

## **CERTIFICATE OF ENVIRONMENTAL CLEARANCE RULES**

**Draft Terms of Reference for the Environmental Impact Assessment in respect of:**

**Application for a Certificate of Environmental Clearance by the Solid Waste Management Company Limited for the Establishment of a New Municipal Waste Disposal Facility to Include an Engineered Sanitary Landfill, Material Recovery Facility, Leachate Collection and Treatment Facility and Associated Infrastructure on 75 Hectares of Land at Kangawood Road, Forres Park, Claxton Bay**

**Application Reference: CEC5702/2019**

### **INTRODUCTION**

The Environmental Management Authority (EMA) received an application for a Certificate of Environmental Clearance (CEC) from the Solid Waste Management Company Limited (SWMCOL) on March 12, 2019, relating to a proposal for the establishment of a new municipal waste disposal facility to include an engineered sanitary landfill, Material Recovery Facility (MRF), Central Composting Facility (CCF), Leachate Collection and Treatment Facility and associated infrastructure on 75 hectares of land at Kangawood Road, Forres Park, Claxton Bay. The application was made in accordance with the CEC Rules and relates to Activities 8(a), 8(c), 35, 36, 37, 39, 41(a), 42 and 43(a) of the CEC (Designated Activities) Order (as amended).

The EMA has determined that it is likely that significant environmental impacts will arise from this activity, which requires a CEC. As such, an Environmental Impact Assessment (EIA) must be undertaken to allow for an informed CEC determination. EIAs must be undertaken in compliance with a Terms of Reference (TOR) which is prepared by the EMA in consultation with the Applicant. The purpose of the TOR is to guide the conduct of the EIA and the preparation of the EIA Report, which must describe the proposed project; identify and, where appropriate, quantify potential impacts and explain measures to be taken to mitigate any significantly negative impacts.

**This Notice and the Annexes relating to it, form the TOR for conducting the EIA required in respect of the proposal described above.** Every attempt has been made to ensure that this TOR addresses all major issues associated with this proposal. However, it is not exhaustive and should not be interpreted as excluding matters deemed to be significant but not incorporated within it, or matters (currently unforeseen) that emerge as important or significant from environmental studies, or otherwise, during the course of preparation of the EIA.

An outline of the EMA's understanding of the proposed project is set out in **Annex 1**.

It should be noted that the preparation of the TOR for this EIA does not indicate approval or support in any way, nor does it indicate approval in principle for the proposed activities.

## LEGAL FRAMEWORK

The CEC Rules were developed under section 26(h) of the Environmental Management (EM) Act, Chapter 35:05 and came into effect on July 7, 2001. The CEC (Designated Activities) Order (as amended) outlines a list of activities that require a CEC. No person shall proceed with any activity as listed within the Designated Activities Order unless such person applies for and receives a CEC from the EMA.

The proposed project to which this TOR relates is consistent with the following designated activities:

	Activity	Definition
8	<b>Clearing, excavation; grading and land filling</b>	a) The clearing, excavation, grading or land filling of an area of more than two hectares during a two-year period;  c) The clearing, excavation, grading or land filling of any area with a gradient of 1:4 or more.
35	<b>Establishment of a facility for solid waste disposal</b>	The establishment, modification, expansion, decommissioning or abandonment of a solid waste disposal facility inclusive of the disposal of industrial waste, aircraft and ship generated waste.
36	<b>Establishment of a facility for hazardous or toxic substance handling</b>	The establishment, modification, expansion, decommissioning or abandonment of a facility for handling, storage, treatment or disposal of hazardous substances.
37	<b>Recovery, recycling or incineration of waste</b>	The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of a facility for the recovery or recycling or incineration of waste.
39	<b>Establishment of surface impoundments, dams or reservoirs for storage of water</b>	The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of surface impoundments, dams or reservoirs for storage of water.

41	Establishment of land drainage and irrigation schemes	a. The establishment, modification, or expansion (inclusive of associated works) of a land drainage or irrigation scheme for a parcel of land of more than 1 hectare during a two-year period.
42	Establishment of waste water or sewage treatment facilities	The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of a waste water or sewage treatment facility.
43	Provision of other service-oriented activities	a) The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of an automotive repair garage, autobody shops, gasoline/service stations or vehicle inspection stations.

The CEC Rules describe the process to apply for and obtain a CEC. Rule 5(1) describes the process for preparation of the TOR for an EIA, while Rule 10 outlines the standards for preparation of the EIA.

In order to be environmentally acceptable, the proposed project must be in compliance with international standards or guidelines [as indicated in the National Environmental Policy (NEP), 2018] and pertinent local standards or guidelines. Local environmental standards or guidelines, which should be considered, are listed in **Annex 2**, together with sources for international standards.

## EIA OBJECTIVES

The purpose of the EIA is to identify and assess (qualitatively and quantitatively) the type and extent of environmental and socio-cultural impacts arising from the proposed project. The EIA must evaluate the cumulative impacts from this proposed project, ongoing projects and other proposed activities within the area and the surrounding environment. It must include an examination of the socio-cultural impacts (positive and negative) of this project on the wider community that can potentially be affected by it. The EIA Report must address these requirements as well as describe strategies for:

- The management or mitigation of any significant negative impacts;
- Assessment of the risks and hazards associated with all aspects of the proposed project; and
- Monitoring of the mitigation measures used, to ensure that the desired results are being achieved.

The Applicant must ensure that details provided regarding the design, layout and operations of all activities are sufficient for cumulative impacts to be assessed and for a rigorous assessment of these impacts in the public domain. The assessment must also address potential future project modifications, where these can reasonably be predicted. These must all be addressed in the EIA Report to the satisfaction of the EMA.

It is envisaged that the EIA Report will be based on the results of available research, studies and data, as appropriate, with further studies being conducted where necessary and practical. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed in the EIA Report.

The EIA is intended to:

- Allow communities that can potentially be affected by the proposed project and the wider public to understand the project and its impacts on them and their socio-cultural and physical environment, and to have their views and concerns addressed in the determination of the CEC application;
- Provide decision-making information with respect to the determination of the CEC application;
- Provide information that allows for maximum benefits of the project to the Applicant, the environment, and the local communities and wider public, if a CEC is granted and the project proceeds; and
- Allow regulators to ensure that positive impacts of the project are maximised and negative impacts eliminated or minimised to acceptable levels.

## **REQUIREMENTS FOR ENVIRONMENTAL IMPACT ASSESSMENT AND THE EIA REPORT**

Specific and detailed requirements for the EIA are set out in **Annex 3A** and these must be addressed fully in the EIA Report. In general terms, items to be addressed in this EIA include:

- 1. Legislative and Regulatory Considerations;**
- 2. Institutional and Financial Mechanisms;**
- 3. Description of the Proposed Project** (including the locations and description of project components, such as, but not limited to, MRF, CCF, landfill cells, leachate collection and treatment facility, engineered liner system, on site systems for leak detection, leachate collection, treatment and management of landfill gas, scale house and scale, administration facilities, maintenance garage, associated infrastructure and utility requirements, site and security, access arrangements, waste pre-treatment and acceptance criteria, landfill cell design and capping system, stormwater management system);

4. **Definition of the Study Area** in detail (which will include the proposed site, i.e. the immediate study area, together with the wider area within which the proposed project activities and operations may have impacts on the physical, biological and socio-cultural environments);
5. **Description of the Environmental and Socio-cultural Characteristics of the Study Area** (ensuring that the physical, biological, and socio-cultural features that may be susceptible to the impacts of the proposed project are clearly identified and described);
6. **Analysis of Alternatives** (describe the alternatives that have been considered and explain why they are not being pursued);
7. **Stakeholder Engagement** (which entails a listing of all organisations, non-governmental organisations, specialised/focus groups, individuals and other members of the public engaged/consulted in the course of preparing the EIA Report, together with the comments and feedback provided);
8. **Analysis of Environmental, Natural Impacts and Climate Change Impacts** - (describe the impacts that the proposed development will have on the physical, biological, and socio-cultural environments and consideration of climate change impacts on the proposed development);
9. **Assessment of Risk** (describe the risk associated with the proposed development as it relates to the physical, biological and socio-cultural environments);
10. **Emergency Response Plan;**
11. **Mitigation Strategy and Environmental Management Plan** - (describe and detail the measures to be taken to mitigate adverse impacts of the proposed project);
12. **Monitoring and Intervention Strategy** (describe and detail the ways in which the impacts of the proposed project are to be monitored and measured and contingency plans and actions to be activated if unforeseen and harmful – or potentially harmful residual impacts arise during the all phases of the project).

Detailed requirements relating to the format and presentation of the EIA Report are set out in **Annex 3B**.

Detailed requirements relating to Mapping and Geographical Information Systems are set out in **Annex 3C**.

## **OTHER INFORMATION**

Under section 35(5) of the EM Act, any application that requires the preparation of an EIA shall be submitted for public comment in accordance with section 28. Section 28(3) stipulates a period of not less than 30 days to receive public comments and this EIA Report would be made available for such comments as part of an administrative record.

## SUBMISSION REQUIREMENTS

In order to aid the review process, the following is required:

- One (1) hard copy and one (1) digital copy of the EIA Report must be submitted to the EMA in the first instance for preliminary review. If the EMA is not satisfied with the original submission, the documents will be returned to the Applicant to address these concerns;
- If the submission is deemed acceptable, the Applicant will be requested to submit to the EMA a further 10 hard copies and four (4) digital copies of the EIA Report;
- Digital copies of the EIA Report must be in PDF format and the Executive Summary in Microsoft Word. Each chapter of the EIA Report and each Appendix must be individual PDF files. Digital copies must be submitted on a USB/flash drive;
- All spatial and mapped data required must be provided digitally in a GIS format compatible with ArcGIS 10.3.

All submitted information will be used for the public comment process, and will be made available to other departments/agencies that would have a critical role in the evaluation of the EIA Report. Any information submitted may be copied as required, except in cases where confidentiality has been approved.

Dated this 11<sup>th</sup> day of July 2022

  
Hayden Romano  
**MANAGING DIRECTOR**

## **ANNEX 1**

### **OUTLINE OF THE EMA'S UNDERSTANDING OF THE PROPOSED PROJECT**

The Applicant has applied for a CEC for the establishment of a new municipal waste disposal facility to include an engineered sanitary landfill, MRF, CCF, leachate collection and treatment facility and associated infrastructure on 75 hectares of land at Kangawood Road, Forres Park, Claxton Bay.

The proposed facility will also include an engineered liner system, on-site systems for leak detection, leachate collection and treatment and management of landfill gas, scale house, scale, administration facilities and maintenance garage.

It is envisaged that this facility will receive waste from throughout Trinidad.

The proposed project will entail the following:

- a) **Engineered Sanitary Landfill**  
The proposed design approach will be a 'Canyon/Depression Method'. This design was selected as it takes advantage of the natural topography of the Forres Park site, while allowing for landfilling against the current waste disposal area at the site.
- b) **Liner System**  
The engineered sanitary landfill will be underlined by an engineered liner system. The liner consists of multiple layers which form a base for landfilling, physically separating the waste layers from the natural environment and includes a leachate collection system which allows for the collection for leachate for treatment. The intent of the liner is to minimise the leachate into subsurface soil thereby reducing the potential for groundwater contamination by leachate. The proposed liner is a composite liner which consists of a sub-base, base layer, a bottom liner system, a leak detection system, soil and High Density Polyethylene (HDPE) liner, leachate collection layer and cushion layer.
- c) **Leachate Treatment System**  
The conceptual leachate system proposed is a passive treatment system consisting of mechanical aeration followed by a constructed wetland or an equivalent leachate collection, treatment and discharge facility.
- d) **Landfill Gas Management System/Facility** – An engineered solution to efficiently and safely monitor, collect and process landfill gas.
- e) **MRF**  
Proposed to facilitate the receipt and processing of source separated recyclables into their appropriate material streams for marketing and recycling.


- f) Compost Facility: Proposed for the processing of organic waste including food, leaf and yard waste.
- g) Drainage system – A system of berms, culverts, pipes, drainage ditches and detention ponds.
- h) Other Site Infrastructure
- Scale house: Anticipated to be a single-level structure to facilitate the weigh scale operation and load inspection;
  - Weigh Scales;
  - Security Building;
  - Maintenance Garage: This facility is anticipated to permit maintenance of vehicles and on-site equipment, including oil and filter changes, topping of hydraulic fluids, washdown/cleaning of equipment, storage of tools, shower/washroom facility, etc.
  - Administrative building, inclusive of parking and staff welfare facilities;
  - Wheel wash.



**ANNEX 2**

**APPLICABLE STANDARDS AND GUIDELINES**

In order to be environmentally acceptable, the proposed project must be in compliance with international standards or guidelines (as indicated in the NEP, 2018) and pertinent local standards or guidelines. Local environmental standards or guidelines, which should be considered, are listed below.

1. Air Pollution Rules, 2014 (APR);
  2. Water Pollution Rules, 2019 (WPR);
  3. Environmentally Sensitive Species Rules, 2001 (ESS);
  4. Environmentally Sensitive Areas Rules, 2001 (ESA);
  5. Noise Pollution Control Rules 2001 (as amended) (NPCR);
  6. Waste Management Rules, 2021 (WMR);
  7. Town and Country Planning Act, Chapter 35:01;
  8. Planning and Facilitation of Development Act, 2019;
  9. The National Physical Development Plan, 1986;
  10. The National Spatial Development Strategy, 2013.
  11. State Lands Act, Chapter 57:01;
  12. The Water and Sewerage Act, Chapter 54:40;
  13. The Waterworks and Water Conservation Act, Chapter 54:41 (Rev. 2011);
  14. National Environmental Policy, 2018 (NEP);
  15. National Climate Change Policy, 2011;
  16. National Waste Recycling Policy, 2015;
  17. Integrated Solid Waste Management Policy, 2012;
  18. Municipal Corporations Act, Chapter 25:04;
  19. Litter Act, Chapter 30:52;
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20. Beverage Containers Bill, 2012;
21. Pesticides and Toxic Chemicals Act, Chapter 30:03;
22. Public Health Ordinance;
23. Occupational Safety and Health Act (as amended), Chapter 88:08;
24. Conservation of Wildlife Act, Chapter 67:01; and
25. The Forest Act Chapter 66:01 and Amendments Act 24 of 1999.

International standards or guidelines can be sourced from the following:

- International Conventions to which Trinidad and Tobago is signatory e.g. United Nations Framework Convention on Climate Change (UNFCCC), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention), the Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention), Protocol concerning Pollution from Land-Based Sources and Activities (LBS Protocol), and any other relevant agreements and treaties, and the following:
  - United States Environmental Protection Agency (USEPA);
  - World Bank Group, including the International Finance Corporation (IFC);
  - The Intergovernmental Panel on Climate Change (IPCC);
  - World Health Organization (WHO);
  - Multilateral Environmental Agreements; or
  - Other appropriately referenced and available material.



**ANNEX 3A**

**DETAILED REQUIREMENTS FOR THE ENVIRONMENTAL IMPACT ASSESSMENT**

**1.0 Legislative and Regulatory Considerations**

- a) Describe the relevant local and international regulations, standards and guidelines governing environmental quality, health and safety that would apply to the proposed project. Some of these are identified in **Annex 2** and should be expanded, as appropriate.
- b) Other agencies will be involved in various approval processes that would be applicable to this project. The approvals that are required should be outlined. Some of these agencies include, but are not limited to:
  - i. The Occupational Safety and Health Authority and Agency of the Ministry of Labour and Small Enterprise Development (OSHA);
  - ii. The Town and Country Planning Division of the Ministry of Planning and Development (TCPD);
  - iii. The Ministry of Health;
  - iv. The Drainage Division of the Ministry of Works and Transport (Drainage Division);
  - v. The Highways Division of the Ministry of Works and Transport (Highways Division);
  - vi. The Water and Sewerage Authority of the Ministry of Public Utilities (WASA);
  - vii. Commissioner of State Lands of the Land Management Division, Ministry of the Agriculture, Land and Fisheries (CoSL);
  - viii. The Forestry, National Parks and Wildlife Division of the Ministry of the Agriculture, Land and Fisheries (Forestry Division);
  - ix. The Water Resources Agency of the Ministry of Public Utilities (WRA);
  - x. The Hydrographic Unit, Surveys and Mapping Division of the Ministry of Agriculture, Land and Fisheries (Hydrographic Unit);
  - xi. The Office of Disaster Preparedness and Management of the Ministry of National Security (ODPM);
  - xii. The Couva/Tabaquite/Talparo Regional Corporation of the Ministry of Rural Development and Local Government (CTTRC);
  - xiii. The Trinidad and Tobago Fire Service of the Ministry of National Security (Fire Service);
  - xiv. The Trinidad and Tobago Police Service (TTPS).

**2.0 Institutional and Financial Mechanisms**

- a) Examine mechanisms or arrangements which may be utilised to address the following:

- i. Impacts resulting from explosions, discharges, spills or leaks;
  - ii. Potential and unexpected health and environmental consequences arising out of upset conditions or other unforeseen circumstances;
  - iii. Maintenance activities during the lifetime of the project.
- b) Mechanisms for addressing the implementation of mitigation measures and compliance monitoring by regulatory agencies must also be identified and evaluated.

### **3.0 Description of the Proposed Project**

- 3.1 The purpose of the project, as well as a justification for its conceptualisation and implementation, should be discussed, including a detailed description of the project's phases and activities.
- 3.2 A site plan of the entire site at a scale of 1:10 000 or 1:5000 (or other appropriate level) shall be provided to indicate the general layout of the proposed facilities as well as its relationship with the study area. Appropriate plans shall be included, at relevant scales, to facilitate comprehension of location, design, construction or operational processes, where necessary.
- 3.3 Provide sufficient information on the proposed scope and detail in the project description information to allow quantitative assessment of the environmental consequences where practical. If the scope of information varies among components, processes or phases of the project, provide a rationale, demonstrating that the information is sufficient for assessment purposes.
- 3.4 Detailed information on the project should be provided and must include the following:



- a) Location — map(s), showing the overall positioning of the engineered sanitary landfill and associated facilities (e.g. MRF, CCF, landfill gas treatment and management). This should show the layout of the proposed facilities/infrastructure, as well as their relationship to other proposed and existing activities and receptors in the area (e.g. any oil and gas infrastructure, utilities, agriculture, residential, institutional, recreational or commercial activities). Also, indicate the locations with respect to existing water resources (including, but not limited to watersheds, groundwater resources, surface water such as rivers and tributaries and coastlines), access roads, communities, institutional facilities, areas of cultural significance, terrestrial and aquatic migratory pathway(s), designated forest/wildlife protected areas and areas that should be conserved. Setbacks and proposed exclusion zones from any reserves and protected, prohibited areas and sanctuaries must be provided;
- b) Project scope – Description of all phases of the project including, but not limited to: mobilisation, site preparation, construction, commissioning and operation. A description of all the activities that would take place during each phase, including the equipment and machinery involved. Describe works for building/upgrade of infrastructure required for the project, including installation of administration and storage facilities, maintenance facilities, roads, bridges and drainage systems;
- Also, describe the processes involved in each aspect of the project, including points at which waste is collected, generated, and treated.
- Flow diagrams shall be utilised as far as possible to illustrate the process for the different phases/activities, where applicable;
- c) The resource requirements (i.e. personnel, tools, equipment, materials, and utilities) for mobilisation and site preparation, construction, start-up, operation and for worst-case conditions/emergencies, including the water and electrical requirements;
- d) Design basis, design capacity and normal operational capacity (stating all design codes and standards employed);



- e) Source and description of all raw materials/chemicals to be used in all phases of the project, if applicable. This should also include estimates of quantities to be stocked, quantities to be consumed - volumes/weights of each must be included. Safety Data Sheets (SDS) for each chemical should be provided in an appendix. Include storage and transport arrangements (i.e. measures for the safe storage and transportation of potentially dangerous materials), how and when they will be used and safety precautions for use and disposal;
- f) Description of the source, estimated quantity and composition of all potential hazardous and non-hazardous liquid wastes (e.g. sewage, waste chemicals, leachate and other wastewater) that will be received at the facility and/or generated during the treatment and disposal process, as well as a description of how they will be managed (i.e. containment, treatment, transport and disposal) and what special risks, if any, they pose. All estimates of quantity must be stated in appropriate units of volume or weight and concentration-based rates in mg/L. The receipt, collection, storage and treatment of all effluent generated may best be depicted on a flow diagram;
- g) Description of the source, estimated quantity, composition and characteristics of all potentially hazardous and non-hazardous (e.g. domestic solid waste) municipal solid wastes that will be received, as well as a description of how they will be managed (i.e. containment, treatment, transport and disposal) and what special risks, if any, they pose. All estimates of quantity must be stated in appropriate units of volume or weight;
- h) Description of the source, and estimation of the quantity and concentration-based rates of air emissions generated from all associated activities from this type of project in units of milligrams per normal cubic metres (mg/Nm<sup>3</sup>). This shall include Greenhouse Gas Emissions (GHGs), where applicable. A description of any emissions control systems and/or operational practices/ measures to reduce the release of air pollutants shall also be included;
- i) Description of any climate change considerations/adaptation measures incorporated into the project's design, such as, but not limited to:
  - Project location/siting and layout;
  - Greenhouse Gas (GHG) emission sources associated with the project;



- Proposed technologies and/or strategies to reduce identified GHGs.
  - j) Description of the anticipated source(s) of noise and estimation of the sound pressure levels (i.e. average and peak levels at the fence line) expected to be generated from any project-related activities (in dBA);
  - k) Description of flaring activities and other measures for dealing with upset conditions at the proposed site, where applicable.
- 3.5 Description of required utilities (natural gas, water, fuel, electricity, etc.) in terms of requirements and areas to be utilised, availability, sources and plans for obtaining such, and infrastructure that will be required. Evidence of discussions with relevant utility companies should be provided to demonstrate their ability to meet the requirements of the development. A description of any renewable energy utilities that will be included within the project should also be provided;

3.6 Drainage, Leachate and Stormwater Management

Description of the stormwater management systems for the proposed facility during the site preparation, construction and operational phases of the development. This should include the following:

- A description of proposed drainage infrastructure such as, but not limited to, box drains, curb and slipper drains, process water reticulation/piping system, if applicable. Existing drainage infrastructure (natural and built) shall also be discussed in relation to the proposed infrastructure;
- Scaled site plans showing site drainage for the proposed MSW facility, including the engineered sanitary landfill, MRF, CCF, gas management facilities, proposed garage etc., and measures for the management of stormwater, as well as any contaminated wastewater from site operations (e.g. leachate). This shall be illustrated in relation to existing (built and natural) drainage infrastructure;
- Site plans of the associated project area showing access arrangements, daily traffic route(s), internal roads, carparks, where applicable;
- Expected discharge rates and location of all proposed point(s) of discharge into the receiving environment.



- 3.7 Establishment/Upgrade of access roads and installation of supporting infrastructure
- Description of the requirements for earthworks and site preparation, including the nature and extent of cutting, filling and rehabilitation works to be done to existing and proposed access roads. Areas where new roads will be created and where existing roads will be upgraded should be clearly identified, where applicable;
  - Description of the methods and equipment proposed for the site works;
  - Description of any bridges to be constructed and/or rehabilitated to facilitate access to the facility;
  - Identification of areas/routes for the installation of pipelines for the transmission of water, fuel, leachate/contaminated runoff and any other utilities required for the MSW facility, as well as a description of the procedures/construction methods and equipment proposed for use.
- 3.8 Description of transportation requirements – discuss equipment and machinery to be utilised, access routes and information regarding the design and upgrade of new or existing transportation resources;
- 3.9 Inspection and maintenance – describe integrity checks and procedures for maintenance of equipment and infrastructure, including upgrade work. This shall include, but not be limited to, corrosion prevention systems, leak detection systems and any required emergency or shutdown procedures;
- 3.10 Scheduling of the project - include specific timeframes and sequencing for all phases of the project, including but not limited to, mobilisation, staging of equipment and materials, earthworks/site preparation, construction, installation of infrastructure, utilities and facilities operational and maintenance activities; indicate which activities will occur concurrently or sequentially. Project schedules should utilise flowcharts/Gantt charts as much as possible;
- 3.11 Identification of staffing, support, facilities and services that would be required during the different phases of activities;
- 3.12 Description of other existing, approved and ancillary projects in sufficient detail to allow for assessment of cumulative impacts, particularly over the duration of the proposed activity.



#### 4.0 Definition of the Study Area

- 4.1 The study area should be determined by the extent of direct and indirect interactions between the proposed project and the physical, biological and socio-cultural environments, including the natural hazard or climate change elements affecting the spatial and/or temporal boundaries of the proposed project. This should include the locations of the proposed landfill facilities, associated MRF, CCF, leachate and gas treatment, storage facilities and access route as well as surrounding areas and sensitive receptors that can be affected by discharges, explosions, emissions, accidental spills or other incidents;
- 4.2 The study area should also include:
- a) Surrounding environment inclusive of existing infrastructure within the general area, and associated areas that can be affected by discharges, emissions, explosions or accidental spills;
  - b) Surrounding communities that can be affected by noise, air emissions, increased traffic, spills, emergencies or other upset conditions also need to be considered in defining the study area;
  - c) Areas that may be potentially affected by the activities or by associated infrastructure such as storage and recovery facilities, treatment systems and other infrastructure;
  - d) Biological environments that can be affected by the development activities;
  - e) Adjacent developments (existing and proposed that are planned within the range of influence of the project site) as well as commercial/agricultural/recreational/institutional/residential activities that may be affected by the proposed project.
- 4.3 The immediate and wider study area should be properly delineated and referenced in relation to the Universal Transverse Mercator (UTM) coordinate system (Zone 20 N) within the World Geodetic System 84 (WGS84) datum and should be described with accompanying photographs, aerial photographs, satellite imagery, geological maps and/or topographical maps and any other diagrams at easily understood scales to illustrate the spatial extent of the project and the potentially impacted areas and sensitive receptors. Labelling of maps and diagrams must be at a font size that is readily legible, and data sources and dates must be cited.



- 4.4 The rationale used for delineation of the study area (i.e immediate and wider) must be explicitly described.

**5.0 Description of the environmental and socio-cultural characteristics of the study area**

- 5.1 Conduct a review of recent studies [i.e. studies conducted within the last five (5) years] undertaken in the study area to determine the relevance of these studies as they relate to the current physical, biological and socio-cultural environments. Where recent studies are being utilised, justification must be provided to demonstrate that the baseline conditions would not have changed over this five-year period and the data are still representative of the study area. Where it is believed that past studies failed to produce a relatively good assessment of baseline conditions, the Applicant shall undertake field studies to fill appropriate data gaps so that a comprehensive description of the physical, biological and socio-cultural environments can be produced.
- 5.2 The data presented shall be representative of the study area. The term 'representative' defines the extent to which a set of measurements taken at a collection site spatially and temporally reflects the actual conditions within the study area. Therefore, in instances where the data are being collected and reported from stations that are located offsite (i.e. outside the boundaries of the study area), and/or, where data is dated (i.e. greater than five years), a justification must be provided to demonstrate that the data are representative of the study area. Otherwise, the Applicant will be required to provide more accurate, site-specific data.
- 5.3 Include changes that may occur before the project commences in light of previous, ongoing (i.e. other operations within the defined study area) or future activities that could reasonably be determined to have a combined effect.
- 5.4 Sufficient detail is needed to allow a clear understanding of the likely negative impacts of the proposal, and to assess the effectiveness of any proposed mitigation measures. An examination of any positive impacts should also be included to ensure as comprehensive an assessment as possible.
- 5.5 Adequate spatial and temporal samples shall be taken to ensure a proper assessment of baseline conditions. Details of the study area shall include the following:



### 5.5.1 Physical Environment

The Applicant shall design a network of sampling stations for the study area which is representative of areas that may be impacted by the release of pollutants into the environment or by the other aspects of the project. The sampling network and regime must be designed to obtain a comprehensive assessment of the environmental conditions, including seasonal variations within the study area. Methodologies should be detailed for all sampling stations, sampling regions and analyses, and included in the relevant appendices of the EIA document. An assessment of the physical environment should include:

#### 5.5.1.1 Geology and Soils

- a) Subsurface stratigraphy (mapped) and characteristics of the study area;
- b) Structural geology (mapped) and seismology of the study area;
- c) Geological anomalies of note, if any;
- d) Map formations within the project area which may be significant sources of other economically viable resource, for example aggregates;
- e) Land use capability maps which clearly represent the potential uses of the land within the wider study area;
- f) Topography – a topographical map that clearly shows the elevation patterns within the proposed study area, in order to determine the amount of cutting and filling which will be required to develop the proposed site and to inform site layout and design.

The Applicant shall conduct a scoping exercise to identify any additional parameters of concern that should be included in the testing regime, based on the characteristics of the spoil to be disposed of, and the characteristics of the receiving environment at the disposal site;

#### 5.5.1.2 Water Resources

- a) Surface Hydrology and Drainage – map and discuss the existing drainage patterns/characteristics of the site and wider study area, and provide the dry season and wet season flow rates of all watercourse(s) which traverse the study area, where applicable;
- b) Groundwater – including, but not limited to, such aspects as:

A discussion of the characteristics of the major aquifers and other groundwater resources in the study area, including area and volume capacity, and specifically whether they are confined or unconfined.

Map known recharge areas of aquifers, where these occur in the study area.

- c) Surface Water Quality – including, but not limited to, such aspects as:

Assessment of the surface water quality within the study area, particularly at the proposed main outfall point(s), if any, from the proposed facility to inland surface waters. Sampling locations in relation to proposed activities shall be clearly illustrated on a suitable map.

- d) Data shall clearly show coordinates of sample points and should be geo-references and mapped.
- e) Monitoring shall be conducted according to test procedures as prescribed in the 23<sup>rd</sup> edition or more recent of the Standard Methods for Examination of Water and Wastewater (SMEWW), American Public Health Association (APHA) or USEPA. If the method chosen for analysis does not conform to an internationally accepted or comparable method, please provide a justification for its use;
- f) Copies of all quality data records in support of the monitoring data should be included. Documents include, but are not limited to, sample records, chain of custody, identification of sampling and analysis equipment, analytical methods, calibration records and the competency of the personnel and/or service provider conducting the analysis (e.g. laboratory certification).

A scoping exercise (based on the intended activities to be carried out during the operational phase of the project) should be conducted to identify all relevant baseline parameters that may be affected. Analysis shall include a wet season and a dry season sample, at least 4-6 months apart, within the study area(s), and comparison should be made with any historical data for the area and with Schedule III of the WPRs. Discussions to address any above-standard parameter level(s) shall be provided;

These studies must demonstrate that they satisfactorily describe the full range of environmental conditions that could be expected during the proposed project.



5.5.1.3 Air, Noise, Light and Climate

- a) A description of the climate and meteorology as they relate to the potential to impact on the project's activities, operations, safety and the discharges/emissions related to the activity (including wind speed and direction, prevailing wind conditions, seasonal variations and storm conditions). Historical data about the intensity and frequency of storms and hurricanes that traverse the study area, the potential for such an event, and consequences on the proposed project may be presented.

This shall also include an analysis of the future meteorological conditions of the study area based on published information from recognised sources and appropriate professional judgement. Any extrapolated data must be justified, and references provided, where applicable (e.g. source of data and metadata for use in modelling exercises, where actual sampling was not conducted);

- b) Ambient air quality representative of the study area that may be affected by project activities - Describe, assess and discuss appropriate ambient air quality parameters associated with the expected emissions of this type of project including, but not limited to the ambient concentration of Total Suspended Particulates (TSP), Particulate Matter less than 10  $\mu\text{m}$  ( $\text{PM}_{10}$ ), Particulate Matter less than 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ), carbon monoxide (CO), nitrogen dioxide ( $\text{NO}_2$ ), sulphur dioxide ( $\text{SO}_2$ ), hydrogen sulphide ( $\text{H}_2\text{S}$ ), Volatile Organic Compounds (VOCs), Ammonia ( $\text{NH}_3$ ), Methane ( $\text{CH}_4$ ) and Ozone ( $\text{O}_3$ ); also, if a history of gas emissions is known, information must be furnished on levels, events, etc. The following shall be considered when conducting the sampling exercise:

- The number and distribution of ambient air quality monitoring stations shall take into consideration the area to be covered and the spatial variability of the pollutants being measured. At a minimum, monitoring shall be conducted upwind and downwind of the facility at the property fence line and downwind of the nearest sensitive receptor. Monitoring should also be conducted within each community surrounding the proposed facility, which may be impacted by the proposed project. Meteorological data (wind speed, wind direction, temperature and atmospheric pressure) should be provided;



- A map illustrating the sampling points and a justification for the number and locations of the sampling points must be provided;
- Recommended methods of sampling and analysis include those developed by the United States Environmental Protection Agency (US EPA), the New South Wales Approved Methods for the Sampling and Analysis of Air Pollutants or any other internationally accepted or comparable methods (e.g. ISO and Environment Canada).
- Copies of all quality data records in support of the monitoring data should be included. Documents include, but are not limited to, sample records, chain of custody, identification of sampling and analysis equipment, analytical methods, calibration records and the competency of the personnel and/or service provider conducting the analysis (e.g. laboratory certification).

c) Measurement of Sound Pressure Level (Noise).

A baseline noise data collection exercise should be conducted to ascertain ambient noise levels, representative of the study area that may be affected by the project's activities. Sound Pressure Level (SPL) measurements during this exercise shall be recorded at appropriate locations within the study area, (inclusive of surrounding communities that may be impacted by project activities) in an attempt to adequately capture the fluctuations in baseline noise levels in the area. This shall include a justification/rationale for selection of sampling locations, to demonstrate appropriateness/representativeness of the selected sites. Monitoring exercises should ideally capture both weekdays and weekends and shall be repeated at each sample location over the data collection exercise. The noise monitoring regime should consider the monitoring of the following parameters for the determination of background noise levels:

- Equivalent continuous sound pressure level ( $L_{eq}$ );
- The maximum instantaneous unweighted peak sound pressure level ( $L_{peak}$ );
- Minimum sound pressure level ( $L_{min}$ );
- Maximum sound pressure level ( $L_{max}$ ).



The methodology shall be conducted in accordance with the Second Schedule of the NPCR. Reporting shall be done in accordance with the Third Schedule of the NPCR, which includes, but is not limited to: the make and model of instrument, frequency weighting, time weighting, exchange rate and the logging interval.

- d) Light – Qualitatively assess and discuss baseline light conditions (especially for any residential or pristine areas) within or in proximity to the study area.

#### 5.5.2 Biological Environment

The Applicant shall use current, available information or site-specific field surveys to assess the terrestrial environment and the riverine environment, where applicable, for impact prediction, and development of mitigation and monitoring programmes. The sampling regime must be scientifically rigorous and statistically significant to allow for future comparisons. Life cycles, seasonality and migration of species must also be captured. Characterisation of the biological environment shall include, but not be limited to, the following:

- a) An identification of floral and faunal species within the study area (both terrestrial and riverine environments, where applicable). This shall include a description of the following:
  - i. Flora - A quantitative description of floral species within the study area. Provide information on plant species and communities that are present within the study area, including information on any rare or endangered plant species, and information on any specialised or unique plant communities that may be present. Plant communities should be mapped, and the area of any community type that may be lost due to project activities must be estimated, in square metres or hectares;
  - ii. Fauna – A quantitative description and classification of faunal species within the study area and their use of the surrounding environments – document and describe any species of wildlife including, but not limited to, amphibians, fish, reptiles, birds, mammals and invertebrates, that use the study area. Include a description of the aquatic, as well as avian fauna. The description should highlight species of commercial importance within the receiving environment. The description should also focus on seasonality, as well as migration patterns and population estimates. An explanation of, and discussion on, diversity indices and controls used must be provided;

- iii. Provide information on the ecological relationships, biological productivity and sensitivity/vulnerability of the floral and faunal species within the study area (immediate and wider), where applicable, using local and international studies. Particular emphasis should be placed on species (both floral and faunal) that may be impacted by the project;
- iv. Identify and describe any environmentally sensitive species (as defined within the ESS Rules) as well as rare, threatened, endangered and endemic species in the study area;
- v. Identify and describe any environmentally sensitive areas (as defined within the ESA Rules) located within the study area;
- vi. Any certain or potential scientific correlation(s) between the health of ecological communities described and the various soil, sediment and water quality parameters observed should be clearly identified and discussed.

#### 5.5.3 Socio-cultural Environment

- a) Describe the socio-cultural baseline of the study area. In order to capture a true representation of the baseline conditions, it will be useful to identify the proposed project's probable area of influence, as it relates to its potential biophysical and socio-cultural impacts. This may be achieved through the collection, reporting and analysis of appropriate and sufficient data from relevant sources (including Census data, information from village councils, local government, community-based organisations and community knowledge/asset information) and primary research;
- b) Map overlays (depicting any communities within the areas of potential impact) should be used to provide a spatial portrayal of socio-cultural data. Field studies shall be undertaken to fully establish an appropriate social baseline, and to update information that may no longer be current;
- c) Appropriate data gathering methods shall be used commensurate with the level of detail required to determine risk to socio-cultural components;
- d) The socio-cultural baseline shall also include, but not be limited to, the following information, where applicable:



- i. Identification of resource users (including traditional users and other service providers) ranging from subsistence utilisation of natural resources to resource use on a commercial scale;
- ii. Description, quantitatively and qualitatively, of the use of the area;
- iii. Identification of any archaeological and/or cultural resources within the study area;
- iv. Identification of recreational uses.

## 6.0 Analysis of Alternatives

6.1 The EMA encourages the Applicant to recognise the integral relationship of a robust, iterative alternatives analysis process to meaningful and effective stakeholder engagement and the overall effectiveness of the EIA. A careful, rigorous alternatives analysis carried out at the core of an EIA process presents a logical platform for an effective stakeholder engagement process. These principles are reinforced and supported as sound practice by international bodies such as the World Bank, the Inter-American Development Bank (IDB) and the United Nations, and are consistent with adopted national policies such as the National Environmental Policy, 2018;

6.2 The Applicant will benchmark, where applicable, the preferred alternative against case studies of similar projects and will describe reasonable alternatives to the proposed project, technology and operations involved that would achieve similar objectives. This extends to, but is not limited to, the project alternatives such as the location of the facility and process alternatives to technology, mobilisation, demobilisation, access routes, treatment facilities, systems and technologies to be employed, maintenance procedures and decommissioning, if applicable. This extends to, but is not limited to, the project alternatives such as:

- Siting – possible alternative locations for this activity;
- Conceptual design, including dimensions, alternative options, for example changes in orientation, layout, components and facilities offered at the proposed facility;
- Changes in scale/scope of services to be offered at the facility;
- Types of technology and equipment used in construction activities;
- Construction techniques and phasing;
- Type of treatment, recovery, composting and disposal approaches and systems proposed;

- Operation and maintenance procedures.

- 6.3 The 'no action' alternative must also be considered. Provide a comparison of impacts as a result of a continuation of existing activities and conditions with those of the proposed project and action alternatives. This will demonstrate potential changes in the existing socio-cultural and environmental baseline conditions without the project;
- 6.4 Alternatives must be discussed in sufficient detail to clarify the reasons for preferring certain options and rejecting others. The reasons for choice of the preferred option(s) should be explained, including the following:
- i. A comparison of the adverse and beneficial effects (both to the environment and community-local and national) used as the basis for selection;
  - ii. Compliance with government policy;
  - iii. Compliance with the principles and objectives of sustainable development;
  - iv. The impact of significant delay or abandonment of the project before all of the proposed phases are completed.

## **7.0 Stakeholder Engagement**

- 7.1 Stakeholder engagement is crucial to the overall success of a given project. It can assist in the early identification of all affected stakeholders, identification and mitigation of environmental and socio-cultural issues, maximisation of project benefits, and avoidance or reduction (to the extent practicable) of the potential for controversy, cost overruns and project delays;
- 7.2 The Applicant can utilise alternative means of engagement including but not limited to those below keeping in mind the most recent Ministry of Health guidelines:
- i. Conducting focus group meetings with identified stakeholders;
  - ii. Lodge/Post project related documents at business places or other accessible locations within the community for public comment;
  - iii. Conduct virtual meetings with key stakeholders as well as statutory and advisory agencies.



- 7.3 The Applicant shall identify all relevant stakeholder groupings, such as project beneficiaries, adversely affected groups/individuals, interested parties, as well as relevant government agencies/authorities, non-governmental organisations and other members of the public (including, but not limited to media and any communities) that may be affected by the project and facilitate a minimum of two (2) public and other specialised discussions/fora (such as those identified below) with these stakeholders;
- 7.4 A first round of engagement exercises should be held prior to initiation of studies for the project; to engage with, garner and integrate feedback from all identified stakeholders into project design;

The following information must be presented during this first round of engagement exercises:

- Purpose and need for the project;
- All relevant project alternatives and designs (including the “no action” alternative);
- All alternatives that satisfy the purpose and need for the project;
- Description of all alternative actions or projects that were/are/being considered;
- Description of initial environmental impact assessment processes and results (i.e. impacts/risks and mitigation measures);
- The precise location of the project and its components;
- The activities to be undertaken by the Applicant;
- All logistics associated with the activities, including use of resources, infrastructure, scheduling and duration of activities;
- Anticipated impacts/risks associated with the project and proposed mitigation measures; and
- Studies to be undertaken as part of the project.

Additional rounds of engagement exercises must be held, which must include, but not be limited to, the same stakeholder groups as the first/subsequent/follow-up round(s) of the engagement to provide results of previously identified concerns and queries as well as relevant studies, demonstrate how potential impacts will be mitigated and if and how their initial concerns would be addressed and/or incorporated into the project design.

These engagement exercises shall be scheduled to allow all stakeholders, adequate time for assimilation and assessment of the information presented and submission of concerns. Information must be graphic, concise, clear and designed in a manner that is easily understood by all and to elicit participation;

- 7.5 Each engagement exercise must be prominently advertised to the public and in the local areas. Such exercises may take the form of public meetings, local radio stations, open houses, question-and-answer sessions, surveys, focus group meetings, workshops with parallel discussions of key issues, use of virtual platforms and any other formats appropriate for their intended audience taking into consideration any current Public Health Regulations and guidelines;
- 7.6 The Applicant is advised that these afore-mentioned engagement exercises are only a minimum requirement and additional exercises may be necessary to ensure that all concerns and issues are brought to the fore and measures incorporated to address such issues/concerns, as far as practical. The Applicant may also choose to conduct independent consultations or focus group meetings with stakeholders as it sees fit;
- 7.7 An appropriate number of copies of the relevant document(s), summarising the project must be placed at locations where the document can be easily accessed/referenced by members of the public and other stakeholders at least two (2) weeks prior to the scheduled stakeholder engagement exercise;
- 7.8 The Applicant shall ensure that it has experts along with project (company) personnel who are authorised to make a decision/pronouncement on the project and are able to respond to questions and concerns in their respective fields. After each engagement exercise, the Applicant will be responsible for providing additional information in response to questions or concerns raised and discussed/ventilated which may not have been fully answered/answerable during particular meetings/forum, in a timely fashion. The manner in which feedback is to be provided to stakeholders must be clearly explained. After each forum, the facilitation team will document information provided by the Applicant, and summarise questions, especially those that pertain to potentially significant project impacts, raised and the Applicant's responses to those questions.

7.9 Public Meetings

The following guidelines shall be followed for public meetings, considering the most recent Ministry of Health Guidelines and Regulations;



7.9.1 Location

- a) Virtual platform(s), if being considered for meetings, shall be easily accessible to interested participants and communities that can be directly affected by the project, and with the capacity to accommodate at least 100 persons. Meetings shall be held at a time that is best suitable for maximising attendance/participation.

7.9.2 Advertising

- a) The meetings shall be advertised on social media, local media and at least one (1) national daily newspaper at least one (1) week before the date of the meeting. The advertisement should occupy at least one quarter of a page in the newspaper and should be bold and noticeable.
- b) Flyers of at least 8 1/2" by 11" in size shall be placed at popular stops within the surrounding communities such as gas stations, supermarkets, local shops, banks and drugstores or within daily newspapers circulated within the communities (this service can be accessed via the newspaper houses). Fonts on the flyers shall be bold and noticeable;
- c) Letters or other measures of communication to those stakeholders who may not reside in the affected communities (e.g. governmental entities, including regional and city corporations who deliver to the site, scrap metal dealers association, contractors hired by SWMCOL to collect waste, private service providers).
- d) Other means of advertising may be used, such as radio and television announcements, public announcements systems, announcements in community organisations such as community centres, churches, etc.

7.10 Stakeholder Engagement Format

7.10.1 The Applicant or representatives authorised to make project decisions (the facilitator) shall identify themselves and inform attendees of the purpose and need for the stakeholder engagement, the reason that stakeholder input is being sought, i.e. to garner stakeholder feedback for consideration in the final project design, and that specifically that a CEC is being sought from the EMA to proceed with the project;

7.10.2 During the stakeholder engagement forum, the Applicant or representative(s) of the Applicant shall give a clear and concise synopsis on the project as detailed above;

- 7.10.3 All persons shall be given an opportunity (fair hearing) to express any concerns on any one or several of the project's components;
- 7.10.4 All comments/questions from the meeting(s) shall be documented and submitted as the Stakeholder Engagement Report within the EIA Report, including a verbatim record of the proceedings;
- 7.10.5 The information gathered shall be representative of all stakeholders and shall address the concerns raised during the consultation process. The Stakeholder Engagement Report must demonstrate that public and stakeholder concerns have been adequately considered by suggesting possible modifications to the project proposal/designs or by clarification of items within the document. This must be appropriately documented and included in the Stakeholder Engagement Report;
- 7.10.6 The Stakeholder Engagement Report shall also contain details on the manner in which the public and other stakeholders were notified, the groups targeted, a description of the stakeholder engagement process, a list of all stakeholders included in the process, the number of engagement exercises held, location of the exercises, dates held, minutes of all engagement exercises, a copy of the surveys/questionnaires used (if any), and the results of such. Any uncertainties and gaps in the collected data as well as challenges encountered during the data collection process and the manner in which such gaps were addressed, should be highlighted;
- 7.10.7 A plan on how stakeholders will continue to be engaged during the project lifecycle (implementation and operations) must also be provided in the Stakeholder Engagement Report.

#### **7.11 Grievance Redress Plan**

Establishing a Grievance Redress Plan (GRP) is an important part of mitigating environmental and social risk. A GRP is required when there is a risk of potential adverse impacts, actions and/or results related to project activities or programmes. People may also communicate concerns and complaints about the nature of the consultation process itself, for example if some feel excluded. Affected stakeholders, whether individuals or groups, should have access to a transparent, fair, and equitable mechanism that can act with a degree of independence from the project.



The Applicant must formulate a mechanism for addressing external grievances as part of its stakeholder engagement plan, which should serve four (4) purposes:

- Decision making related to project design and development, i.e. form part of a project management system;
- A mechanism for timely resolution of an issue and prevention of the escalation of problems into social conflict;
- An accountability mechanism, where people can seek remedy when needed without fear of costs or retribution; and
- Embodiment in the project's monitoring and evaluation process, and thus contribute to institutional learning.

A project-specific GRP must be established and operational throughout the project life cycle and incorporate:

- a) An understandable, accessible and culturally appropriate grievance process (i.e. how people are informed about the GRP and its purpose);
- b) Appropriately scaled mechanism(s) to address project and stakeholder needs;
- c) Clear and public process for handling grievances (i.e. who is responsible for managing queries, concerns and/or complaints; the manner in which queries, concerns and complaints related to the project are received; the procedure to be followed to address/manage queries, concerns and complaints, including proposed turnaround times; accessibility to community liaisons etc.);
- d) Mechanism for mediation by third parties, where required;
- e) Transparency (i.e. the manner in which queries, complaints and/or concerns are received, documented, treated, resolved and how resolution actions are monitored);
- f) Good record-keeping protocols to facilitate effective grievance management (i.e. the manner in which resolution outcomes will be documented and communicated); and
- g) Free access to legal remedies.

The GRP must be included in the stakeholder engagement forum to allow for an early understanding of the grievance redress mechanism and submitted as part of the Stakeholder Engagement Report.

## **8.0 Analysis of Environmental, Natural Impacts and Climate Change Impacts**

- 8.1 The Applicant shall identify all impacts that could arise during each phase of the project and distinguish, where applicable, between negative and positive impacts, direct and indirect impacts, immediate, short-term and long-term impacts, and cumulative impacts;

- 8.2 The Applicant shall provide a description of the vulnerability of the project, inclusive of proposed structures and design, to natural hazards and climate change impacts including increases in temperature, changing rainfall intensity, dry spells, drought and associated lowering water levels as well as changes in the frequency, magnitude and distribution of any natural hazard or climate change element affecting the spatial or temporal boundaries of the proposed project. This shall consider the effects of the current climate on the project, as well as prediction of the future environmental impacts related to climate change on the project. Prediction of impacts may be achieved through the review of research and information published by reputable bodies which will aid in understanding of future climate trends over the next 20 to 100 years;
- 8.3 To illustrate significance, direct comparisons should be made between estimates of the potential impacts and the baseline conditions for given parameters/indicators;
- 8.4 The Applicant shall also describe impacts quantitatively, as far as possible, and shall consider those that can occur in unforeseen circumstances. The reliability of forecasts and predictions shall be indicated as appropriate;
- 8.5 The Applicant shall utilise models of physical, chemical and geochemical processes to aid in the understanding of predicted changes within the terrestrial and aquatic zone environments, where applicable;
- 8.6 The Applicant shall also provide data from other existing activities using the same technology with which to compare, or assist in the prediction of impacts for this proposed project, where applicable;
- 8.7 Impacts must be categorised and illustrated using an appropriate format e.g. matrices, where applicable;
- 8.8 A method of determination of impact significance must be clearly outlined, including specific significance criteria that would allow the reader to understand the level of impact of the project on key ecological and socio-cultural components and how these levels were estimated;
- 8.9 Areas of impact/hazards shall be illustrated in map form and those that are unavoidable or irreversible must be specifically identified. Significant changes to baseline conditions shall also be quantified and displayed where possible;



- 8.10 Ambient air quality environmental impacts of emissions from each significant source can be assessed by conducting air dispersion and deposition modelling to predict the concentrations of air pollutants. The inputs to the model and any assumptions used in the process should be stated. Note that inputs to the model should represent maximum emission rates of the units being modelled. A discussion of the results should include a discussion of existing ambient and cumulative increases, where applicable.
- 8.11 A determination of residual impact significance shall be provided for each key environmental or socio-cultural component (by major phase or activity) after considering the application of proposed mitigation measures (i.e. rank the significance of residual effects following mitigation. Proposed mitigation measures to reduce adverse impacts and measures to enhance benefits must be clearly described;
- 8.12 A list of all Applicant commitments for mitigation, monitoring and follow-up measures must be clearly recorded and included in the Environmental Management Plan;
- 8.13 The potential impacts to be discussed include, but are not limited to, those related to:
- a) Air (including, but not limited to):
    - i. Dust – discuss the generation and movement of dust offsite during the site preparation, construction and operational phases (such as dust from the receipt, storage, treatment and disposal of input material on site) of the project;
    - ii. Provide an emissions profile (type, emission rate, concentrations, source etc.) for the main disposal and supporting facilities, such as, but not limited to landfill gas management facility and a discussion of the expected emissions from all aspects of the project, inclusive of vehicles associated with the facility;
    - iii. Discuss the potential for cumulative impacts on ambient air quality during construction activities with other existing or approved construction activities within the study area; assess cumulative impacts on ambient air quality from emissions during operation and maintenance activities with other existing or approved projects for the study area, and assess the potential for reduced air quality;

- iv. Discuss any implications of the expected impacts to air quality for environmental protection and public health;
  - v. Evaluate the contribution to, and impacts of emissions from the proposed project with respect to greenhouse gas composition, emissions and influence on climate change, where applicable.. This should include a description of the expected annual greenhouse gas (GHG) emissions over the various phases of the project;
  - vi. Include realistic, feasible measures employing Best Available Technologies Not Entailing Excessive Cost (BATNEEC) and Best Practicable Environmental Options (BPEO) to avoid, mitigate or remedy adverse impacts to acceptable levels (i.e. in accordance with Schedules 1 and 2 of the APR 2014). Provide details on how air emissions will be controlled at each emission source and discuss why the proposed technology was selected over other potential methods of control;
  - vii. Assess the impacts of the project on the micro-climate of the study area, where applicable.
  - viii. Regarding stack emissions, if applicable, the following is required:
    - A discussion of any consideration of the BATNEEC as specified in the NEP, 2018;
    - A comparison of stack emissions with the limits in the Schedule 2 of the APR, 2017;
    - Emissions should be presented in mg/Nm<sup>3</sup>.
- b) Noise and vibrations including, but not limited to, such aspects as:
- i. The impact of noise and vibration during all phases of the proposed project on fauna (including nesting, feeding and other animal behaviour such as migration) within the study area; this should include both short- and long-term impacts; the fauna considered should include those identified in the characterisation of the baseline environment;
  - ii. The impacts of noise and vibration on human receptors, human activity and buildings/existing infrastructure.

- c) Water quality, surface hydrology and drainage including, but not limited to, such aspects as:
- i. Impact of the project on surface water quality (including changes to baseline levels) and the potential for contamination from any aspect of the proposed project. Emphasis should be placed on the potential impact to receiving water quality during site preparation and construction, as well as runoff, effluent discharge, inclusive of stormwater runoff and leachate management during the operational phase of the project. A scoping exercise (based on the intended activities to be carried out during the operational phase of the project) should be conducted to identify all relevant parameters of concern, where changes from the baseline are anticipated;
  - ii. The cumulative impacts of continuous/long-term discharge at the proposed site outfall point(s) of the project site including comparison of discharge parameters with those prescribed in Schedule II of the Water Pollution Rules 2019, that are likely to result from the project in combination with other existing, approved and other ancillary projects;
  - iii. Changes in surface hydrology and drainage of surrounding areas, where applicable;
  - v. Impacts on existing drainage infrastructure and conditions – possible impairment of existing drainage infrastructure during the construction phase, inclusive of structural damage, siltation, blockages/narrowing, etc.;
- d) Solid, semi – solid and liquid wastes –
- i. Identify the activities during the site preparation, construction and operational phases of the project that may produce both hazardous and non-hazardous solid, semi – solid and liquid wastes;
  - ii. Assess the possible impacts associated with all type(s) of waste(s) received, including their recovery, storage, treatment and disposal; Provide details of the methods for recovery, treatment and disposal of waste generated during the site preparation and construction activities as well as waste received during the operational phase.



- e) Soil – Identify any activities associated with the construction and operation of the main facility and associated infrastructure that may result in contamination or soil deterioration;
- f) Light – estimate the potential for increased light that may result from the project (i.e. operational lighting of the buildings within the facility, as well as warning/safety lights). Potentially affected sensitive receptors; such as but not limited to surrounding residents and businesses, must be identified and the implication of any increased light on these receptors described, including any cumulative impacts;
- g) Traffic - Impacts on the passage of traffic in relevant affected areas, during the construction and operation of the proposed project;
- h) Impacts of land clearing activities, such as, but not limited to, changes in the aesthetical value of the area, erosion of material and increased sediment loading of the receiving environment;
- i) Impacts on archaeological and historical sites, and cultural resources of interest, if applicable;
- j) Impacts on scenic views, vistas and aesthetics;
- k) Human beings – including, but not limited to, such aspects as:
  - i. The potential health implications of the emissions/effluent that will be released to the environment from the proposed operations in relation to exposure limits established for acute or chronic adverse effects on human health and safety;
  - ii. The cumulative health effects that are likely to result from the project in combination with other existing, approved, and proposed projects (projects that have been advanced to the public disclosure stage);
  - iii. Identify and discuss the data and methods used to assess the impacts of the project on human health and safety;
  - iv. Social impact as it relates to natural resource management, demands on local services, use of the project area (i.e. temporary or permanent dislocation of vulnerable groups that may frequent the study area) and understanding of the issues related to the proposed development;
  - v. Impact on traffic, during all phases of the project.

N.B. This assessment shall include identification and discussion of methods and data used to assess the impacts of the project on the socio-cultural environment. The Applicant shall use a Social Impact Assessment approach to determine measures that will address community expectations.

- l) Flora and fauna including, but not limited to, such aspects as:
- i. Physical impacts on terrestrial and aquatic (i.e. riverine) habitats, where applicable;
  - ii. Impacts to the environment that may result from increased traffic associated with the different phases of the project;
  - iii. Impacts to any ESS or commercially exploited species and sensitive habitats that may result from the proposed activity and the physical and/or chemical alterations that will take place;
  - iv. Expected changes in the health of flora and fauna that will result from the expected/potential changes in water (surface and ground water) and soil quality. This should include any expected changes to species count and diversity, changes in behaviour and nesting patterns within the study area. The assumptions used for making such correlations should be explained;
  - v. Ecological impacts that may result from accidental spills, discharges or leachate;
  - vi. Estimate the potential for increased noise resulting from project activities. Identify potentially affected species and state the implication of any increased noise on these species.

## 9.0 Cumulative Impact Assessment

The description of impacts shall include an assessment of the cumulative environmental impacts that are likely to result from the proposed activities in combination with other existing, approved and proposed projects in the area that could reasonably be considered to have a combined effect;

The cumulative assessment must be based on an adequate understanding of the design and operation of the proposed facilities and infrastructure, as well as other existing, approved and proposed projects. Cumulative impacts shall either be described within a specific section of the EIA Report, or be well defined within each of the report's sub-sections on potential impacts, as relevant;

The cumulative impacts associated with other existing or proposed activities identified within the defined study area (i.e. immediate and wider study area) to be determined include, but are not limited to, the following:

- a) Relate potential impacts from the proposed activity with existing impacts from other activities within the wider area and particularly among communities within the project's study area, in terms of effects to the social climate and civil amenities/infrastructure;
- b) Relate potential impacts of climate change to the design and maintenance of the proposed facility and associated infrastructure.

## 10.0 Assessment of Risk

### Quantitative Risk Assessment

A suitable and sufficient quantitative assessment of the risk to the health and safety of the public must be conducted for the operational phase of the proposed activities. The terms suitable and sufficient implies the following:

- A decision framework should be used and documented in the Quantitative Risk Assessment (QRA) report on the identification of potential hazards/sources for the project. The rationale for the selection of significant hazards/sources to be quantitatively assessed must be included in the report. The output of the risk estimation should be a list of hazards/sources in ranked order of importance for consideration;
- The potential consequences of each release scenario (including, but not limited to, toxic exposure, gaseous releases, explosions, leaks from piping, equipment and systems and other toxic substances) shall be identified and justified. Consequence modelling shall be carried out to predict the spatial distribution of these effects on the public offsite. A description of the assessment methodologies used for predicting the consequences of the significant hazards must be provided in the QRA report. A rationale for the choice of the consequence model(s) and their appropriateness for this project shall also be provided in the report.
- The failure frequencies (including data sources/references) used in the risk calculations should be provided. Justification of the applicability of these data for use in Trinidad and Tobago with respect to local conditions (including but not limited to, seismic conditions, storms/floods, and extreme weather) must be presented.



- The individual and societal risks of the identified significant hazards must be presented. Individual risk is defined as the cumulative risk associated with all the identified significant hazards. The risk calculation methodology should be documented in the QRA report. Any assumptions (e.g. frequency of meteorological conditions and indoor/outdoor exposures) must be documented and justified in the report.
- Individual risk results should be presented in a contour plot showing isopleths of individual risk around the proposed facilities on a map of the area showing the immediate and wider population distribution. Results of the societal risk calculations should be presented in the form of an F-N plot.
- Appropriate risk control must be identified for hazards that pose a significant risk, based on established risk criteria using the 'as low as is reasonably practicable' (ALARP) principle. The findings of the risk assessment are to be used to identify and prioritise risk management strategies that include prevention, control, protection and mitigation of risks to the ALARP principle.

The reasoning for or against the choice of particular risk-reduction measures to be implemented must be clear, well documented and justified in the report. Detailed design of these mitigation measures is not required for the RA. However the mitigation measures that will be adopted and included in the final project configuration must be clearly identified. Further, a commitment and timeframe for submitting the final detailed designs to the EMA must be provided.

The risk assessment should be carried out to assess and quantify the risk of occurrence of significant hazards during all aspects of the project including, but not limited to:

- Chemical usage, generation, storage and transport;
- Operating conditions;
- Chemical releases from leaks or failure of equipment/systems;
- Explosion hazard due to the formation of an explosive gas mixture and the potential of this to generate extensive offsite risk;
- Flash fires, pool fires and liquid spray fires (where applicable);
- Instantaneous release of any gas of a toxic or persistent nature; and
- Any other significant hazards/consequences identified during the QRA.

The results of the risk calculations should be compared to the following criteria:

- Individual risk: Acceptable level for public - less than  $1 \times 10^{-6}$  per year;
- Societal risk: Unacceptable societal risk based on the line on an F-N plot through point (1, 0.01) with a slope of -1, and negligible societal risk based on the line on an F-N plot through point (1, 0.0001) with a slope of -1.



The risk assessment study shall also inform/advise the Applicant on the formulation of an Emergency Response Plan (ERP) and the additional measures that can be taken to assist in managing safety, such as the establishment of adequate buffer zones.

### **11.0 Emergency Response Plan**

The Applicant shall formulate a conceptual Emergency Response Plan (ERP) for the project including additional measures that can be taken to assist in managing safety. Describe the plans to respond to emergencies, incidents and accidents, including fires and unregulated burning and spills. A conceptual ERP shall discuss, but not be limited to, such aspects as:

- a. The rationale and/or design basis for key equipment and processes being used in the programme, including the location and availability of key equipment for the various Tier levels and emergency response;
- b. An outline of the components and structure of the emergency response team, defining their qualifications and roles as emergency response team members;
- c. A description of how any potentially impacted users of the area, surrounding communities and populace will be contacted during an emergency, the type of information that will be communicated to them and their involvement in the emergency response mechanism;
- d. Emergency reporting procedures and management of the results;
- e. The ERP should also make provision for training of relevant stakeholders on the response requirements in the event of an emergency.

### **12.0 Mitigation Strategy and Environmental Management Plan**

- 12.1 In consideration of significant adverse impacts that were identified in relation to Sections 8 and 9 above, the Applicant shall propose realistic, feasible measures by employing BATNEEC and BPEO to avoid, mitigate or remedy such impacts to acceptable levels. These should satisfy, and show comparison with, local environmental, health and safety standards/guidelines and, where these are not available, international standards/guidelines shall be used;



- 12.2 Mitigation measures can be best addressed in the form of an Environmental Management Plan (EMP) that must be formulated and submitted. The EMP shall be a framework management plan for the project that seeks to manage health, safety and environmental issues resulting from the proposed project. The EMP must identify potential negative impacts of each phase of the project and describe the specific measures to be taken to avoid, manage or compensate for identified potential negative impacts. Mitigation measures shall specifically describe how existing pollution, if any, would be handled to prevent a cumulative impact with respect to the intended project;
- 12.3 The EMP shall also include a table that summarises potential impacts and describes mitigation measures that will be used. Details to be included within the management plan shall comprise, but not be limited to:
- i. Environmental Policy of the company and specific objectives of the plan;
  - ii. Detailed description of the appropriate mitigation and compensatory measures, with equipment and resource requirements for carrying out these plans, and a description of operational procedures (as appropriate) to respond to these impacts, or to avoid or reduce risks;
  - iii. Requirements for ensuring that responses to predicted impacts are accurate and effective, and an implementation schedule (timing) for mitigation measures that must be carried out as part of the project;
  - iv. A conceptual Waste Management Plan, describing how collected waste will be managed, treated and disposed. This shall also include a hazardous materials management plan including, but not limited to, such aspects as spill management handling, disposal and tracking of hazardous waste from its source, during transportation and to its ultimate destination. The management of hazardous waste must comply with all relevant legislative and regulatory requirements;
  - v. The principles that have been incorporated into the project design for pollution prevention and waste minimisation.

### 13.0 Monitoring and Intervention Strategy

- 13.1 Describe and detail the ways in which the impacts of the proposed project are to be monitored and measured;

- 13.2 A detailed monitoring plan must be provided for the different aspects of the project to ensure that mitigation measures are achieving their objectives. Such plans shall include, but not be limited to information on the organisation/entity responsible for monitoring, proposed methodologies for sampling and analysis, monitoring locations and frequencies and relevant quality assurance/quality control (QA/QC) data
- 13.3 Monitoring programmes shall address the physical, biological and socio-cultural impacts of the project, as well as adaptation measures to monitor climate change impacts during all phases of the project; ;
- 13.4 The parameters/indicators to be monitored and their respective frequencies of measurement must be detailed;
- 13.5 Include also any monitoring programmes that the Applicant is proposing to conduct collaboratively with other stakeholders. Include in this programme a description of the role and responsibilities that the Applicant will be taking in each of these programs;
- 13.6 The Applicant shall devise mechanisms for sharing results, reviewing findings and adjusting programmes, should monitoring identify unanticipated consequences of its operations or mitigation plans, including:
  - a. Corporate adaptive management strategies;
  - b. Consultation with regulators, public stakeholders and, if necessary, relevant management fora.



**ANNEX 3B**

**DETAILED REQUIREMENTS FOR THE EIA REPORT**

1. The EIA Report shall be concise and limited to significant environmental issues and must provide all the relevant information needed by the regulatory agencies to consider fully any adverse or beneficial impacts of the proposal. It is envisaged that the EIA will be based on the results of available research (including any preliminary results from research through consultation with research organisations), studies and data as appropriate, with further studies being conducted where necessary and practicable. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment shall be discussed.
2. The main text shall focus on findings, conclusions and recommended actions, supported by summaries and analyses of the data collected, as well as citations for any references used in their interpretation. Unpublished documents and detailed data must be presented in appendices. Where the EIA utilises the results of previously conducted research, appropriate references and a listing of individuals and organisations consulted must be included. The public availability of data and studies utilised shall also be indicated. Methodologies for all data collection and analyses (including quality control measures) must be included in relevant appendices.
3. Wherever practical, maps, flow diagrams, charts and photographs directly referred to in the main text shall be included in the relevant section of the main body of the document.
4. The introduction to the EIA shall provide an explanation of the scope of the proposal and the issues and decisions which led to the proposal at this time and in this context — including a history of events leading up to project formulation and alternatives considered, envisaged time scale for implementation and project life, anticipated establishment costs and actions already taken at the project site.

The introduction shall also briefly describe the study area and regional setting for the proposal (with reference to any maps as appropriate), including land use and tenure, and describe the studies/surveys/consultations that have been conducted in developing the proposal and preparing the EIA. The completed studies and detailed comments resulting from consultations must be included as appendices. The EIA shall provide a listing and description of the approvals needed for the proposal to proceed.

5. A suggested format of the EIA Report is outlined below:

- Executive (Non-technical) Summary;
- Table of Contents;



- Glossary of terms/abbreviations/acronyms;
- List of preparers including their professional qualifications and experience on similar projects;
- Summary of Methodologies (detailed methodologies should be presented in an Appendix);
- Legislative and Regulatory Framework;
- Institutional and Financial Mechanisms;
- Description of the Proposed Project;
- Definition of the Study Area;
- Description of the Environmental and Socio-cultural Characteristics of the Study Area ;
- Analysis of Alternatives;
- Stakeholder Consultation and Public Engagement - Inter-Agency and Public/NGO Involvement, including Grievance Redress Plan;
- Analysis of Environmental, Natural Impacts and Climate Change Impacts, including Cumulative Impacts;
- Assessment of Risk;
- Emergency Response Plan;;
- Mitigation Strategy and Environmental Management Plan
- Monitoring and Intervention Strategy;
- List of References;
- Appendices:
  - CEC Application Form A and Final Terms of Reference;
  - List of Stakeholder Engagement, Inter-Agency and Public/NGO Communications;
  - Minutes of meetings and transcripts of public meetings;
  - Description of methodologies for data collection analysis;
  - Site plans, elevations, schematics;
  - Data sets

Note: All pages are to be numbered and the metric system of units is to be used consistently. The report shall be formatted in size 12, 'Arial' font.



**ANNEX 3C**

**MAPPING AND USE OF GEOGRAPHICAL INFORMATION SYSTEMS**

- 1) Mapping (i.e. spatial data to scale, represented in digital or printed format) must be presented at easily understood and appropriate scales to illustrate the spatial extent of the project and the impact area.
- 2) Geographical information systems (GIS) shall be used to represent spatial data wherever practicable. Submitted data shall be presented in a working GIS project compatible with ArcView 10.3 and be organised into discrete themes (i.e. shape files, point, raster and vector data). Data themes shall illustrate, but not necessarily be limited to, the following features/attributes:
  - Study area boundaries (e.g. immediate and wider study areas);
  - Non-built development such as agriculture, forested areas/reserves, recreational areas, natural features etc.;
  - Water resources such as rivers/streams, aquifers/groundwater resources, municipal wells, watersheds, standing water bodies, where applicable;
  - Flora, including endemic species and faunal habitats;
  - Soil and geology;
  - Topography (contour lines at appropriate intervals, preferably employing the metric system) including derived digital elevation models (DEMs) and triangulated irregular networks (TINs);
  - Sampling points for baseline data;
  - Administrative areas (e.g. municipalities);
  - Any existing and proposed oil/gas infrastructure, including pipelines and other utilities.;
  - Proposed monitoring stations/points;
  - Intended effluent points;
  - Protected/Managed/Prohibited Areas/Reserves;
  - Proposed buffer and exclusion zones;
  - Conceptual Emergency operations (e.g. evacuation routes, shelters, contamination zones, fire zones and explosion zones); and
  - Known archaeological sites and sites of historical and conservation interest.
3. Digital data themes or shape files should be clearly labelled/annotated with supporting metadata.
4. Map units and distance should be set in metres and in relation to UTM Zone 20N coordinate system, WGS84 datum.



5. The use of GIS should not otherwise exclude the use of photographs, map sheets and diagrams at easily understood and appropriate scales to illustrate the spatial extent of the project and the impacted area. Such photographs should be indexed with the map sheet to aid in the illustration process. Updated high resolution aerial and satellite imagery should be used as reference data and must be ortho-rectified so that they align perfectly with digital data themes.
6. Printed maps of the site area shall clearly indicate the layout of the facilities in the context of the immediate site, as well as relative to the wider study area. Each printed map shall be at appropriate/easily-understood scales for the overview being illustrated (e.g. 1:10 000 or 1:5000 for site plans) and shall be inserted at the point of reference in the text in the EIA. In the event that any of the maps are large and/or bulky, these should be incorporated into one of the appendices, as appropriate.
7. All maps and figures shall adhere to the following guidelines:
  - i. Spatial data shall be appropriately scaled;
  - ii. Map/figures shall be legible and include proper legends/keys;
  - iii. Maps/figures shall be dated and the source of the datum stated;
  - iv. Maps/figures shall include an appropriate scale and a north arrow;
  - v. The use of scanned documents, texts or graphics is not acceptable and should be avoided.
8. Mapping (i.e. spatial data to scale, represented in digital or printed format) must be presented at easily understood and appropriate scales to illustrate the spatial extent of the project and the impact area.

