

## EXECUTIVE SUMMARY

### 1.0 INTRODUCTION

This EIA report is prepared for the project titled "**Proposed Development of Clinical Waste Thermal Treatment Plant at Tanjung Langsat, Johor for Souther Medi One Sdn. Bhd.**" (SMOSB). Throughout the report, the project will be referred to as the "Proposed Project" or "SMOSB Project". After the endorsement of Terms of Reference (TOR), this EIA report is prepared for the purpose of EIA approval only but prior to the construction and operation of the clinical waste thermal treatment plant, project proponent needs to have the following approvals:

- i. Environmental Management Plan (EMP);
- ii. Written Permission to construct;
- iii. Written Notification for installation of Air Pollution Control System (APCS);
- iv. Written Notification for new source of industrial effluent discharge or release; and
- v. License to use and occupy prescribed premises.

### 1.1 Project Proponent

The project proponent is Southern Medi One Sdn. Bhd. (SMOSB) proposes to develop a clinical waste thermal treatment plant in Tanjung Langsat, Johor specifically located at the Southern Region of Peninsular Malaysia. SMOSB was established and incorporated as a private limited company. The correspondence address together with the telephone and facsimile number of the person to whom enquiries concerning the EIA is indicated as below:



Address : **Southern Medi One Sdn. Bhd. (SMOSB)**  
Suite 1705, Level 17,  
Menara Landmark,  
12 Jalan Ngee Heng,  
80000 Johor Bahru,  
Johor, Malaysia.

Tel. No. : +607 241 8988/8445 / +6012 359 2105

Fax No. : +607 241 8898

Contact Person : Mr. Anba Nadeson (Director)

Email : anbamedi1@gmail.com, southernmedi1@gmail.com



Environmental Impact Assessment (EIA) for Proposed Development of Clinical Waste Thermal Treatment Plant at Tanjung Langsat, Johor for Southern Medi One Sdn. Bhd.

(Report No: AMR.2018.SMOSB.EIA)

## 1.2 EIA Consulting Firm

The EIA consulting firm for the project is AMR Environmental Sdn. Bhd. (AMR). AMR provides environmental, industrial hygiene, remediation, engineering and laboratory services providing solutions to various problems pertaining to the general and workplace environment, complying with the Department of Environment (DOE) requirements and standards. AMR has been established for more than 17 years since 2001, providing professional environmental consultancy services and it is accredited under ISO/IEC 17025 for Chemical Testing Laboratory. This EIA study is prepared by AMR Environmental Sdn. Bhd. (AMR), with the involvement of various specialised consultants in their areas of expertise. The EIA study team comprises of professionals who are recognized EIA qualified person in their respective field of interest. The correspondence details and contact person of AMR are as below:



Address	: <b>AMR Environmental Sdn. Bhd.</b> AMR Group Building, 29 & 29A, Jalan Pulai Perdana 11, Taman Sri Pulai Perdana, 81110 Johor Bahru, Johor Darul Takzim.
Tel. No.	: +607 520 8334
Fax No.	: +607 520 8554
Contact Person	: Mr. Ammar Mohd Rashid (MD, EIA Project Team Leader)
Email	: enquiry@amr.com.my
Website	: www.amr.com.my

## 1.3 Legal Requirement of Prescribed Activity

Environmental Impact Assessment (EIA) is a statutory requirement for activities which have been prescribed under Section 34A of the EQA. Section 34A (2) of the Act stipulates that any person intending to carry out any of the prescribed activities is required to conduct an EIA study and submit a report to the Director General of Environment for prior approval

A further detail of main prescribed activities to be built at the proposed SMOSB site according to the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 2015 are listed as follows:

### **1) Thermal Treatment Plant (Second Schedule of Prescribed Activity)**

#### **14. Waste Treatment and Disposal:**

##### **(a) Scheduled Waste:**

##### **(i) Construction of Thermal Treatment Plant**

### **3) Industrial Effluent Treatment System (First Schedule of Prescribed Activity)**

#### **14. Waste Treatment and Disposal**

##### **(a) Scheduled Waste:**

##### **(ii) Construction of Wastewater Treatment Plant (off-site)**

According to the Environmental Impact Assessment (EIA) Guidelines in Malaysia, 2016, the Proposed Development of Clinical Waste Thermal Treatment Plant warrants the preparation of an Environmental Impact Assessment (EIA) report to be submitted and approved by the Director General of Department of Environment (DOE) [*Section 34A(2) of the Environmental Quality Act 1974 (Act 127)*]. The EIA study and report shall be undertaken in accordance to the Environmental Impact Assessment (EIA) Guideline in Malaysia 2016 published by the DOE.

## **2.0 TERMS OF REFERENCE OF EIA STUDY**

The TOR report entitled "Proposed Development of Clinical Waste Thermal Treatment Plant at Tanjung Langsat, Johor for Southern Medi One Sdn. Bhd." has been submitted to DOE Headquarter, Putrajaya on 2nd January 2018. A site visit was conducted by the DOE on 8th February 2018 to evaluate on the site conditions and related requirements which need to be taken into consideration prior to the preparation of EIA report. The TOR approval letter from the DOE (Ref. No.: JAS 20/110/190/097 (7) dated 2nd March 2018) which states the requirement and scope of an EIA study for the intended project as provided in **Chapter 2: Terms of Reference of EIA Study**. The scopes of potential impacts to be study are as follow:

- i. Air Quality
- ii. Land Disturbing
- iii. Health Impact
- iv. Quantitative Risk Assessment
- v. Waste Management
- vi. Wastewater Quality
- vii. Process Review
- viii. Noise Quality

## **3.0 STATEMENT OF NEED**

The development of proposed clinical thermal treatment plant facilitates the transportation, storage and treatment of clinical waste collected from private clinics, hospitals and potentially from other waste generator in Southern Region of Peninsular Malaysia in the future.

SMOSB is targeting to collect only clinical wastes with scheduled waste code of SW 403 and SW 404 from the private hospitals, clinics and other potential waste generator to be received and treated at the proposed thermal treatment plant. All clinical wastes are placed in rigid containers or bags which are tagged in accordance with the requirements of the MOH so that all wastes can be tracked from the sources of generation to the point of final disposal. The definition of the type of waste to be received at SMOSB are as follow:

- **SW 403** – discarded drugs containing psychotropic substances or containing substances that are toxic, harmful, carcinogenic, mutagenic or teratogenic
- **SW 404** – pathogenic and clinical wastes quarantined materials

The generation of wastes may present threats to the environment and public health, but this depends on the type of waste management option and the way it is controlled. Waste is a complex mixture of different substances, only some of which are intrinsically hazardous to health.

Poor management of health care waste potentially exposes health care workers, waste handlers, patients and the community at large to infection, toxic effects and injuries, and risks polluting the environment. It is essential that all medical waste materials are segregated at the point of generation, appropriately treated and disposed of safely. The summary of statement of need for the thermal treatment plant are as follows:

- 1) To assist the private health care services by providing an avenue for the treatment and disposal of clinical waste;
- 2) To provide enhanced infrastructure for a higher quality of life in urban and rural areas;
- 3) To provide a 'surge capacity' for processing clinical wastes supplied by current concessionaires during breakdowns; and
- 4) To provide additional avenue for resource recovery whilst protecting the environment.

#### **4.0 PROJECT OPTION**

**Chapter 4** outlines the available project options to address issues on the increasing trend in the generation of clinical waste. The various project options being considered and evaluated are as follows:

- Option 1: Site Option
- Option 2: Technology Option
- Option 3: No Project Option

### **Option 1: Site Option**

The important site selection criteria have been taken into consideration in the initial screening process. Both the environmental and social or public welfare are the dominant factors in the selection process. The details of the siting criteria for the proposed clinical waste thermal treatment plant are as **Table ES.1** below:

**Table ES.1: Criteria and Parameters in Site Selection**

<b>No.</b>	<b>Considerations</b>	<b>Criteria</b>
<b>1.</b>	<b>Size, Physical and Land Use</b>	
	a) Size including any potential expansion area.	The total area of the proposed project is 0.809 hectares.
	b) Compatibility of land use.	The project site has been zoned as industrial by Johor Bahru and Kulai District Local Plan, 2025.
	c) Away from densely populated areas.	The nearest residential area is Kampung Perigi Acheh and Kampung Tanjung Langsat located approximately 2.8 km and 2.6 km away at the North and Northeast and Southeast of the proposed project site.
	d) Away from abstraction points in the catchment areas.	There is no water catchment area located upstream and downstream of the project site.
	e) Away from rivers and swamp.	The proposed project site is drained by a small stream to Sungai Pelawan and Sungai Kopok only and directed to the sea. Potentially monsoon drain and may appear during the event of rainfall only.
<b>2.</b>	<b>Environmental Constraints</b>	
	a) Avoidance of unique habitat, ecological value or scenic beauty areas.	There is no environmental constrains for the proposed project since the location of the project is in industrial area.
<b>3.</b>	<b>Economic Constraints</b>	
	a) Distance to be less than half day travel by lorries to the site	The waste transporting would not take more than half a day since the site has a good road network.
	b) Minimal transportation costs	The transportation costs to the proposed project site should be relatively low as the routes to the sites are accessible.
<b>4.</b>	<b>Social Constraints</b>	
	a) Land preferably government owned	The proposed project site is under the ownership of Southern Medi One Sdn. Bhd. (SMOSB).
	b) Distance from major settlements	The residential areas are located from 2 – 3 km from the proposed project site.

**Table ES.1: Criteria and Parameters in Site Selection**

No.	Considerations	Criteria
	c) Distance from public facilities	The public facilities such as schools, hospitals or clinics and mosque are located within 2 – 5 km from the proposed project site.

### **Option 2: Technology Option**

Two (2) major clinical waste treatment technologies are thermal treatment and non-thermal treatment technologies. The superiority of the thermal treatment method non-thermal treatment methods for the disposal of clinical waste is well documented and in most cases met the technical, environmental and regulatory requirements criteria. The advantages of thermal treatment are as follows:

- Fast detoxification process;
- Inert or stabilized end products;
- Tremendous mass and volume reduction; and
- Option for energy or steam recovery.

**Table ES.2** shows the advantage and disadvantage of clinical waste treatment options available.

**Table ES.2: Advantages and Disadvantages of Clinical Waste Treatment**

Type of Treatment	Advantages	Disadvantages
Thermal Treatment	<ul style="list-style-type: none"> <li>• Involved direct combustion thus aim at the reduction of the waste volume</li> <li>• Convert waste into harmless materials and the utilization of the energy that is hidden within waste as heat, steam, electrical energy or combustible material</li> <li>• Reducing the volume of waste into ash and the ability to dispose recognizable waste and sharps</li> </ul>	<ul style="list-style-type: none"> <li>• Largest concern is <b>pollution</b> i.e. air, water and noise pollution</li> <li>• <b>Operation cost</b> is at higher end since it require high temperature in order to ensure all harmful material completely destroyed and additional investment for flue gas treatment and water treatment</li> </ul>
Autoclave	<ul style="list-style-type: none"> <li>• Can be used to process up to 90% of clinical waste and are easily scaled to meet the needs of any medical organization</li> </ul>	<ul style="list-style-type: none"> <li>• Waste that is treated using an autoclave is still recognizable after treatment, and therefore must be shredded after treatment to allow for disposal with general waste</li> </ul>
	<ul style="list-style-type: none"> <li>• Low capital cost</li> </ul>	<ul style="list-style-type: none"> <li>• Autoclaves are not recommended for the treatment of pathological waste, due to the recognisability factor after treatment, and that pathological waste</li> </ul>

**Table ES.2: Advantages and Disadvantages of Clinical Waste Treatment**

Type of Treatment	Advantages	Disadvantages
		<ul style="list-style-type: none"> <li>may contain low levels of radioactive material or cytotoxic compounds</li> <li>No volume or mass reduction in waste</li> </ul>
Microwave Disinfection	<ul style="list-style-type: none"> <li>Absence of liquid discharge</li> </ul>	<ul style="list-style-type: none"> <li>Not suitable for all waste types</li> <li>No significant volume reduction</li> </ul>
	<ul style="list-style-type: none"> <li>Rapid processing</li> </ul>	<ul style="list-style-type: none"> <li>High investment cost</li> <li>Require significant space to accommodate waste</li> <li>No volume or mass reduction waste</li> </ul>
Chemical Disinfection	<ul style="list-style-type: none"> <li>Well known and widely being used</li> </ul>	<ul style="list-style-type: none"> <li>High investment cost</li> <li>Dealing with chemical, primarily chlorine products</li> <li>No volume or mass reduction waste</li> </ul>

Further analysis of thermal treatment technologies are provided in **Chapter 4: Project Options** of this EIA report.

### **Option 3: 'No Project' Option**

With 'No Project' option, no action will be taken to address the critical issues of increasing amount of clinical wastes to be disposed or treated. This could result in serious environmental and health implications and also contradicts the Government's effort to ensure a safe handling and disposal of ever increasing clinical waste in the country.

Poor or improper clinical waste management practices will be a risk to human health and the environment. The waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission. The hazardous and toxic parts of waste from healthcare establishments comprising of infectious, medical and radioactive material as well as sharps constitute a grave risks to mankind and the environment, if these are not properly treated, disposed or allowed to be mixed with other municipal waste.

With 'No Project' option, the worst outcomes are when the treatment or disposal of clinical waste is halted for a number of days, weeks or even months or unforeseen breakdown of current concessionaires' incineration plant. This illustrates the dire need of such initiatives on the part of the project proponent, Southern Medi One Sdn. Bhd. (SMOSB) and thus the development of clinical waste thermal treatment plant is very necessary and renders the 'No Project' option as irrelevant.

## 5.0 PROJECT DESCRIPTION

Southern Medi One Sdn. Bhd. (SMOSB) has planned to undertake the planning, construction and installation of two (2) line of 250 kg/hr clinical waste thermal treatment plant with the total processing capacity of 500 kg/hr at Lot PTD 4865, Tanjung Langsat Industrial Area, Johor by incorporating the established combustion technology with an effective air pollution control system. The proposed project is initiated by SMOSB to play an important role to cater for the increasing generation of clinical waste from private healthcare establishments (i.e. hospitals and clinics) as well as assisting the current concession company to meet the increasing regional generation and demand for treatment of clinical waste. Apart from that, SMOSB also accept waste generated by the other waste generator from Peninsular Malaysia mainly from Southern Region that meets the SOFMSB waste acceptance criteria.

In Malaysia, the rapid growth of public and private hospitals together with private clinics has resulted to an abundance of clinical waste. Clinical waste is a special category of scheduled waste because it poses a potential health and environment risks. The problematic areas are similar for all clinical waste units and at all stages of management, including segregation, collection, packaging, storage, transport, treatment and disposal. Improper clinical related waste management can cause health risks impact, thus it is important to manage it effectively.

### 5.1 Project Location

The proposed clinical waste thermal treatment plant will be built in Tanjung Langsat, the South Eastern Part of Peninsular Malaysia (Johor State). The location of the proposed thermal treatment plant project is specifically located at the following address:

**Southern Medi One Sdn. Bhd.**

Lot PTD 485

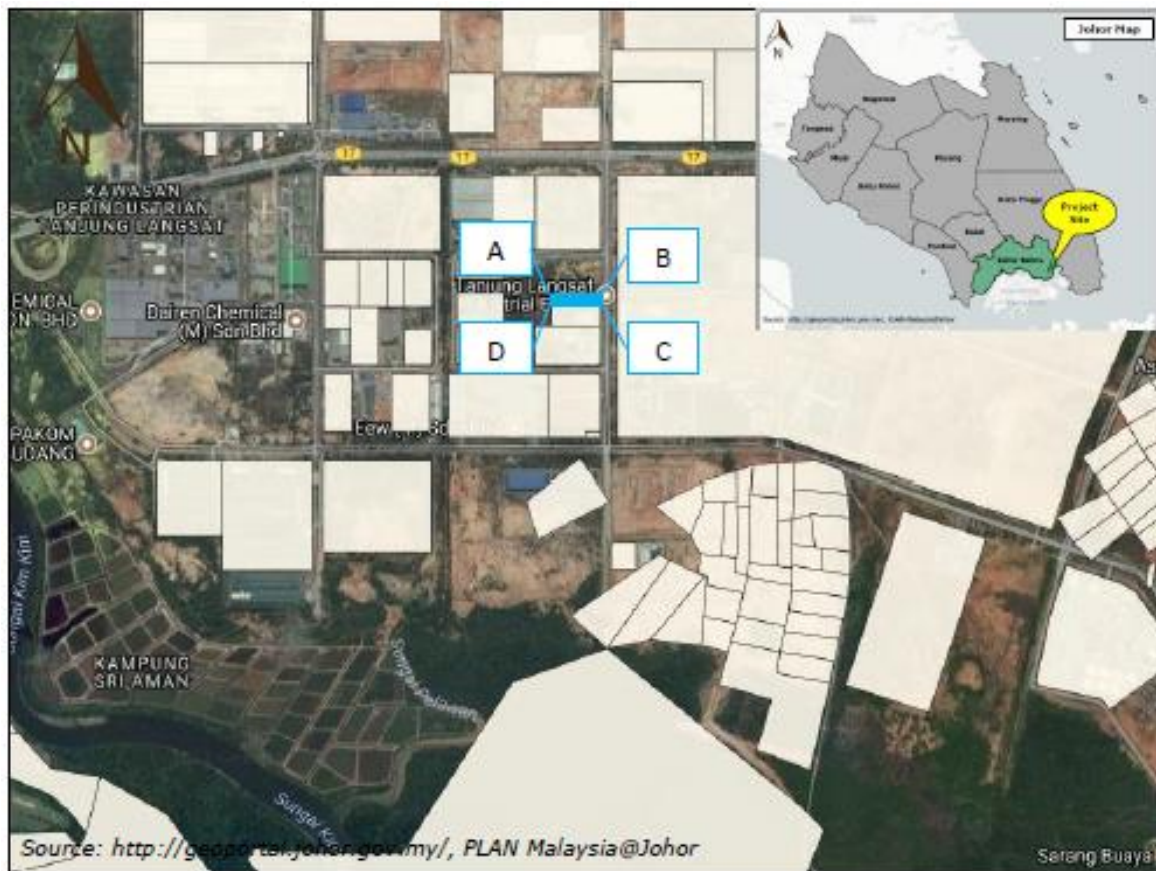
Mukim Sungai Tiram,

Tanjung Langsat, Johor Bahru,

Johor Darul Takzim.

Currently, the existing land is gazette for industrial activities. The proposed project site will be sited on 0.809 hectares on part of PT 4865, in Tanjung Langsat, Mukim Sungai Tiram, District of Johor Bahru, Johor. **Figure ES.1** shows the location and extent of project coverage of proposed project site.





0.809 hectares/2 acres Proposed Project Site, Lot PT 4865, Mukim Sungai Tiram, District of Johor Bahru  
Coordinate: A - 1°27'37.41"N 103°58'44.80"E, B - 1°27'37.52"N 103°58'50.17"E,

C - 1°27'35.80"N 103°58'50.12"E, D - 1°27'35.84"N 103°58'44.79"E

**Figure ES.1: Location of Proposed Project Site**

## 5.2 Waste Acceptance Criteria

Only clinical wastes with scheduled waste code of **SW 403** and **SW 404** collected from the private hospitals and clinics will be received to be treated at the proposed thermal treatment plant. All clinical wastes are placed in rigid containers or bags which are tagged in accordance with the requirements of the Ministry of Health (MOH) so that all wastes can be tracked from the source of generation to the point of final disposal.

As a whole, the clinical waste to be treated or accepted as the waste criteria for this project are those further defined by the Ministry of Health (MOH) Malaysia which includes;

- i. Any waste which consists wholly or partly of human or animal tissue, blood or other body fluids, excretion, drugs or other pharmaceutical products, swabs and dressings, syringes, needles and other sharp instruments, being waste which unless rendered safe may pose hazardous to any person coming in contact with it, and

- ii. Any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practices, investigation, treatment, care, teaching or research, or the collection of blood for transfusion being waste, which may cause infection to any person coming in contact with it

The source of clinical waste to be accepted above are expected to be from over 200 potential private clinics and hospitals as outlined in **Section 5.3.3, Chapter 5: Project Description** of this EIA report.

### **5.3 Thermal Treatment Process Description**

Proposed project will have the following major activities:

- Collection and transportation of clinical wastes from private clinics and hospitals to the proposed treatment facilities;
- Receiving and storing of the clinical wastes at the cold room storage; and
- Processing and treatment of the clinical wastes at the thermal treatment plant.

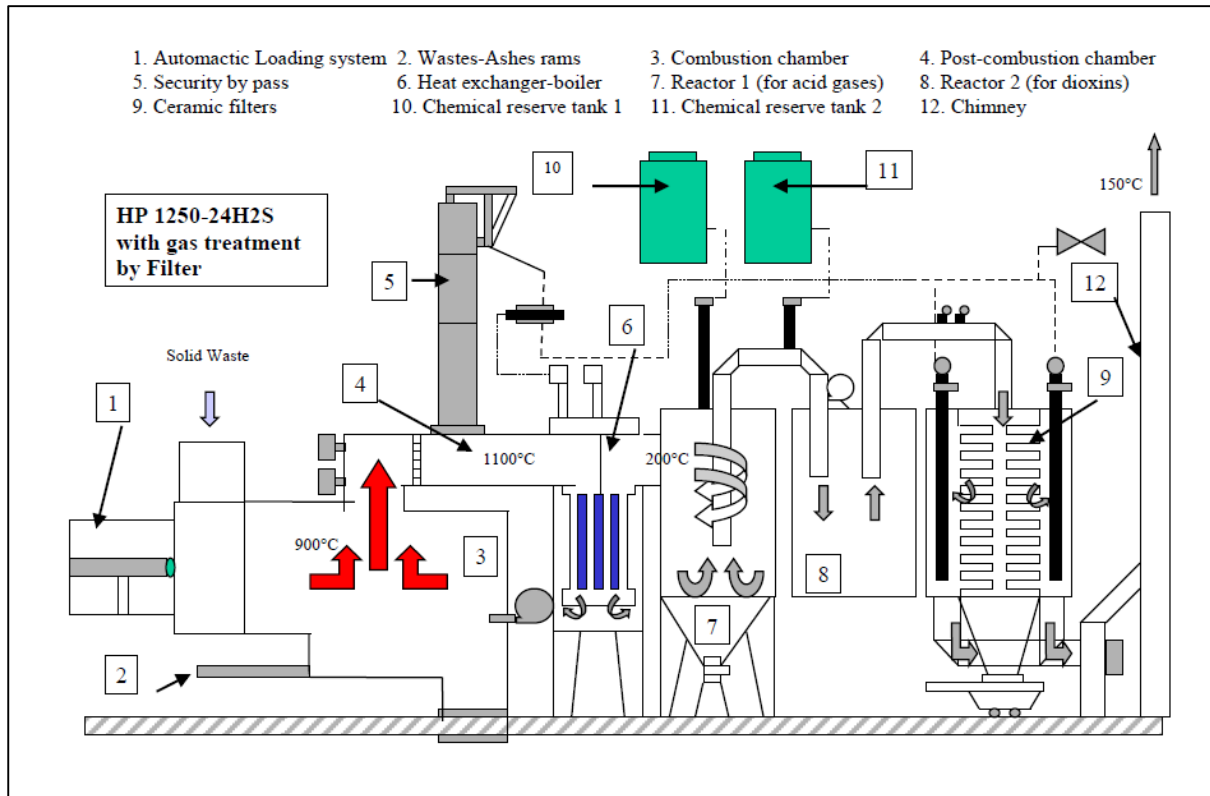
The entire facility will be divided into the following major areas:

- Dedicated transportation vehicles for the collection of clinical wastes;
- Weighing of incoming waste bins carrying clinical wastes to the proposed project site;
- Clinical waste thermal treatment plant;
- General amenities such as administration offices, maintenance room, cold room storage, emergency exit gate, approach roads and landscaping; and
- Empty bin cleaning station;

This clinical waste thermal treatment plant will include the following main unit operations;

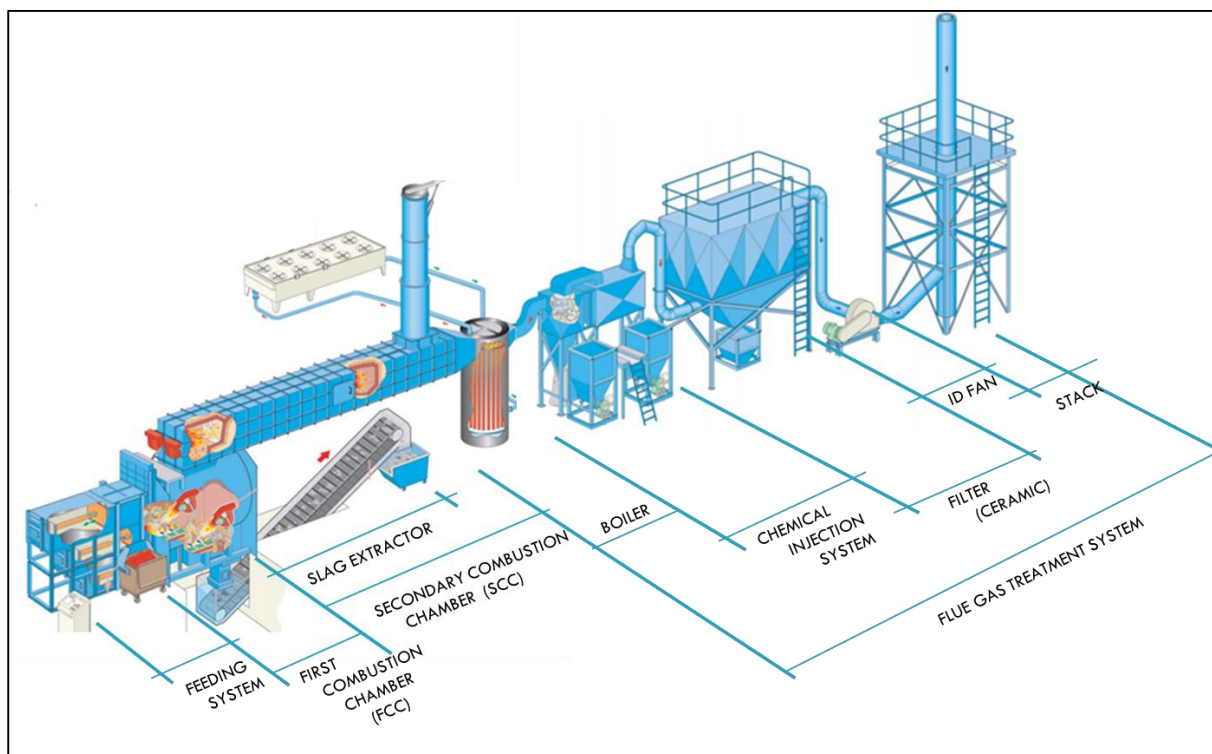
1. Feeding System (Automatic waste loading system for solid waste);
2. First Combustion Chamber (Stepped Hearth);
3. Automatic De-Ashing System;
4. Secondary Combustion Chamber;
5. Waste Heat Recovery System;
6. Air Pollution Control (APC) System (To ensure the plant meets the requirement in the Environmental Quality (Clean Air) Regulation, 2014);
  - Emergency By-Pass Stack (Security).
  - Heat Exchanger.
  - Dry Reactors and Ceramic Filter System.
7. Chimney and Continuous Emission Monitoring System (CEMS) (To continuous monitor the emission and sending data to DOE); and
8. Process Control and Safety.

The general process flow diagram of the clinical waste thermal treatment plant at the proposed project site is presented in **Figure ES.2** as follow:



**Figure ES.2: General Process Flow Diagram of Clinical Waste Thermal Treatment Plant**

The thermal treatment unit operation as well as detail calculation is provided in **Section 5.5.1** of this EIA report. **Figure ES.3** shows the illustration of clinical waste thermal treatment plant that will be installed:



**Figure ES.3: Illustration of Proposed Clinical Waste Thermal Treatment Plant**

#### 5.4 Industrial Effluent Treatment System

The wastewater generated from the bin and truck washing activity will be channelled directly to Equalization Tank (waste water collection tank) to be treated at the designated IETS. The wastewater will undergoes several treatment processes until it meets Standard A of the Environmental Quality (Industrial Effluent) Regulation, 2009 before being discharged as industrial effluent.

The source of the waste water from the operation of this plant mainly comes from the internal washing activities including washing of waste storage bin and trucks. The raw effluent volume generated will be kept as minimum and removed immediately to prevent contamination. Through best practices, it is anticipated that effluent generated from this premises shall be kept to very low below 5 m<sup>3</sup>/day. The wastewater from the plant will be collected at the Equalization Tank. The Equalization Tank can store wastewater up to 6 m<sup>3</sup>/day before being channelled to the IETS for treatment process.

Main components for the IETS to be built are as follow:

- 1) Oil Trap and Collection Sump
- 2) Equalization Tank
- 3) Batch Treatment Tank
- 4) Sequencing Batch Reactor

- 5) Activated Carbon Filter
- 6) Sludge Management

Detail calculation for IETS components are provided in **Section 5.6.2.3** of **Chapter 5**. The block diagram for IETS will be as **Figure ES.4**.

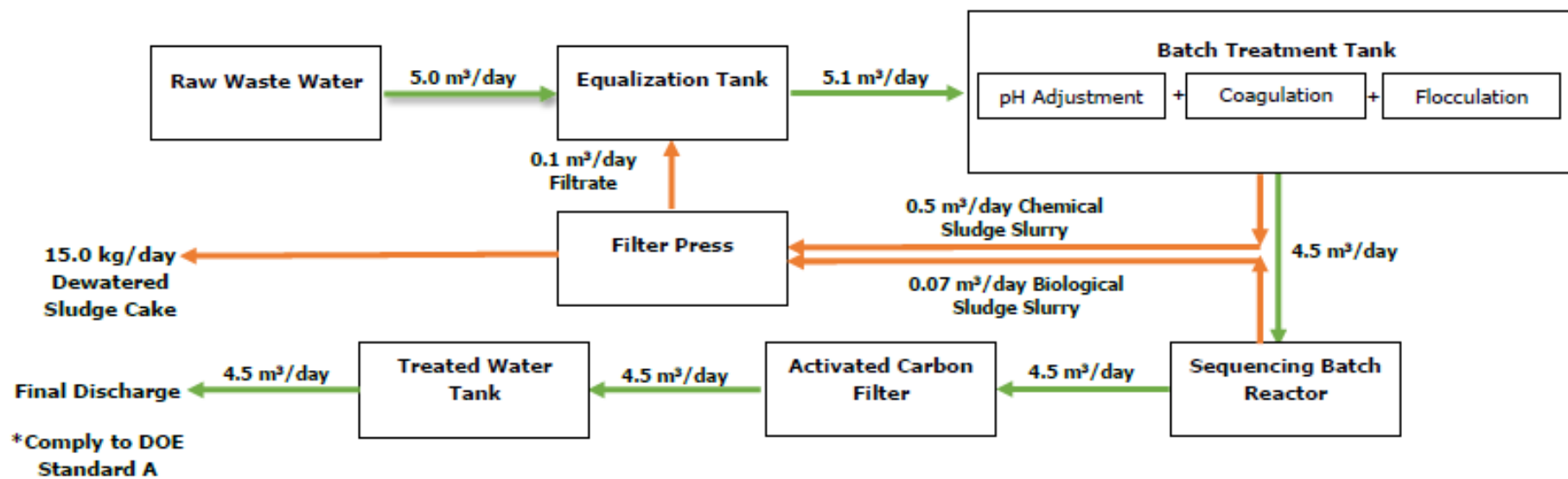


Figure ES.4: Block Diagram of Industrial Effluent Treatment System (IETS)

## **6.0 EXISTING ENVIRONMENT**

Survey of the sensitive receptor from proposed project area and its surroundings is reported in the EIA. The information that is used in the EIA report is taken from site survey within 5 km Zone of Impact (ZOI). The mandatory 5 km of ZOI has been divided into radiuses i.e. 0-1 km radius, 1-2 km radius, 2-3 km radius, 3-4 km radius and 4-5 km radius. A detailed analysis of the existing land use near the project site area within a radius of 5 km will be made through field survey and information gathered from local authorities as well as from remote sensing, if available. **Figure ES.5** shows the surrounding nearest industrial areas and residential areas.

In general, the 3 km radius shows that areas to the north east and south east (Kampung Tanjung Langsat and Kampung Perigi Aceh) is seeing development for residential area. The nearest residential area to the proposed site is located to the south east at Kampung Perigi Aceh which is approximately 2.7 km from site boundary. Other residential area is Kampung Tanjung Langsat approximately 2.8 km to the north east of the project site boundary. The sensitive receptors for surrounding residential areas of the project site are shown in **Figure ES.6**.

The baseline environmental monitoring results are compiled in **Chapter 6: Existing Environment** of this EIA report.





Figure ES.5: Surrounding Nearest Industrial Areas and Residential Areas





Figure ES.6: Surrounding Residential and Sensitive Receptors of Project Site

## **7.0 POTENTIAL IMPACTS, POLLUTION PREVENTION AND MITIGATION MEASURES**

Several potential environmental impacts were identified from various activities conducted for the Proposed Project. **Table ES.3** provides the summary of the potential impacts from the project activities, its significance to the environment as well as its respective prevention and mitigation measures (P2M2) recommended to prevent or minimize the adverse impacts to the environment. The followings are the key environmental components studied in the EIA report:

- i. Air Quality
- ii. Land Disturbing
- iii. Health Impact
- iv. Quantitative Risk Assessment
- v. Waste Management
- vi. Wastewater Quality
- vii. Process Review
- viii. Noise Quality

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
<b>CONSTRUCTION PHASE</b>				
<b>Air Quality</b>				
<ul style="list-style-type: none"> <li>Site preparation and earthworks</li> </ul>	<ul style="list-style-type: none"> <li>Minimal removal of obstructions such as trees and other vegetation to enable earthworks to be undertaken</li> </ul>	Low	<ul style="list-style-type: none"> <li>Access roadways to the proposed project site shall be wetted down to minimise fugitive dust emissions;</li> <li>Transport vehicles and construction machinery shall be regularly serviced and properly maintained to limit exhaust air emissions.</li> <li>Ambient air monitoring should be conducted.</li> <li>Ensure ventilation of potentially hazardous waste storage materials.</li> <li>Land clearing should be carried out in the dry season.</li> <li>Vehicles transporting open loads of construction materials such as sand or clay shall be covered.</li> <li>Limitation of the maximum speed at the construction site, and the access road leading to the site.</li> </ul>	7-6 8-5
<ul style="list-style-type: none"> <li>Wind-blown dust</li> </ul>	<ul style="list-style-type: none"> <li>Generation of dust from open exposed areas during dry period</li> </ul>	Low		7-6 8-5
<ul style="list-style-type: none"> <li>Fugitive dust emission from Transportation Activities</li> </ul>	<ul style="list-style-type: none"> <li>Dust generation due to entrainment of particles that are not likely to be dispersed far and to a limited distance from the source</li> <li>Dust generation or spillage from carriage of dry materials such as silt, aggregate, cement and sand</li> </ul>	Low		7-6 8-5
<ul style="list-style-type: none"> <li>Dust from Construction Related Activities</li> </ul>	<ul style="list-style-type: none"> <li>Air pollution emitted from operation of construction machineries and movement of trucks at site</li> </ul>	Low		7-7 8-5
<b>Land Disturbance</b>				
<ul style="list-style-type: none"> <li>Site preparation</li> </ul>	<ul style="list-style-type: none"> <li>Silt carried from exposed areas by storm water</li> </ul>	Low	<ul style="list-style-type: none"> <li>Adoption of Best Management Practices such as providing the following:</li> </ul>	7-35

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
and earthworks activities at site	<ul style="list-style-type: none"> <li>Spills of earth during transport of earth materials which may enter drainage system during rainfall</li> </ul>		<ul style="list-style-type: none"> <li>✓ Check dam</li> <li>✓ Silt fencing</li> <li>✓ Sufficient slope vegetation with hydro seeding or close turfing</li> <li>✓ Significant earth drain network</li> </ul>	8-8
<b>Waste Management</b> <ul style="list-style-type: none"> <li>Development of Thermal Treatment Plant and Industrial Effluent System</li> </ul>	<ul style="list-style-type: none"> <li>Inefficient utilization of construction materials by developers</li> <li>Generation of municipal solid waste by construction workers</li> <li>Generation of spent lubricant and hydraulics oil during maintenance</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Solid waste and construction waste shall be placed in a proper closed container.</li> <li>Open burning of solid waste from the project site is strictly prohibited.</li> <li>Reuse and recycling activities may be applied to minimize the waste being dumped into the landfill.</li> <li>Scheduled waste should be stored in containers which are sufficiently durable to prevent spillage or leakage into the environment.</li> </ul>	7-87 7-88 8-27 8-28
<b>Wastewater Quality</b> <ul style="list-style-type: none"> <li>Site clearing activities at site</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion and surface runoff from site</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Adoption of Best Management Practices such as providing the following:               <ul style="list-style-type: none"> <li>✓ Check dam</li> <li>✓ Silt fencing</li> </ul> </li> </ul>	7-89 8-30

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
			<ul style="list-style-type: none"> <li>✓ Sufficient slope vegetation with hydro seeding or close turfing</li> <li>✓ Significant earth drain network</li> </ul>	
<b>Noise Quality</b> <ul style="list-style-type: none"> <li>Piling Activities</li> </ul>	<ul style="list-style-type: none"> <li>Nuisance to residents living nearby the site</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Use more silent piling method such as hydraulic piling method</li> <li>Noisy vehicles and equipment used during piling must be checked for proper installation of soundproof encloses and noise control components</li> <li>Machine which generate high noise level should be enclosed properly using soundproof housing</li> <li>Affected residents should be informed of expected duration of particular noisy activities in order to minimize complaints</li> <li>Activities should be minimized during public holiday and weekend when working close to residential areas and places of worship</li> </ul>	7-97 8-34
<ul style="list-style-type: none"> <li>Transportation of Construction Materials and Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Noise caused by the frequent flow of heavy vehicles and long trailers carrying construction equipment</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Scheduling the movement of the heavy vehicles during day-time only, when working close to residential areas</li> </ul>	7-98 8-34

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
			<ul style="list-style-type: none"> <li>All heavy vehicles should be checked for proper installation of engine silencer to reduce the emitted noise level</li> </ul>	
<ul style="list-style-type: none"> <li>Earthwork and Construction of Access Road</li> </ul>	<ul style="list-style-type: none"> <li>Nuisance to local residents during earthwork and construction of access road</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Scheduling the activities during day time only when working close to residential areas</li> </ul>	7-98 8-34
<b>OPERATION PHASE</b>				
<b>Air Quality</b> <ul style="list-style-type: none"> <li>Incineration of clinical waste</li> </ul>	<ul style="list-style-type: none"> <li>Emission of hazardous pollutants from thermal treatment plant</li> </ul>	High	<ul style="list-style-type: none"> <li>Air pollution control systems for flue gas treatment to remove harmful pollutants and toxins from the emissions.</li> <li>The flue gas treatment system comprising of semi-dry lime reactor, fabric filters and a wet-scrubber system along with high stack height of 60 m, is certainly recommended as these provide full-proof mitigation measures on unwarranted air emissions</li> <li>Effective control measures of the air pollution emissions for the protection of public health.</li> <li>Equipped with Continuous Emission Monitoring System (CEMS) that</li> </ul>	7-13 8-25

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
			continuously monitors the flue gas emission concentration emitted from the stack.	
<b>Waste Management</b> <ul style="list-style-type: none"> <li>Incineration of clinical waste</li> </ul>	<ul style="list-style-type: none"> <li>Generation of municipal solid wastes by workers onsite</li> <li>Residue generated from thermal treatment and industrial effluent treatment system</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Provide proper waste disposal system to comply with the requirements of the Destruction of Disease Bearing Insects Act 1975 and the by-laws of the local authorities.</li> <li>Proper maintenance and housekeeping of the worker placement.</li> <li>Dedicated containment shall be provided for each kind of waste.</li> <li>To ensure solid waste is not be mixed with clinical waste</li> <li>Protective clothing and personal protective equipment (PPE) while handling ash.</li> <li>Storage of ash as specified under Environmental Quality (Scheduled Wastes) Regulations, 2005.</li> <li>Fly and bottom ash will be container in a proper bag and sent to KAWMC for further treatment and disposal.</li> <li>The filter press is used to compress in order to remove water from the slurry to produce</li> </ul>	7-87 7-88 8-27 8-28

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
			a solid "cake". The sludge cake generated will be temporarily stored in labelled drums at plant site before being transported for disposal at KAWMC.	
<b>Wastewater Quality</b> <ul style="list-style-type: none"> <li>IETS operation at plant</li> </ul>	<ul style="list-style-type: none"> <li>Contamination of water source at point of discharge</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Regular inspections of the wastewater collecting system in order to timely detect any failures, and take appropriate remedial action</li> <li>Wastewater generated is treated to comply with Standard A of Environmental Quality (Industrial Effluent) Regulations, 2009</li> <li>Providing an effective wastewater treatment system.</li> <li>Carry out self-monitoring of the IETS.</li> <li>Carry out regular service checking for the components of IETS in the manner as specified in the Guidance Document on Performance Monitoring of Industrial Effluent Treatment System issued by the Department of Environment.</li> </ul>	7-89 8-30
<b>Noise Quality</b>	<ul style="list-style-type: none"> <li>Generation of noise from waste transportation vehicles</li> </ul>	Low	<ul style="list-style-type: none"> <li>Scheduling the movement of the heavy vehicles during day-time only and speed</li> </ul>	7-100 8-34



**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
<ul style="list-style-type: none"> <li>Transportation of waste to plant</li> </ul>			limit, when working close to residential areas <ul style="list-style-type: none"> <li>It is recommended that all heavy vehicles to be checked for proper installation of engine silencer to reduce the emitted noise level</li> </ul>	
<b>Health Impact</b> <ul style="list-style-type: none"> <li>Operation of Thermal Treatment Plant and Industrial Effluent Treatment System</li> </ul>	<ul style="list-style-type: none"> <li>Health risks to local residents from the prolonged exposure to air emission pollutants</li> <li>Prolonged exposure to hazardous materials and emission potentially hazardous operator health if insufficient protection measures are taken.</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Proper plant operating conditions and operation shall be implemented.</li> <li>Design of effective stack height.</li> <li>Installation of proper air pollution control equipment.</li> <li>Effective control measures of the air pollution emissions for the protection of public health.</li> <li>Conduct ambient air quality monitoring.</li> <li>Adequate monitoring to prevent breeding of waterborne vectors.</li> <li>Effluent discharged should be treated and comply with Standard A as listed in the Third Schedule of the Environmental Quality Act 1974, under the Environmental Quality (Industrial Effluents) Regulations, 2009.</li> <li>Properly designed and constructed drainage, oil separator and sump system.</li> </ul>	7-50 8-23 8-24

**Table ES.3: Potential Significant Impacts and Proposed Mitigation Measures for Proposed Project**

Activity	Significant Potential Impacts	Magnitude of Significant Potential Impacts	Pollution Prevention and Mitigation Measures	Reference Page
<b>Quantitative Risk Assessment</b> <ul style="list-style-type: none"> <li>Waste Handling, Transportation and Treatment</li> </ul>	<ul style="list-style-type: none"> <li>Fire, explosion or the release of a dangerous substance.</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Safe or standard operating procedures should be established especially for activities such as transportation of waste within the centre and waste handling and storage;</li> <li>Establish an Emergency Response Plan (ERP) as tool for effective disaster or emergency management in case of an incident or accident; and</li> <li>Emergency response procedures shall also incorporate incidents involving any chemicals handled on the site.</li> </ul>	7-61 8-25

## **8.0 ENVIRONMENTAL MANAGEMENT PLAN**

An Environmental Management Plan (EMP) is recommended to be outlined in order to manage all the potential impacts identified in the report. EMP is a practical tool for the implementation of mitigation and protective measures identified in the EIA. The plan relates anticipated project activities to sensitive environmental factors, outlining policies and procedures for the protection of the environment. The outcome will minimize the risk of costly, time-consuming environmental issues, while maximizing productivity, bottom-line performance and goodwill.

The main elements of the EMP are:

- i) Environmental mainstreaming tools and Guided Self-Regulation (GSR) element;
- ii) Legislative and contractual requirements and conditions that need to be observed and complied with;
- iii) An administrative setup (i.e. safety, health and environment unit) to be responsible for environmental management with well defined organization structure, manpower requirements, and responsibilities of personnel;
- iv) Environmental monitoring requirements and compliance requirements;
- v) Monitoring programmes during construction phase (i.e. ambient air, surface water, noise and silt trap discharge quality);
- vi) Monitoring programmed during operation phase (i.e. stack emission, ambient air, surface water, effluent and noise quality);
- vii) Environmental records and reporting requirements;
- viii) Key environmental management action plan for the protection of environmental component identified; and
- ix) Actions required and the reporting sequence for emergency responses during accidents or abnormal operations of the plant.

### **8.1 Proposed Monitoring Programme**

Monitoring programme is an essential component in the overall EMP. It comprises of three (3) types of monitoring i.e. performance monitoring (PM), compliance monitoring (CM) and impact monitoring (IM). The monitoring programme will be periodically reviewed and revised by accredited laboratory when necessary to take into consideration the changes made during project development.

#### **8.1.1 Performance Monitoring**

Performance monitoring (PM) is a proactive and preventive monitoring of processes to ensure Air Pollution Control Systems (APCS) as well as Industrial Effluent Treatment System (IETS) are optimally operated and maintained during the operation phase. PM should be incorporated as a standard code of practice (SOP) which must be implemented and strictly enforced. The performance monitoring shall be conducted by SMOSB project in accordance to the technical guidance published by the Department of Environment (DOE) as follow;

1. Technical Guidance on Performance Monitoring of Air Pollution Control Systems (APCS); and
2. Technical Guidance on Performance Monitoring of Industrial Effluent Treatment Systems (IETS);

The details for both Performance Monitoring of APCS and IETS are provided in **Chapter 9: Environmental Management Plan** of this EIA report.

#### **8.1.2 Compliance Monitoring**

Compliance monitoring (CM) will be conducted to ensure the emission and discharge from the proposed project complies with the local regulations and relevant standards. **Table ES.4** and **ES.5** shows the proposed compliance monitoring for the Proposed Project.

#### **8.1.3 Impact Monitoring**

Impact monitoring (IM) will be only conducted to monitor the impact from effluent discharge from the proposed project towards the nearby sensitive receptors on a case to case basis when required. This is because the P2M2 is clearly identified and operation procedures are adequate.

**Table ES.4: Proposed Compliance Monitoring (CM) Programme During Construction Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
<b>1.</b>	<b>CONSTRUCTION PHASE</b>						
1.1	Ambient Air Quality	Malaysian Ambient Air Quality Standards, 2013	Quarterly	A1 A2	Particulate Matter 10 (PM $\leq$ 10 micron)	120 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
					Particulate Matter 2.5 (PM $\leq$ 2.5 micron)	45 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
1.2	Surface Water Quality	Standard A, Environmental Quality (Industrial Effluent) Regulations, 2009	Quarterly	W1 W2	COD	80 mg/L	APHA 5220 C
					BOD	20 mg/L	APHA 5210 B
					TSS	50 mg/L	APHA 2540 D
					Oil & Grease	1.0 mg/L	APHA 5520 B
					Ammoniacal Nitrogen	10 mg/L	APHA 4500-NH <sub>3</sub> B & C
					pH	100	APHA 2120 F
					Colour	100 mg/L	APHA 2120 F
					Trivalent Chromium	0.20 mg/L	In-House Method TM/WEP/013'
					Hexalent Chromium	0.05 mg/L	*APHA 3500-Cr B
					Barium	1.0 mg/L	*APHA 3120 B
					Silver	0.1 mg/L	*APHA 3120 B
					Selenium	0.02 mg/L	*APHA 3120 B
					Boron	1.0 mg/L	APHA 3120 B
					Lead	0.10 mg/L	APHA 3120 B
					Nickel	0.20 mg/L	APHA 3120 B
					Zinc	2.0 mg/L	APHA 3120 B
					Arsenic	0.05 mg/L	APHA 3120 B
					Cadmium	0.01 mg/L	APHA 3120 B

**Table ES.4: Proposed Compliance Monitoring (CM) Programme During Construction Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
1.2	Surface Water Quality (cont.)	Standard A, Environmental Quality (Industrial Effluent) Regulations, 2009	Quarterly	W1 W2	Copper	0.20 mg/L	APHA 3120 B
					Iron	1.0 mg/L	APHA 3120 B
					Manganese	0.20 mg/L	APHA 3120 B
					Aluminum	10 mg/L	APHA 3120 B
					Mercury	0.005 mg/L	In-House Method TM/WEP/012"
					Tin	0.20 mg/L	In-House Method TM/WEP/012"
					Free Chlorine	1.0 mg/L	*HACH 8021
					Cyanide	0.05 mg/L	HACH 8027
					Sulfide	0.50 mg/L	HACH 8131
					Fluoride	2.0 mg/L	HACH 8029
					Formaldehyde	1.0 mg/L	HACH 8110
					Phenol	0.001 mg/L	HACH 8047
		National Water Quality Standards, Malaysia (Class III)	Quarterly	W3 W4	Ammoniacal Nitrogen	0.9 mg/L	*HACH 8155
					COD	50.0 mg/L	APHA 5220 C
					BOD	6.0 mg/L	APHA 5210 B
					DO	3.0-5.0 mg/L	APHA 4500-O C
					Turbidity	-	*HACH 2100Q
					Iron	1.0 mg/L	APHA 3120 B
					Manganese	0.2 mg/L	APHA 3120 B
					Phosphorus	0.1 mg/L	*HACH 8048
					Oil & Grease	N	APHA 5520 B
					TSS	150.0 mg/L	APHA 2540 D
					Faecal Coliform	5,000.0 (20,000.0) <sup>a</sup>	*APHA 9221 E

**Table ES.4: Proposed Compliance Monitoring (CM) Programme During Construction Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
1.2	Surface Water Quality (cont.)	National Water Quality Standards, Malaysia (Class III)	Quarterly	W3 W4	Coliform	50, 000 mg/L	*APHA 9221 B
1.3	Noise Quality	The Planning Guidelines for Environmental Noise Limits and Control, Second Edition, 2007	Quarterly	N1 N2 N3 N4	LAeq, Lmax, Lmin	≤70 dBA (day time) ≤60 dBA (night time)	BS 4142:1997
				N5	LAeq, Lmax, Lmin	≤55.0 dBA (day time) ≤45.0 dBA (night time)	
1.4	Silt Trap Discharge Quality	As per requirement by the DOE	Fortnightly	Discharge point of Silt Trap	TSS	50 mg/L	APHA 2540D
					Turbidity	250 Nephelometric Turbidity Unit (NTU)	APHA 2130 B

**Table ES.5: Proposed Compliance Monitoring (CM) Programme During Operation Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
<b>2.</b>	<b>OPERATION PHASE</b>						
2.1	Stack Emission Quality	Environmental Quality (Clean Air) Regulations, 2014	Quarterly	Stack 1 Stack 2	Total Particulate Matter	100 mg/m <sup>3</sup>	USEPA Method 5/ MS 1596:2003
					NM VOC as total organic carbon	10 mg/m <sup>3</sup>	USEPA Method 0030
					Hydrochloric Acid	40 mg/m <sup>3</sup>	USEPA Method 26A
					Hydrofluoric Acid	1 mg/m <sup>3</sup>	USEPA Method 26A
					Sulphur Dioxide	50 mg/m <sup>3</sup>	USEPA Method 6C
					Nitrogen Oxides (expressed as NO <sub>2</sub> )	200 mg/m <sup>3</sup>	USEPA Method 7E
					Carbon Monoxide	50 mg/m <sup>3</sup>	USEPA Method 10
					Cadmium	Total 0.05	USEPA Method 29
					Thallium	mg/m <sup>3</sup>	USEPA Method 29
					Mercury	0.05 mg/m <sup>3</sup>	USEPA Method 29
					Antimony	Total 0.5 mg/m <sup>3</sup>	USEPA Method 29
					Arsenic		USEPA Method 29
					Lead		USEPA Method 29
					Chromium		USEPA Method 29
					Cobalt		USEPA Method 29
					Copper		USEPA Method 29
					Manganese		USEPA Method 29
					Nickel		USEPA Method 29
					Vanadium		USEPA Method 29
					PCDD/PCDF	0.1 ng TEQ/M <sup>3</sup>	USEPA Method 23/1613A
			Bi-annually				



**Table ES.5: Proposed Compliance Monitoring (CM) Programme During Operation Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.2	Ambient Air Quality	Malaysian Ambient Air Quality Standards, 2013	Quarterly	A1 A2	Particulate Matter 10 (PM $\leq$ 10 micron)	120 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
					Particulate Matter 2.5 (PM $\leq$ 2.5 micron)	45 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
					Sulphur Dioxide	300 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 704C
					Nitrogen Dioxide	300 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 406
					Carbon Monoxide	35 $\text{mg}/\text{m}^3$ @ 1-hr	In house method AMR-AA01 Manufacturer's Measurement Procedures (Dräger)
					Ozone	200 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 411
2.3	Effluent Quality	Standard A, Environmental Quality (Industrial Effluent) Regulations, 2009	Weekly	Final Discharge Point	COD	80 $\text{mg}/\text{L}$	APHA 5220 C
					BOD	20 $\text{mg}/\text{L}$	APHA 5210 B
					TSS	50 $\text{mg}/\text{L}$	APHA 2540 D
					Oil & Grease	1.0 $\text{mg}/\text{L}$	APHA 5520 B
					Ammoniacal Nitrogen	10 $\text{mg}/\text{L}$	APHA 4500-NH <sub>3</sub> B & C
					pH	100	APHA 2120 F
					Colour	100 $\text{mg}/\text{L}$	APHA 2120 F
					Trivalent Chromium	0.20 $\text{mg}/\text{L}$	In-House Method TM/WEP/013'
					Hexalent Chromium	0.05 $\text{mg}/\text{L}$	*APHA 3500-Cr B
					Barium	1.0 $\text{mg}/\text{L}$	*APHA 3120 B
					Silver	0.1 $\text{mg}/\text{L}$	*APHA 3120 B

**Table ES.5: Proposed Compliance Monitoring (CM) Programme During Operation Phase**

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.3	Effluent Quality (cont.)	Standard A, Environmental Quality (Industrial Effluent) Regulations, 2009	Weekly	Final Discharge Point	Selenium	0.02 mg/L	*APHA 3120 B
					Boron	1.0 mg/L	APHA 3120 B
					Lead	0.10 mg/L	APHA 3120 B
					Nickel	0.20 mg/L	APHA 3120 B
					Zinc	2.0 mg/L	APHA 3120 B
					Arsenic	0.05 mg/L	APHA 3120 B
					Cadmium	0.01 mg/L	APHA 3120 B
					Copper	0.20 mg/L	APHA 3120 B
					Iron	1.0 mg/L	APHA 3120 B
					Manganese	0.20 mg/L	APHA 3120 B
					Aluminum	10 mg/L	APHA 3120 B
					Mercury	0.005 mg/L	In-House Method TM/WEP/012"
					Tin	0.20 mg/L	In-House Method TM/WEP/012"
					Free Chlorine	1.0 mg/L	*HACH 8021
					Cyanide	0.05 mg/L	HACH 8027
					Sulfide	0.50 mg/L	HACH 8131
					Fluoride	2.0 mg/L	HACH 8029
					Formaldehyde	1.0 mg/L	HACH 8110
2.4	Noise Quality	The Planning Guidelines for Environmental Noise Limits and Control, Second Edition, 2007	Quarterly	N1 N2 N3 N4	LAeq, Lmax, Lmin	≤70 dBA (day time) ≤60 dBA (night time)	BS 4142:1997

## **9.0 CONCLUSION**

As a conclusion, the summary of environmental impact assessment is help to determine the level to which identified impacts need to be assessed and to suggest the suitable methodologies when conducting the EIA study. The environmental components on which assessment will need to be carried out to predict the scale of the impact will be project specific.

Environmental assessment is a comparison of the existing environment and a prediction of alterations or changes to these existing conditions that result from the implementation of proposed project. All significant changes, whether negatively or positively affecting the existing environment, need to be described conclusively and the appropriate assessment methodology applied to verify conclusions. **Table ES.6** shows summary of impact assessment that can be used to evaluate the scale and extent of environmental impacts on the key environmental components.

**Table ES.6: Summary of Impact Assessment**

No.	Impacts	Method of Assessment	Evaluation Criteria	Reference	Study Findings
1.	Air Quality	AERMOD air dispersion modelling	Emission Limit  Ambient Air Quality Standards	Environmental Quality (Clean Air) Regulations, 2014  Malaysian Ambient Air Quality Guidelines, 2013	The predicted maximum pollutants concentrations plus the background level were all below the recommended guidelines. The location of the Maximum Ground Level Concentration (MaxGLC) occurs within 250m (to the east – project boundary) from the source i.e. the proposed stack location.
2.	Land Disturbing	Universal Soil Loss Equation (USLE) to assess the erosion risk  Modified Universal Soil Loss Equation (MUSLE) for sediment yield estimation	Soil Erosion and Sediment Risk	Urban Stormwater Management Manual for Malaysia (MSMA) (DID, 2015)  Guideline of Erosion and Sediment Control in Malaysia (DID, 2010)  Guidance Document for the Preparation of Land Disturbing Pollution Prevention and Mitigation Measures (LD-P2M2) (DOE,2017)	The proposed project is designated on a cleared vacant land with a flat terrain with no cut and fills activity. Thus, minimal site preparation activity will be conducted.  Adequate mitigation measure is to be implemented to further minimize potential impact from land disturbing activities.

**Table ES.6: Summary of Impact Assessment**

No.	Impacts	Method of Assessment	Evaluation Criteria	Reference	Study Findings
3.	Health Impact	Health risk assessment (HRA) methodology	Acceptable lifetime carcinogenic risk range will be taken as a range between $10^{-6}$ to $10^{-4}$  Health Quotient < 1	Guidance Document on Health Impact Assessment (HIA) in Environmental Impact Assessment (DOE, 2012)	The assessment on exposure to the PM <sub>10</sub> , NO <sub>2</sub> , SO <sub>2</sub> , acid gases, heavy metals and Dioxin-Furan during the normal and worst case scenarios showed that the calculated hazard quotient is below 1 (HQ<1), which indicates a non-carcinogenic risk to the local community.  The cancer risks were recorded to be within the acceptable limit (i.e. between $10^{-4}$ to $10^{-6}$ as stipulated in Guidance Document on Health Impact Assessment (HIA) in EIA by the Department of Environment (DOE), Malaysia).
4.	Quantitative Risk Assessment	QRA Individual Risk Modelling (CASQADE)	Criteria for QRA Individual Risk: <ul style="list-style-type: none"> <li>• <math>1 \times 10^{-6}</math> fatality per year for residential areas</li> <li>• <math>1 \times 10^{-5}</math> fatality per year for neighbouring industry</li> </ul>	UK Health and Safety Executives Criteria  Asian Development Bank (ADB)  Department of Environment (DOE), Ministry of Natural Resources and Environment, Malaysia, Environmental Impact	Individual Risk (IR) Contour based on the following description: <ul style="list-style-type: none"> <li>• The <math>1 \times 10^{-5}</math> fatalities per person per year individual risk contour is not extend beyond industrial developments; and</li> <li>• The <math>1 \times 10^{-6}</math> fatalities per person per year individual risk contour is not encompass involuntary recipients of industrial risks such as residential areas, schools,</li> </ul>

**Table ES.6: Summary of Impact Assessment**

No.	Impacts	Method of Assessment	Evaluation Criteria	Reference	Study Findings
				Assessment Guidelines for Risk Assessment, December 2004, Third Edition, October 2007, EG 1/04.	hospitals and places of continuous occupancy.
5.	Wastewater Quality	Industrial Effluent Characteristic Study	DOE Discharge Limit, Standard A	Environmental Quality (Industrial Effluent) Regulations, 2009	<p>Wastewater resulting from the internal washing activities including washing of storage bin and trucks that involved during the operation of SMOSB facility (called as effluent) will be treated first through the Industrial Effluent Treatment System (IETS) constructed at site.</p> <p>The discharge limit for the IETS designed is following Standard A of Environmental Quality (Industrial Effluent) Regulations, 2009.</p>
6.	Waste Management	Identification and management of waste generated (i.e. scheduled, solid and biomass waste)	Waste (solid and scheduled) procedures as in the regulations	Environmental Quality (Scheduled Waste) Regulations, 2005	Waste generated is to be disposed in appropriate manner (i.e. designated location, container etc.). Some volume of residue will be generated from thermal treatment plant as well as the IETS. The residue including scheduled waste that cannot be treated at SMOSB is to be sent to Kualiti Alam Sdn. Bhd. in Negeri Sembilan for treatment and final disposal.

**Table ES.6: Summary of Impact Assessment**

No.	Impacts	Method of Assessment	Evaluation Criteria	Reference	Study Findings
7.	Socio-economic	Secondary Data: Literature Review  Primary Data: Fieldwork  Stakeholder Consultation	Demographic background, property ownership, infrastructure and basic amenities, perception, aesthetics and culture, assessment of level of acceptability.	Primary and Secondary Data	Although socio-economic study is not required for this project as advised by JPPD, fieldwork during health assessment have gathered 250 respondents from 17 residential within 5km radius from the project site and a Focus Group Discussion is conducted with the stakeholders and community leaders. Support to the proposed project is seen due to the job opportunities (permanent work) and increase in demand for treatment of clinical waste.
8.	Noise Quality	Noise modelling by using soundPLAN software	70 dBA (day time) and 60 dBA (night time) for designated industrial zone	Annex A, Procedure for Measurement of Noise Emission Levels, The Planning Guidelines for Environmental Noise Limits and Control, 2007	Noise generated by transportation of construction materials is expected to be short-term impact.  The site construction activities are expected not to cause any significant impact to the surrounding sensitive receptors as mitigating measures to reduce the noise level will be implement during the construction stage such as piling works during day time only and enclosed machine that generate high noise level with soundproof housing or enclosures.

Based on the findings from all sub-studies in this EIA, the main concerns are the air quality issue. However, with the mitigation measures proposed in **Chapter 8** of the EIA complimented with the past experienced in managing the scheduled waste, it is expected that the proposed activity will not impose any significant adverse impact to the environment in the vicinity of the proposed site.

Overall, based on the findings of this EIA, it is concluded that, with planned mitigation and the implementation of best practices to avoid or minimize adverse environmental impacts, the environmental impacts including cumulative environmental impacts during all phases are not rated significant. This report has also clearly demonstrated general acceptability of the residual impacts and thus the environmentally sensitive receptors in the vicinity of the new project would be successfully protected. Thus, it has been established that the development of the proposed SMOSB facility is predicted to not causing any severe residual impacts onto the environment if its operation strictly adhere to the standard guidelines. Thus, it is recommended that the proposed development of SMOSB facility to be approved on the basis that the project proponent will continuously adhere to the requirements of the environmental guidelines, employing mitigation measures to ensure compliance with statutory requirements and recommended criteria.