropriate prevention action can be proposed by the project management and endorsed by the authority prior to the implementation for any methods which might infringe the law.

Plate 9.8.1: Example of Signage for Tapir

9.9 FIRE FORTIFICATION PLAN

Open burning is prohibited under the law (Environmental Quality Act, 1974), Section 29A "Prohibition on Open Burning":

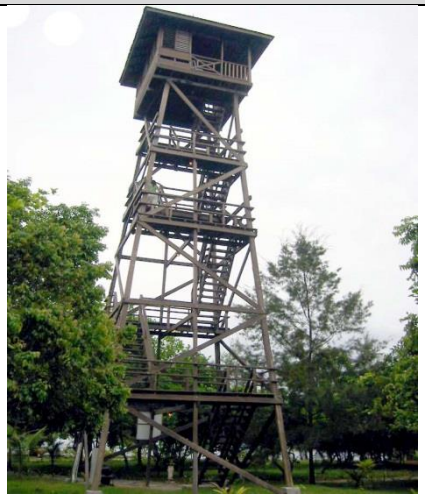
(1) Notwithstanding anything to the contrary contained in this Act, no person shall allow or cause open burning on any premises.

(2) Any person who contravenes subsection (1) shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding five hundred thousand ringgit or to imprisonment for a term not exceeding five years or to both.

This open burning fortification plan outlines the procedure to follow in the event of emergencies during land preparation and operation of plantation activities. It also assigns the responsibilities for its implementation (**Table 9.9.1**). The proposed plan contains all the followings:

- Construct watch tower where the watch tower has to be built on stake with a highest height of the project site.
- Installed open burning warning posts 'No Burning' at the approach and strategic locations along the access road to alert workers at the vicinity of the project site.
- Plantation Management also shall establish the Emergency Response Team (ERT).All staff is responsible to understand ERP and response procedures and evacuation routes and to follow the instructions of the designated Estate Manager. The locations of the Fire Assembly Points should be marked with appropriate signs to clearly indicate its location.
- The ERT should conduct periodical training for the ERP and ensure emergency response equipment are tested were applicable at least once a year. The ERT also should review and revise the ERP at least once a year particularly after the occurrence of accidents or emergency situations.

Table 9.9.1: Signage and Example of Watch Tower for Fire Fortification Plan

DESCRIPTION	PICTURE
Example of Watch tower	

Open Burning Warning Post	
Signage of Fire Assembly Point	

Figure 9.9.1 shows the flow chart for the overall response to a fire emergency and together with the above information should be displayed in appropriate areas.

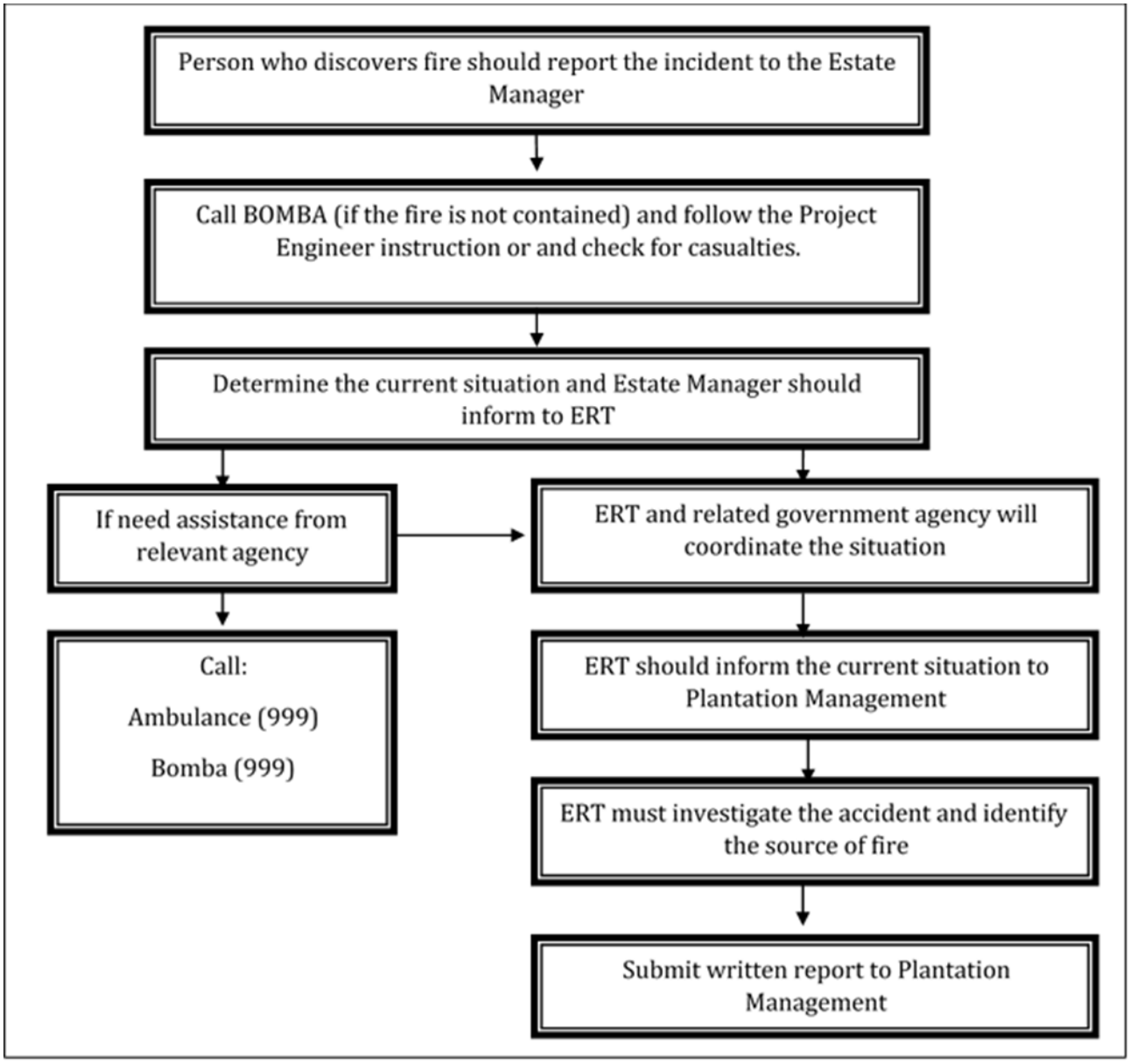


Figure 9.9.1: Fire Emergency Response Flow Chart

9.10 EMERGENCY RESPONSE PLAN (ERP)

An Emergency Response Plan (ERP) is an essential component of a facility's safety and loss strategy. It provides an organized structure for a chain of action to be put into motion in the event of an emergency at the proposed project site. In the context of emergency of the ERP, it is defined as an incident which has the potential to cause injury or loss of life, and/or damage to property and the surrounding environment.

This section outlines the requirements for the preparation of an ERP for the operational phase of the proposed project. The general outline of this plan is not intended to provide specific details on how to handle potential emergency situations but has been included to highlight the salient areas of concern. Once the proposed project commences operation, this plan shall be used as template or guide for the development of a more detailed site specific plan. A description of various actions need to be taken in response to specific emergencies are discussed below.

9.10.1 Objectives of ERP

The main objectives of developing the ERP are:

a) To establish a formalized emergency team and to control and contain any emergency on site through prompt and effective response measures to that its effect is localized

b) To ensure that trapped or injured persons are rescued and given prompt and appropriate medical assistance

c) To control the spread of the damage arising from the emergency situation to the environment including the nearest sensitive receptors

d) To communicate information on the emergency to the relevant facility personnel and the relevant on-site parties, including the Police, Fire and Rescue Department, Department of Occupational Safety and Health (DOSH), Department of Environment (DOE) and the local authority

e) To keep information and records for investigation into the incidents/accidents

f) To restore normality at the proposed project site prior to personnel re-entering the project site after an emergency and resuming work

g) To provide training for all the workers in emergency response management to maintain a high level of preparedness at all times

9.10.2 Basis for Emergency Response Plan

The ERP is a formal document that identifies the potential emergency conditions at the proposed project site and specifies pre-planned actions to be followed and to minimize property and environmental damages and loss of life. The document specifies the actions the facility's management shall undertake to moderate or alleviate the impact from accidents and contains step-by-step procedures and information to assist in issuing early warning and notification messages to responsible emergency management authorities. An emergency response plan generally contains six main elements (**Figure 9.10.1**).

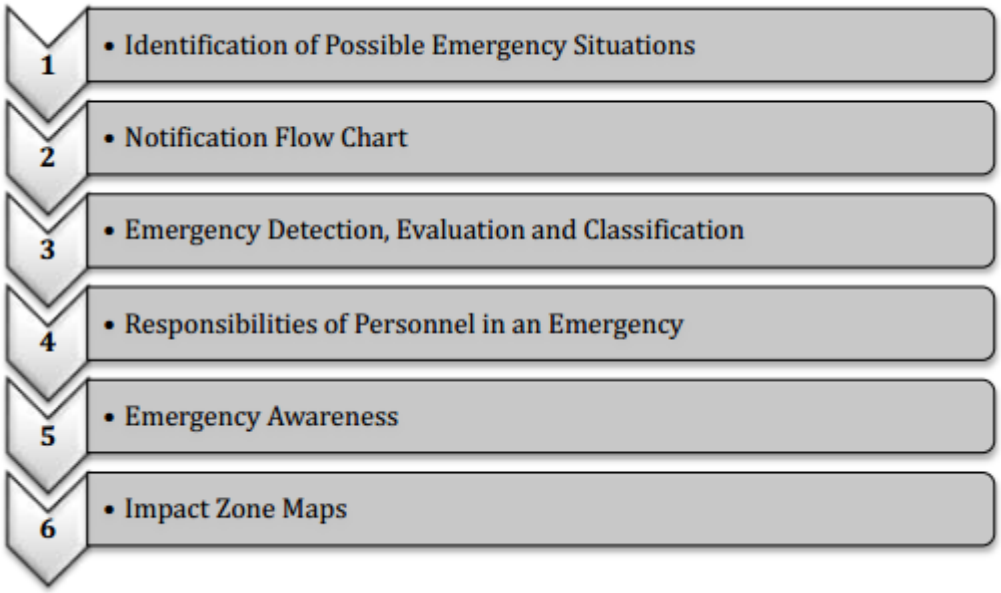


Figure 9.10.1: Six Elements of Emergency Response Plan

a. Identification of Possible Emergency Situations

An emergency identification exercise is to list emergency or hazard or abnormal situations resulting in the operation of the proposed project. From the exercise, the high and medium risks can be identified and the possible incidents documented. The emergency response actions relevant to each of these hazards will be focus of the emergency planning exercise.

b. Notification Flow Chart

A notification flowchart indicates the nominated persons who are to be notified during the emergency and in the order of priority. The information presented on the flow chart is needed to ensure the timely notification of persons responsible for handling the emergency situations.

c. Emergency Detection, Evaluation and Classification

Early detection and evaluation of the situation(s) or triggering event(s) that initiates or requires an emergency action is crucial. The establishment of procedures for reliable and timely classification of an emergency situation is necessary to ensure the appropriate course of action is taken based on the urgency of the situation.

d. Responsibilities of Personnel in an Emergency

A clear definition of the responsibilities of personnel for ERP related tasks must be determined during the formulation of the plan. Project manager or facility operators are responsible for developing, maintaining, managing and implementing the ERP.

The Federal and local emergency management officials have the statutory obligations for warning and evacuating affected areas. The ERP must clearly specify the responsibilities of operator and when/how those responsibilities are transferred to government officials, to ensure timely and effective action.

e. Emergency Awareness

Actions of the ERP are taken to moderate or alleviate the effect of a potential situation and facilities responses to the situations.

f. Impact Zone Maps

Impact zone map delineates the areas that could be affected as a result of accidental events at the proposed project site. Impacted zone maps are used both by the project manager and emergency management officials to facilitate timely notification and evacuation of areas affected by accidental events.

9.10.3 ERP for the Proposed Project

9.10.3.1 Organization

Within the facility management, a Health, Safety and Environmental (HSE) committee has to establish to ensure all issues related to safety, health and environment pertaining to the facility, employees and surrounding environment, are adequately incorporated into the actual implementation of the ERP. However, the setting up of the committee is dependent on the number of persons employed at the facility. If the number is below 40, then the formation of the committee is not required by law.

Upon agreement or acceptance of the proposed ERP by DOE and DOSH, the HSE committee shall ensure that all personnel are familiar with the plan. To ensure workability of the plan, training sessions and regular rehearsals by means of drills have to be conducted.

a. Establishment of 'Local Response Team'

A 'Local Response Team' may be established through the initiation of the nominated HSE Committee. The team would comprise of the relevant from the project proponent, government agencies and local authorities such as the local BOMBA (Fire and Rescue Department), DOSH (Department of Occupational, Safety and Health), and DOE (Department of Environment) (**Table 9.10.1** and **Plate 9.10.1**).

Plate 9.10.1: Example of Signage of Government Emergency Phone List

Table 9.10.1: Internal and External Emergency Phone List

NO	AGENCY	LOCATION	CONTACT NUMBER
INTERNAL (PROJECT PROPONENT & PROJECT DEVELOPER)			
1	Liput Raya Sdn Bhd (Project Proponent) Samasuka Sdn Bhd (Project Developer)	Suite 30, 3A Floor, IOI Business Park, 47100 Puchong, Selangor Darul Ehsan	016-503 3152
EXTERNAL (GOVERNMENT AGENCIES)			
1	Department of Environment (DOE)	Tingkat 4 & 7, Bangunan Seri 30000, Jalan Sultan Idris Shah, 30000 Ipoh, Negeri Perak	05-253 4749
2	Fire & Rescue Services Department (BOMBA)	Jalan Sungkai, 35800 Slim River, Perak	05-452 8444
3	Muallim District Police HQ	Kampung Kurnia, 35800 Slim River, Perak	05-452 8222
4	Slim River Hospital	35800 Slim River, Perak	05-450 8000
5	Department of Occupational, Safety & Health (DOSH)	Tingkat 3, Bangunan Sri Kinta, Jalan Sultan Idris Shah, Perak, 30000 Ipoh	05-242 1925
6	Department of Wildlife and National Parks (DWNP)	Kompleks Pejabat PERHILITAN, Batu 3, Jalan Lintang, 31100, Sungai Siput (U), Perak	05-597 4173

b. Types of Emergency

An emergency is an unforeseen combination of circumstances that disrupts normal operating conditions and poses a potential threat to human life, health and property or the environment if not controlled, it has to be contained or eliminated immediately. Generally, emergencies in the project facility areas can be categorized into the following (**Figure 9.10.2**).

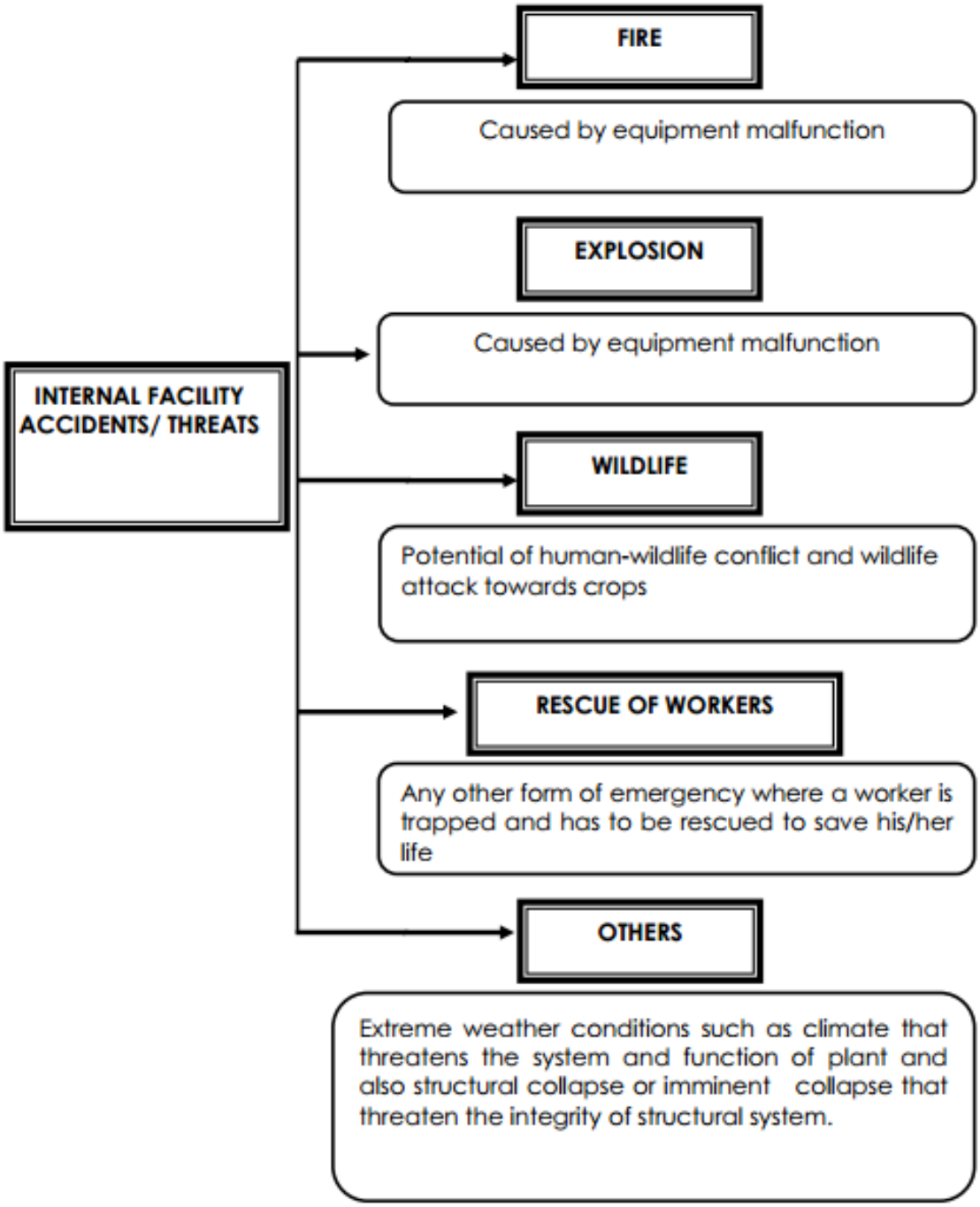


Figure 9.10.2: Categories of Emergencies in Project Facility Area

9.10.3.2 Emergency Classification Levels

Emergencies are classified according to their severity and urgency. An emergency classification system is one means of classifying emergency events according to the different times at which they occur and to the varying levels of severity.

The emergency classification level for the types of emergencies described in the previous section can be further divided into three (3) levels of response. This three level system is proposed as a general principle to activate the type of emergency response and is listed below:

LEVEL 1 (LOCAL LEVEL)

This is an emergency situation where only the transfer stations operations personnel would be required to manage and control the emergency. Level 1 emergency would normally call for the station's own resources and equipment for the response.

LEVEL 2 (AREA LEVEL)

This is an emergency situation which requires action and management by the combined efforts of the in-house transfer station's response teams or any of the relevant government agencies (e.g. BOMBA).

LEVEL 3 (DIVISIONAL LEVEL)

This is an emergency situation where a Level 2 emergency has escalated into an uncontrolled situation and has resulted, or would result in, loss of many human lives, extensive property or environmental damage, and has reached a scale that is beyond the control and capabilities of all response teams combined. Consequently an Evacuation action plan is then needed to be activated.

9.10.4 General Responsibilities of On Scene Commander (OSC) and Emergency Response Team

The purpose of having a nominated emergency response team is to take immediate action to combat the emergency at local level (Level 1). In the event the emergency escalates to Level 2 or 3, the emergency response has to ensure proper actions are taken to control the emergency while waiting for the arrival of external assistance, such as from BOMBA and other external aids.

The emergency response team is led by an On Scene Commander (OSC). The OSC is usually a general officer who has operational control of emergency response forces and supervises all on-site operations at the scene of the accident. He is the responsible person for all decisions relating to the management of the incident. As an OSC, he should be well versed with the transfer station's operation and must have in-depth knowledge on occupational safety and health.

The general responsibilities of an OSC during an emergency are as follows:

- To ensure all emergency response team members are assembled at predetermined location according to their respective responsibilities.
- To assess information and the situation, and decide on the actions to be taken as outlines in the response flowchart.
- To approved changes to the response plan during the event, if necessary. To direct the orderly evacuation of personnel not involved in the emergency response to a safe place.
- To ensure that all personnel are accounted for and coordinate search and rescue.
- To decide raising alarm for external assistance in the event the emergency escalates from Level 1 to Level 2 or 3.
- To coordinate between the team members and the sub-team members.
- To coordinate efficient hand over of firefighting, area containment or other responsibilities upon the arrival of external assistance such as BOMBA
- To assist the external assistance team(s) to combat the emergency event as whenever required.
- To ensure that the incident is recorded and reported to the HSE committee and the necessary government agencies, such as BOMBA, DOSH and DOE.

Typical emergency team members shall acknowledge his/her responsibilities as an emergency response member having pertinent duties and responsibilities in the event of an emergency situation. For each designated position in the team, there should be at least one (1) name assigned and two (2) others as standby.

For the project in particular, the following sub-teams are to be established as part of the emergency response team.

a. Fire Fighting Team

The Fire Fighting Team members should comprise of employees that are familiar and trained for firefighting. Preferably, the team members should be experienced in handling the firefighting equipment.

b. Security Control Team

During an emergency event the Security Control Team will be responsible to maintain order at the premises and ensuring security at all time. This is crucial as there may be presence of outsiders on the site during the emergency event. Some of the responsibility of the Security Control Team is to prevent unauthorized entry during the emergency, control of vehicle movement and providing access to external assistance team(s), take head counts and conducts search and rescue, if needed.

c. First Aid Team

The First Aid team members shall be ideally personnel with basic knowledge of First Aid and CPR. 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 ambulance, depending on its necessity.

d. Communication Team

The communication Team assumes the role of team coordination and providing instructions through the command of OSC. The main responsibility of the team is to ensure the instructions are correctly and timely conveyed to the right party during an emergency. The team will record instructions conveyed out by OSC and received from all parties.

e. Restoration/Remediation Team

The Restoration/Remediation Team is responsible for the recovery of any losses and damages caused by the incident. After overcoming the emergency and the situations has

been secured, the team will investigate the cause of the incident and estimate the damages and losses. It is also the team's duty to propose remedial steps to restore the affected area (with the collaboration of government agencies if required) and proposed the mitigation measures to prevent future occurrence.

9.10.4.1 Emergency Equipment

An emergency response plan must be based on realistic assessment of the availability of the emergency response facilities and equipment. To ensure that the Emergency Response Team is able to control an emergency situation, the team has to be fully equipped by proper facilities and dedicated equipment. It is the responsibility of the Facility Manager with the assistance of HSE committee to ensure its efficiency.