SINT MAARTEN

EMERGENCY DEBRIS MANAGEMENT PROJECT
(P167347)

Environmental and Social Management Plan
(ESMP)

Municipal Solid Waste Site and Irma Debris Site management and related activities

December 15th, 2023

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Abbreviations and Acronyms

CESMP	Contractors - Environmental and Social Management Plan
CDC	Center for Disease Control and Prevention
COVID-19	SARS-CoV-2, the virus that causes coronavirus disease 2019
EEG	EE&G Disaster Response, LLC
EE&G	EE&G Disaster Response, LLC
EHS	Environmental, Health, and Safety
EHSGs	Environmental Health and Safety Guidelines
EDMP	Emergency Debris Management Project
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
GRM	Grievance Redress Mechanism
IDS	Irma Debris Site
ISO	International Organization for Standardization
LEL	Lower Explosive Limit
MSW	Municipal Solid Waste
NRPB	National Recovery Program Bureau
OHSAS	Occupational Health and Safety Standards
PIU	Project Implementation Unit
RAI	Resettlement Area of Impact
TDSR	Temporary Debris Storage Reduction (project within EDMP)
TMP	Traffic Management Plan
VROMI	Ministry of Public Housing Spatial Planning Environment and Infrastructure
UEL	Upper Explosive Limit
USEPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WHS/CHSP	Worker Health and Safety and Community Health and Safety Plan

Executive Summary

This environmental and Social Management Plan (ESMP) relates to construction and operational activities at the Municipal Solid Waste Site (MSWS) and Irma Debris Site (IDS) in Sint Maarten, these are:

i) Installation of a Temporary Weighbridge and Reconstruction of the Access Road to the MSW landfill;
ii) Daily Management of the MSW Landfill Operations including Fire Suppression and Slope Recontouring.
iii) Irma debris disposal site management, rehabilitation, restoration and/or closure

This ESMP identifies the set of responses to potentially adverse impacts; it determines requirements for ensuring that those responses are made effectively and in a timely manner; The Project Implementation Unit (PIU), the National Recovery Program Bureau (NRPB), will have to implement and monitor this Environmental and Social Management Plan (ESMP).

The mitigation section is conceived in order to deal with those potential negative impacts listed on the section 5.0 of the ESMP.
The most relevant Impacts found are summarized in tables 5.1 & Annex F of the ESMP, and these are as follows: Community Resettlement, Air Quality, Roads and Traffic, Noise, Geology and Soils, Hydrogeology, Hydrology, and Surface Water Quality, Ecology, Worker health and safety, Public Health and Safety including the approach to handle the COVID-19 Pandemic issues, Aesthetics, Archaeological, Historic, and Cultural Heritage, Natural Disaster Risk, Contractor's Performance, Stakeholder Engagement and Labor Conditions. In the mitigation section of this ESMP, Annex G summarizes the mitigation measures, estimated cost and responsibilities for each of the above-mentioned potential impacts of this project.

1. Introduction

This Environmental and Social Management Plan (ESMP) relates to construction and operational activities at the Municipal Solid Waste Site (MSWS) and Irma Debris Site (IDS) in Sint Maarten, these activities are as follows:

- Installation of a Temporary Weighbridge and Reconstruction of the Access Road to the MSW landfill
- Daily Management of the MSW Landfill Operations including Fire Suppression and Slope Recontouring
- Irma debris disposal site management, fire suppression, rehabilitation, restoration and/or closure

This ESMP describes a set of mitigation, monitoring, and institutional measures to be taken during implementation of the construction of a new access road, the construction and installation of a new weighbridge and the improvement of management at the MSW and IDS landfill, in order to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. This ESMP also includes the actions needed to implement these measures and estimated budget.

1.1 Environmental and Social Assessment of the Project

This ESMP is an essential element of the Environmental and Social Impact Assessment (ESIA) Report which has been issued separately it identifies the set of responses to potentially adverse impacts; determines requirements for ensuring that those responses are made effectively and in a timely manner; and it describes the means for meeting those requirements. This Plan includes the following components:

1.2 Mitigation of Environmental and Social Impacts

The ESMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental and social impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.

- Specifically, the ESMP identifies and summarizes all anticipated significant adverse environmental and social impacts identified in the ESIA report
- Describes --with technical details-- each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;
- Estimates any potential environmental and social impacts of these measures; and provides linkage with any other mitigation plans (e.g., for involuntary resettlement) required for the project.
- Provides an estimate about the cost of the required mitigation measures;
- Identifies Contractor responsibilities, including the preparation and implementation of an Environmental and Social Management Plan (C-ESMP), reporting obligations and safeguards personnel engagement.

1.3 Monitoring

The ESMP identifies required monitoring of key environmental and social impacts of the project during project implementation and the effectiveness of mitigation measures. This will enable VROMI, the NRPB and the World Bank to evaluate the success of mitigation as part of project supervision, and allows corrective action to be taken when needed. The ESMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the ESIA instrument and the mitigation measures described in the ESMP. Specifically, the monitoring section of the ESMP provides:

- a specific description, with cost consideration and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate),
- monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

1.4 Contents of the Report

In addition to this Chapter 1, the ESMP consists of the following chapters:

- Chapter 2: Project Description This chapter describes the baseline situation, and detailed scope of activities to be carried out under the Project.
- Chapter 3: Government Regulations and World Bank Group's Operational Guidelines. This chapter describes the relevant policies of GoSM, and Environmental and Social Safeguards (ESSGs) of the World Bank, and how they have been considered while designing the Project and preparing this ESMP.
- Chapter 4: Baseline Environmental and Social Conditions. This chapter describes the existing environmental and social condition of the Project area.
- Chapter 5: Potential Environmental and Social Risks and Impacts of the Project and their Management. This chapter describes the environmental setting of the Project area and potential environmental and social impacts and risks associated with the Project activities. This chapter also describes proposed detailed management plans to address these impacts and risks; and a monitoring plan.
- Chapter 6: Implementation Arrangements for the ESMP. This chapter describes the Project institutional arrangements for implementation of the ESMP.
- Chapter 7: Environmental, Health and Safety Monitoring Plan. This chapter describes the monitoring plan for assessing the impact of the MSWS and IDS on the surrounding natural environment, workers health and human settlements.
- Chapter 8: Stakeholder Engagement and Information Disclosure. This chapter describes the stakeholder engagement plan and details of consultations carried out during the preparation of the Project.

2. Project Description

The main project objective is to support Sint Maarten's recovery through management of debris from the hurricane and reconstruction activities, to reduce risks of operations, fire suppression, reorganization, rehabilitation, and upgrading of debris storage and municipal disposal sites. Specifically, upgrading of debris storage and municipal waste disposal sites to improve their organization and layout, introduction of improved operational practices to enhance separation, improve storage, and reduce environmental and safety risks of the

operation, and planning of the municipal disposal site's safe closure, through the following activities:

2.1 Installation of a Temporary Weighbridge, Supportive Infrastructure and Reconstruction of the Access road to the MSW Site

The current landfill entrance has no adequate entrance arrangements, functional weighbridge and supportive infrastructure for keeping under control the site entrance and waste acceptance to the landfill. A landfill entrance road, gate, weighbridge, weighbridge house, office building, personnel building and storage room shall be constructed in order to adequately manage the landfill. Administration & Personnel Building shall be designed and built for accommodating at least six (6) personnel. The contractor shall purchase and install a deck and pitless type stationary weighbridge at the entrance of the MSWS Landfill. The contractor shall design and build a weighbridge house for its operation,a material storage and workshop building at the Landfill entrance, as well as a guardhouse.

This activity will also include the reconstruction and pavement of the access road to the MSW landfill, and the demolition of the old weighbridge and the construction and installation of a new foundation to install a temporary weighbridge scale with a nominal capacity of 45 MT. These activities are located in the existing access road (Brine Dr.), that is adjacent to/ inside the No Work Zone (NWZ) at the Municipal Solid Waste Site (MSW) at Pond Island, Philipsburg.

The remodeling works for Brine Dr., will involve the design of a two-lane cement stabilized base (CSB) access road with an estimated paved surface of 900 m2 (150 m long, 6 m wide), demolition of an old weighbridge foundation and works for construction of a new weighbridge foundation by specifications and drawings to be provided by the Supplier of the weighbridge truck scale, at the Philipsburg Landfill. Road works include regrading of area to provide proper stormwater drainage.

The road design shall ensure safe entry of trucks to the weighbridge scale and exit and return point for large trucks. The nominal capacity of the weighbridge scale must be 45 metric tons. Works will include the installation of the electrical infrastructure suitable for the connection of the scale to power source and for reconditioning the existing metal container facilities as the scale operating office.

Figure 2.1 shows the existing security and scale house and old weighbridge scale location and future location of new weighbridge scale and the trace of the access road that will be reconstructed.

A 6 m, two-panel entrance gate will be installed for controlling the access to the MSWS.

The existing metal container facilities and other obsolete structures will be demolished and removed from site.

Figure 2.2 show details of the location of works related to the paving of the existing access road (Brine Drive) to the MSW landfill, the placement of a main gate, weighbridge scale and buildings

2.2 Solid Waste and Landfill Management

Solid waste management falls under the responsibilities of the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI), the Ministry facilitates regular residential waste collection services to residents of Sint Maarten. Several private waste hauling contractors hold contracts with VROMI to collect and haul the waste in different areas of Sint Maarten. Residential municipal solid waste is brought directly to the MSW site for disposal. The island does not have transfer stations. Commercial waste collection services are provided by private haulers and the waste is disposed of at the MSW/IDS sites. There are no recycling services offered by VROMI and recyclable materials are comingled with municipal solid waste unless the material is recycled by a third party.

Approximately 150.000 cubic meters of waste is disposed of at the landfill each year. The aforementioned volume corresponds to approximately 110K–120K tonnes of waste per year, including construction/demolition waste, yard waste from area cleaning activities, household waste, commercial waste, e-waste, industrial and institutional waste.
Assuming each vehicle can haul 3 - 3.5 tons of waste on average at each trip, approximately 40 - 50 vehicles enter the Landfill each day. Estimated current volume of waste in the MSWS is around 1,83 million cubic meters and 214.136 cubic meters at IDS.

- <u>Slopes Regrading, Roads, Fencing and Stormwater Management</u>

In view of the fact that the MSW and IDS sites lack proper fill sequencing and final closure plans, and has to allow waste operations to continue, this activity will hire specialized services

under contractors' terms to improve the daily management of the MSW landfill. There is a need to determine a final elevation guideline, as well as the need of implementing a regrading of existing slopes to be adjusted to 3:1 slope, and the need to construct and maintain the perimeter roads as well as the management of the storm water structures.

The landfill slopes will be re-contoured and regraded according to slope 3:1 (H:V), and concurrently compacted. Interim capping shall be applied in re-countered parts. See below indicative Detail.

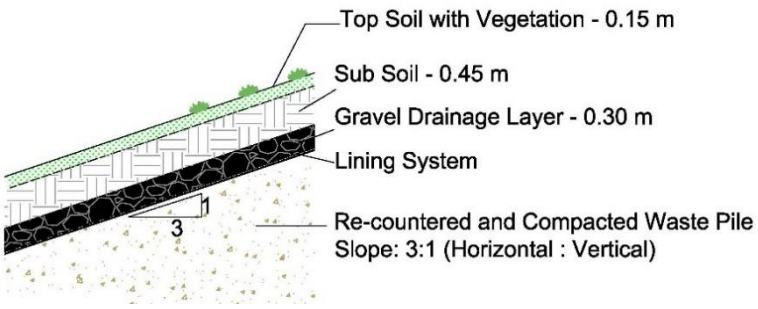

Figure 2.3. Indicative detail of interim capping

Before a contractor can take over the above activities, general daily management activities remain with the Ministry of VROMI, as described in paragraph 1.2.3 above. Until the RAI is cleared, such activities are restricted to the area outside the NWZ. Upon clearance of the RAI, daily waste disposal may be happening in a part of the NWZ, as soon as this is lifted.

A drainage system to collect seeped water through the top soil and sub soil will be constructed along the periphery of the landfill. The drainage system will consist of gravel, perforated corrugated HDPE pipe and will be covered by geotextile.

A cement stabilized paved ring road (approximately 4m in width) will be constructed surrounding the landfill, to provide easy access to the skirts of the landfill during improvement. This road will have concrete drainage ditches in either side, to collect and convey the run-off from rainfall to sediment trap basin.

A perimeter wall and fence will be erected on selected sections of the landfill perimeter to provide structural support, prevent entrance and littering. Height and other design characteristics will depend on location specifics and objectives.

A sediment trap basin and water treatment facility in mechanic room, wet-wells, and treated water reservoir, and etc. will be constructed in the entrance of the landfill in order to collect the storm water, run-off water and seeped water from the landfill drainage system. This water could be then used for landfill daily operations like dust suppression.

- Daily Waste Fill, Daily Cover, and Landfill Equipment

For an optimized operation of the landfill waste fill will be implemented with an optimized fill sequence plan. When the first filling area is floored-out with a lift of waste, the filling will proceed back over the prior fill area with the second lift. This back and forth progression across the filling area will be continued until a waste height is reached in which the slope towards the next filling area is no more than 3:1.

Daily Disposal will be carried out with "Cell Method", the amount of solid waste deposited during one operating period (one day) determines the size of each cell. Each cell will be an independent filling area covered with soil, in order to allow each cell to act as a firewall to minimize the spread of any underground landfill fires.

When pushing solid waste, waste will be spread thinly out in layers of about 30 to 50cm. The layer will be made as uniform as possible. Between each layer, the compacting equipment needs to make regular passes over the waste layer.

The waste that is daily placed will be covered. Soil resources are scarce on island, consequently alternative daily cover (ADC) materials for daily cover of the waste will be encouraged. Suitable ADCs include: Spray applied cementitious products, foam products or non-reusable geosynthetic fabric or panel materials. Inert pre-processed C&D waste fines mixed with non-contaminated sediment or dredge spoils or fine sand may be also used.

Equipment necessary for daily activities include a landfill compactor, bulldozer, back-hoe loader, dump trucks and a trommel screen. A grader and a hydro seeder will be needed for slopes reshaping and interim capping,

- Waste Reception

Regarding the reception of waste, there will be pre-sorting of the municipal trash and waste, to exclude materials such as tires and bulky debris, including vegetative debris, pallets, construction debris, white goods and other miscellaneous large items. Also, attention will be paid to separating other wastes that may require special handling. The incoming waste will be weighed. The incoming waste will be weighed and recorded in tons per day. Excluded materials will be diverted to the TDSR site for further handling.

- Interim & Final Cap

A temporary final cover consisting of a soil layer will be installed over cells which will not receive additional solid waste. The temporary final cover will consist of a 45cm layer of soil. Vegetative cover will be placed on areas which have reached interim final grade. These areas will not receive additional waste.

When portions of the Facility are brought to design grades, final cover will be placed over those areas. The final cover system consists of a 60cm layer of cover soil, followed by a 30cm layer of gravel drainage and 40-mil LLDPE geomembrane / drainage geocomposite, tear protected by a 30cm compacted fine layer. Sod will be installed over all closed portions of the landfill.

- Landfill Gas Management

There is currently no Landfill Gas (LFG) collection system. LFG is a natural byproduct of the decomposition of organic material in landfills and contains methane, which is a potent greenhouse gas (GHG). A passive gasification system through vertical wells will be installed in the landfill, partly in operation time and fully during closing. Passive systems can be effectively used to control LFG migration. The pressure gradient created by gas generation within the

landfill moves the gas toward a well, which then intercepts the gas and conducts it to the surface. The landfill gas will be treated in a high temperature flare to prevent release into the atmosphere. It is expected that LFG management systems will be designed to maintain 75 percent collection efficiency.

2.3 Fire Suppression

During 2020 a site inspection by VROMI and an external consulting firm was conducted; this report found evidence of active subsurface fires at the northwest and southeast of the MSW. The hot spots observed on the northwest of the MSW were located approximately 600 feet northwest of southwest boundary by the stormwater drainage channel; the hot spots located on the southeast were approximately 200 feet west of boundary next to the adjacent residential area. This is a significant decrease in comparison to the situation in 2018, as a result of improved management of waste disposal operations, including compaction and covering of waste, implemented by VROMI. Regardless of the significant improvement, the site inspection revealed evidence that the situation of existing subsurface fires and hotspots was at the time still an issue at the MSW landfill, thus fire suppression activities to achieve control and prevention of subsurface and surface fires need to be implemented by the contractor.

Understanding that for a successful fire suppression method there is a need for oxygen reduction as well as diminishing heat from the system, the contractor/operator will choose the adequate methodology and procedures to achieve the fire suppression and fire control. Knowing that any methodology applied could generate environmental and social risks and impacts, the contractor will have to comply with this Environmental and Social Management Plan (ESMP) and World Bank Environmental and Social Safeguards Operational Policies, for the fire suppression methodology chosen to be implemented.

In general, fire suppression during the everyday operations and management of the MSW and IDS landfill could include but is not limited to: placement of appropriate cover material, water and foam management, excavation of pockets of burning material, approaches for suppressing burning material using foam, quench pits, or use of suppression deck/lay-down areas, transfer of, handling, and final disposal of waste, and managing extinguished areas for safety.

It should also be recognized that while in one portion of the MSW/IDS Sites a certain method may be applicable and successful, in another area of the MSW/IDS Sites the method may not work due to different waste and site characteristics and conditions. Therefore, fire suppression methods at landfills may vary by location and may also evolve over time, depending on changing conditions. Like managing any other complex and dynamic environmental problem, the fire suppression team must be adaptable and timely in responding to unforeseen and changing conditions.

- <u>Excavation with Water/Foam Dousing</u>

When a landfill fire is near or at the ground surface, one alternative is to excavate the burning waste and douse it with water and/or foam. During this process, both hot and burning waste

material must be carefully exhumed and spread out into thin layers for maximum exposure to the extinguishing agent. Water is typically used in combination with a surfactant to help overcome capillary forces that might otherwise limit its vertical penetration through the material. The extinguished waste must then be carefully inspected to ensure it no longer poses a risk of reigniting before being placed back into the landfill. Excavation and dousing with foam is the method recommended as the most effective to suppress the fires at the MSW and IDS landfills.

The excavation is generally limited to relatively shallow depths because a) exposure to oxygen can feed the fire, b) excavation can release health threating gases and c) it can pose slope stability issues. A water source having adequate quantity and quality must be available. It is possible that the firefighting water could be obtained directly from the Great Salt Pond.

A drawback of this method is the generation of leachate and surface water runoff with the potential for additional contaminant generation from the foaming agents/surfactants.

A very similar technique is the use of soil, instead of water/foam, for smothering a fire by covering the excavated burning material with soil and/or sand in order to starve the fire of oxygen. This technique is not very common in landfills and also require reliable source of soil/sand material.

2.4 Irma debris disposal site rehabilitation, restoration and/or closure

The IDS location was put on a reclaimed piece of land that is in a long lease and is to be developed into a soccer/cricket field. The intention for this site is to, as much as possible, remediate the area to the condition prior Irma. If this is not feasible, the wish is to clear and close the site in such a manner that the intended sport field(s) can be constructed, possibly on elevated terrain. Debris on site will be recovered, separated and treated at the TDSR that is constructed and operated under EDMP.

- Landfill Closure and Final Cap

The concept final closure plan for the Irma Debris Site was designed with criteria and features very similar to the main landfill. The design provides for the landfill to undergo a major reshaping and regrading to provide a final side slope of no more than 3:1 (horizontal to vertical), a maximum vertical rise of 30 ft. (9 m) and a 20 ft. (6 m) wide bench (terrace) slope break.

When IDS is brought to design grades, cap cover will be placed over the area. The cap consists of a 60cm layer of cover soil, followed by a 30cm layer of gravel drainage and 40-mil LLDPE geomembrane / drainage geocomposite, tear protected by a 30cm compacted fine layer. Sod will be installed over all closed portions of the landfill.

A drainage system to collect seeped water through the top soil and sub soil will be constructed along the periphery of the landfill. The drainage system will consist of gravel, perforated corrugated HDPE pipe and will be covered by geotextile. Similar to the MSWS, a sediment trap and a water treatment plant will be installed for cleaning the water to acceptable standards for discharge. Alternatively, the collected stormwater will be directed to the equivalent facility of the MSW site.

- Football Field

The southern end of the Irma debris disposal site was promised in long lease to Sint Maarten's football association, who was going to develop a football field on that land. It is proposed that the land is prepared for future development of such a football field as was originally intended. To accomplish this, all disaster debris existing under the proposed footprint and out to a distance of 5 feet (1.5 m) should be removed.

- Debris Mining

The IDS reshaping and Soccer field area preparation works will result in considerable debris volume that needs to be managed. This debris will go through a mining process prepare it for further treatment. Debris will be first excavated using excavator/bulldozer and loader. Following material screening through a trommel screen, the oversize materials - inert C&D waste fractions, wooden materials, metal scraps, scrap glass, plastics/PVC materials – will be hauled with dump trucks to the new TDSR handling area. Recovered soil and fines from this activity could be used as a substitute for daily cover in ongoing MSW landfill operation.

3. Government Regulations and World Bank Group's Operational Guidelines

3.1 Applicable Ordinances, Policies and Regulations of Government of Sint Maarten

Sint Maarten, previously part of the Netherlands Antilles, became an autonomous Country within the Kingdom of the Netherlands on October 10, 2010. Sint Maarten has full autonomy for internal affairs including the environmental legislation.

According to Article 22 of the 'Constitution of the Country of Sint Maarten,' it shall be the constant concern of the government of Sint Maarten to keep the country habitable and to protect and improve the natural environment and the welfare of animals.
The government is strongly committed to sustainable development and the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (Ministry VROMI) is working towards the preparation of draft legislation on (i) environmental policy and management plan, (ii) nature policy plan, (ii) establish noise, air and water quality norms, and (iv) developing standard environmental regulations to include permits. The Contractor will be responsible for obtaining and maintaining any necessary licenses and permits not already obtained by VROMI, and for complying with any National Legislation applicable to the performance of the services. The Contractor will make sure that subcontractors do the same.

Ordinances, policies and decrees related to environmental and social protection that are relevant to this Project are presented in the following Table.

General Environmental and Social Considerations	National Laws and Requirements	Gaps

Environmental and Social Assessment.	The National Ordinance Structure and Organization of National Government (AB 2010, GT no. 6 and AB 2014, no. 29). The Organization Decree Public Housing, Spatial Planning, Environment and Infrastructure (AB 2010, no. 8, AB 2013, GT no. 145 and AB 2014, no. 67).	There is not an adequate legal and regulatory framework to guide environmental and social impact assessments. There a limited number of elements that meet environmental and social assessment good practice.
Labour and Working Conditions	Labour Legislation of St Maarten **National ordinance concerning safeguarding labor in enterprises a.k.a. Safety Ordinance** (AB 2013, GT no. 438). **Safety Decrees I-III** (AB 2013 GT no. 348; no. 280; no. 350) A National HIV and AIDS Workplace Policy (2012)	The current labour legislation covers the issues of minimum wages, employee dismissal, prohibition of child labor, occupational injury, holidays and special leaves etc; however, there is no specific section in the labor legislation which directly regulates vulnerable workers such as women, persons with disabilities. The labor legislation includes a specific ordinance on migrant workers, contracted workers, and community workers
Resource Efficiency and Pollution Prevention Management	**National Energy Policy (2014)** The current **Electricity Concessions Ordinance (AB 2013, GT no. 147)** and the Electricity Concession of N.V. GEBE **Waste Ordinance** (AB 2013, GT no. 135). National Ordinance Wastewater (AB 2013, GT no. 142) The National Ordinance for Nature Protection and Management (AB 2013, GT no. 809) The National Ordinance for the Prevention of Pollution from Ships (AB 2013, GT No. 298) National Ordinance Clearance of Ships and Wrecks (AB 2013, GT no. 314) Environmental Norms for Air & Sound, Water & Wastewater, Waste **Article 28a of the Lrop (26 April, 2021)**	Policies and ordinances are in place to promote sustainable water and energy use. There are gaps with regard to pollution emission and discharges standards. The current Waste Ordinance does not address management, storage and transport of hazardous materials, chemicals and pesticides.
Community Health and Safety	**Nuisance Regulation** (AB 2013, GT no. 139). **Hindrance Ordinance** and derivative regulations. (AB 2013 GT nr. 139 and AB 2013 GT nr. 140). **National Ordinance Public Health** (AB 2018, 20). **National Decree of the Governor of Sint Maarten Concerning Public Health Rules National Decree on Public Health** (AB 2017, GT No. 33).	There are no current regulations that require facilities to inform adjacent communities of potential risks and hazards including hazardous wastes, traffic safety, impacts of labor influx and issues associated with security personnel.

Land Acquisition, Restriction on Land Use and Involuntary Resettlement	St. Maarten adopted its own Planning and Zoning Ordinance in 1993 (Eilandsverordening Ruimtelijke Ontwikkelingsplanning St. Maarten,"EROP") and it is updated in 2013 which is the **National Ordinance Spatial Development Planning** (AB 2013, GT no. 144)**.** National ordinance, concerning Building- and Public Housing a.k.a. **Building Ordinance** (AB 2013, GT no. 136). There are **two National Decrees** for execution of **Article 19** (AB 2013, GT no. 146) and **Article 43** (AB 2013, GT no. 401) of the Building Ordinance. As per April 26, 2020 **Article 28a of the National Ordinance Spatial Development Planning** (**Lrop**) has recently come back into effect. **Article 28a**. regulates the requirements for a civil works permit, which will allow the Minister to review certain planned works prior to approval. This will ensure that the works will not cause undesirable and irreversible damage to the environment and are executed with concern to the environment and that the works fit within the Government Spatial Development Vision. In addition, the article allows the government to impose conditions on the execution of the works. Approval by the Minister would be required for the following works: • The excavation, raising, leveling or explosion of land; • The construction of roads and other pavements; • Works and projects that impact the water management and the groundwater level; • The felling and clear-cutting of trees or other cultivation; • The demolition of structures; • The filling and/or dredging of water.	Currently, there are no requirements to address , nor assess economical and social impacts. There are no specific requirements that insure protection for all people affected including people who do not have full legal rights to land or assets.
Biodiversity Conservation and Sustainable Management of Living Natural Resources	**National ordinance, concerning management of nature and protection of the prevalent fauna and flora** (AB 2013, GT no. 809). **National Decree, entailing general measures, concerning management and protection of flora and fauna as well as nature parks** (AB 2013, GT no. 143). There are two relevant island policies that are not covered by legislation; **Beach Policy** (Public notice August 1994). **Hillside Policy** (Public notice No. 986/98). **Temporary Fishing Prohibition Cartilage Fish Decree (**AB 2011, no. 35). **Fisheries Land Decree** (AB 2013, GT no. 405).	Measures to protect, conserve, maintain and restore natural habitats and biodiversity have been proposed; however, it has not been legalized. Although there are laws regarding development activities impacting critical habitats and biodiversity, degradation continues because of the lack of enforcement. Incorporating ecosystem services into national capital is not required under current legal mandates.

	Fisheries Products National Decree (AB 2013, GT no. 354). **National Nature Conservation Ordinance – Ao2001, No. 41;** **Nature Conservation Ordinance St, Maarten-AB2003, No. 35** **St Maarten Proposed Land Parks Management Plan (2009);** **Sint Maarten Nature Policy** has been approved; in the process to be published..	
Cultural Heritage.	The Philipsburg Declaration and Action Plan (2015) **National decree, entailing general measures of the execution of the Monuments ordinance** (AB 2013, GT no. 50). **National decree indicating protected monuments** (AB 2013, GT no. 46). **National decree monuments register** (AB 2013, GT no. 49).	Comprehensive regulation addressing potential adverse impacts on cultural property requires additional formulation. Legal protection relating to commercial use of cultural heritage remains ambiguous.
Stakeholder Engagement and Information Disclosure.	There is no national law or regulation.	Stakeholder engagement and information disclosure are designed at the project level in related to project's stakeholders and their needs.

3.2 Additional Operational Guidance

Debris reduction operations will be completed in general accordance with the following provisions derived from the United States Occupational Safety and Health Administration (OSHA) or comparable EU legislation:

- **Debris Reduction, Recycling and Disposal** https://www.osha.gov/SLTC/etools/hurricane/debris.html#index.
- **Scrap Metal Recycling** https://www.osha.gov/SLTC/recycling/recycling_scrap_metal.html
- **OSHA Hazardous Waste Operations and Emergency Response** (HAZWOPER) **Activities** https://www.osha.gov/SLTC/etools/hurricane/hazwoper.html
- **Planning for Natural Disaster Debris** https://www.epa.gov/sites/production/files/2019-05/documents/final_pndd_guidance_0.pdf

3.3 World Bank Safeguards Policies and World Bank Group Environmental, Health, Safety and Sectoral Guidelines

3.3.1 World Bank Safeguards Policies

The World Bank has a number of Operational Policies (OPs) and Bank Procedures (BPs) concerning environmental and social issues, which together are referred to as the 'World Bank Safeguard Policies'. If, during the development of a Project, it is considered that it is possible that a proposed Project activity could be the subject of one of the safeguard policies, that policy is considered to have been 'triggered'. In the subsequent development of the Project, that activity

must be considered in more detail to determine whether it is actually of no concern or adequate mitigation can be applied to address the concern, or the activity should be removed from the Project (or the whole Project should be dropped).

Broadly, the Project is expected to bring positive cumulative environmental benefits to the Project area by improving management of the MSW/IDS landfills and related activities in Sint Maarten.

The proposed mitigation measures in this ESMP will prevent, minimize, or mitigate the adverse impacts and improve environmental performance. Preparation of the ESMP includes a consultation process with about the Project's environmental aspects. Feedback received during this consultation process has been considered in this final ESMP (please refer to Section 8 for summary of the consultations carried).

During Project implementation, the NRPB will report on compliance with the measures agreed with World Bank including implementation of the ESMP, and the status of mitigation measures.

The following specific Policies apply:

- **Environmental Assessment (OP4.01/BP4.01):** https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1565&ver=current
- **Environmental Action Plans (OP4.02/BP4.02):** https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3528&ver=current
- **Natural Habitats (OP4.04/BP4.04):** https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1567&ver=current
- **Pest Management (OP4.09):** https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1637&ver=current
- **Physical Cultural Resources (OP4.11/BP4.11):** https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1570&ver=current
- **Involuntary resettlement (OP4.12/BP4.12):** https://policies.worldbank.org/en/policies/all/ppfdetail/1572

3.3.2 World Bank Group Environmental, Health and Safety (EHS) Guidelines

The World Bank Group Environmental, Health and Safety (WBG EHS) guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS guidelines are applied as required by their respective policies and standards. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, Projects are expected to achieve whichever is more stringent. World Bank EHS guidelines are available at:
https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/EHS-Guidelines.

3.3.3 Sectoral Guidelines Applicable to the Project: Waste Management Facilities

The EHS Guidelines for Waste Management cover facilities or projects dedicated to the management of municipal solid waste and industrial waste, including waste collection and transport; waste receipt, unloading, processing, and storage; landfill disposal; physico-chemical and biological treatment; and incineration projects. 2 Industry-specific waste management activities applicable, for example, medical waste, municipal sewage, cement kilns, and others are covered in the relevant industry-sector EHS Guidelines, as is the minimization and reuse of waste at the source.

This industry sector EHS guideline is designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.. Guideline is available at:
Waste Management Facilities - Final - December 7.doc (ifc.org)

4. Baseline Environmental and Social Conditions

4.1 Physiography

Sint Maarten is an island country in the Leeward Islands of the Caribbean. Sint Maarten is centred on 18° 01'N Latitude and 63° 05' W Longitude. The island hinges between the Lesser and the Greater Antilles and lies between the Atlantic Ocean and the Caribbean Sea. Other neighboring island include Saba St. Eustatius, Anguilla, St. Kitts and Nevis and St. Barthélemy. The total land area of the entire island is 90 km^2 (15km long and 13 km wide at its widest point). The island features a series of jagged ranges of hills from north to south terminating at Pic Paradis, 424 m the highest point, on the French side of the island. The coastline is a series of beaches, coastal lagoons, rocky areas and salt and fresh water (brackish) ponds, and the interior is characterized by many valleys.

4.2 Climate

The climate of Sint Maarten is tropical with hot and sunny weather all year around. Daily average temperature ranges from 25 degrees Celsius (°C) in the period from January to March, to 28 °C between June and October. The night temperature rarely drops below 20 °C, while sometimes it can reach 35/37 °C during the day, from June to November. Average monthly weather data of Sint Maarten is given in **Table 4.1**.
Average annual rainfall is 1045 mm. In the period from June to November (but mostly from August to October), Sint Maarten can be hit by tropical depressions and hurricanes, as happens in general in the Caribbean.

Table 4.1: Average Monthly Weather Data of Sint Maarten

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature, Min (°C)	22	22	23	23	24	25	25	25	26	25	24	23
Temperature, Max (°C)	28	27	28	28	29	30	30	31	31	30	29	28
Rainfall (mm)	75	50	45	80	100	70	85	115	120	100	115	90

4.3 Natural Hazards

Sint Maarten is highly vulnerable to natural disasters and adverse climatic events due to its location within the Atlantic hurricane zone. For the past decades, the country has been exposed to tropical storm force winds and numerous hurricanes, including notably intense storms: Donna in 1960 (Category 3), Luis in 1995 (Category 4), and Irma in 2017 (Category 5 on Saffir-Simpson scale). Due to the size of the country, a single storm has the potential to impact the entire population directly. High winds, rainfall and flooding are the principal risk factors while the country is also vulnerable to earthquakes. Coastal areas are exposed to flood risk and erosion from storm surge, run-off and possible tsunamis. Increased urbanization along with climate change and limited country capacity to build with resilience adds to its vulnerability to natural hazards.

4.4 Biological Environment

The major part of Sint Maarten is covered with secondary vegetation derived from either seasonal formations or dry evergreen formations[1]. Only on the top of the hills, some more or less original semi-evergreen seasonal forest is found. This type of forest has regionally become extremely rare too. Because of its small area, this forest formation is very vulnerable. On the higher hills of the two ridges in the middle part of the island, and the hills of the eastern ridge, dense secondary woodland vegetation is growing, preventing erosion and with a high scenic value. Along the coast, ponds and inland waterways remains of mangrove forests and other types of coastal vegetation survive, which are of high ecological, aesthetic and recreational value.

The fauna of St. Maarten is limited in species, not only because of St. Maarten's small size, but also because of habitat destruction, hunting, imported predators and hurricanes.

4.5 Demography and Socio-economy

Sint Maarten is considered a high-income constituent country of the Kingdom of the Netherlands in the Caribbean. It is the most densely populated country in the Caribbean with a population of more than 40,000 in an area of 34 square km and an estimated per capita Gross Domestic Product (GDP) of U$25,381. English is the widely spoken language English and Dutch are official languages of the country.

Tourism and tourism-related industry is the major source employment in the country. Only about 10 % of the land is suitable for domestic agricultural production, and over 90% of food products are imported. Nearly 30% of the male working population (45% for female workers) earn less than ANG 2,000 (USD 1,200) per month. Literacy rate in people over the age of 14 is 95.8%.

Hurricane Irma has severely damaged the economy of the country. Sint Maarten's low unemployment rate (6.2 percent) and youth unemployment rate (23.8 percent) in 2017 have significantly risen following the hurricane due to the shutting down of tourism businesses. The tourism sector suffered from significant damages to the airport, accommodations, and tour operator equipment, dramatically reducing the number of tourist arrivals. Micro, small, and medium-sized enterprises have experienced a significant loss of capital due to the impacts of the hurricane.

A relatively small community resides in the close proximity of the MSWS. Individuals from this particular community, as well as outside of this community, may (partially) depend on the MSWS and/or IDS for their livelihoods, by undertaking activities related to waste picking.

4.6 The Great Salt Pond and Pond Island Biological Environment

The Great Salt Pond is located in south-central St. Maarten, north of Philipsburg. It is bordered by Philipsburg on the South side. It is the largest permanent saltwater pond on the island; it covers an area of 2.25 km² (225 hectares) and is up to 1,5 meters deep. The Great Salt Pond serves as a natural water catchment basin for much of the runoff water from the surrounding hills. Mangroves can be found around the Great Salt Pond, which provides the necessary habitat for roosting, nesting and migrating birds. Despite the development of the surrounding area and subsequent stress to the ecosystem, the Great Salt Pond provides important foraging areas for many birds and the brackish and sometimes hypersaline conditions give rise to a unique wildlife community that includes several fish and crab species. The Great Sal Pond is also an Important Bird Area (IBA) and parts of it have been designated as a national monument based on its cultural and historical significance.

There is periodic mechanically induced water exchange between the Great Salt Pond and the marine environment accessed through Great Bay. As the waters around St. Maarten are relatively shallow, without much exchange between coastal and deep-water currents, corals and other organisms on reefs are exposed to any terrestrial influences including: freshwater runoff, sedimentation, nutrients, etc.

Terrestrial Flora

Species diversity surrounding the MSW/IDS Sites and the Great Salt Pond is low and typically only a limited amount of species will form the canopy.

Mangroves

Around the Great Salt Pond four species of mangroves can be found; *Rhizophora mangle* (Red Mangrove), *Avicennia germinans* (Black Mangrove), *Laguncularia racemosa* (White Mangrove) and *Conocarpus erectus* (Buttonwood).

Terrestrial Fauna

Great Salt Pond is classified as an important breeding and nesting area for nesting birds, migratory birds, and seabirds.

Aquatic Fauna and Flora

Very little is known about the composition, distribution and density of aquatic fauna and flora in the Great Salt Pond wetland. The invasive tilapia or Nile perch (O. niloticus) seems to be the dominant fish in the wetland followed by Mullet and Tarpon, respectively. The same goes for the possible presence of algae.

4.7 Pond Island Surface Soil

Surface soils tested in the "Blue Box" or RAI Zone contained detectable concentrations of heavy metals, PCB, TPHs and dioxins/furans. The heavy metals identified exceeding the comparison criteria of this assessment, included: arsenic, barium, cadmium, chromium, cobalt, chromium, copper, iron, lead and zinc. Of these heavy metals, elevated arsenic, copper and zinc were persistent in nearly all of the analyzed soil samples. Concentrations of heavy metals including arsenic, copper and zinc were noted in select samples above their commercial criteria and/or Dutch Target & Intervention Values.

The source of these constituents was attributed to a combination of runoff & ash deposition from the MWS landfill, ongoing discharges from commercial activities ongoing in the "Blue Box" Zone (i.e., leaking oils/grease from stored/dumped vehicles & equipment, along with the storage and recycling of metals in the general assessment area), runoff from the adjoining Soualiga Road, the creation of the island using landfilled materials, and naturally occurring processes.

A toxicologist expert concluded that affected people are not at immediate risk with regard to the exposure concerns for the constituents tested with the exception of copper which may require further evaluation.

4.8 Great Salt Pond Surface Water Quality

As described in the ESIA, the Great Salt Pond is impacted by sewage runoff from the surrounding neighborhoods, and by runoff and seepage of uncontrolled leachate from the MSW/IDS Sites located on Pond Island, in the middle of Great Salt Pond. The Pond also accepts stormwater runoff from the MSW/IDS landfills as well as the surrounding areas, there are numerous inflow/outflow points where water can intermingle with adjacent bodies of water.

Surface water sampling of the Great Salt Pond contained detectable concentrations of aluminum, copper and iron, along with Total Dissolved Solids (TDS) and chlorides. The surface water samples also revealed high levels of total coliform bacteria and *E. coli* at levels too numerous/elevated for the laboratory to quantify. This suggests that sewage is being discharged into the Great Salt Pond. Based upon the testing results, baseline conditions within the Great Salt Pond suggest that the water quality may have a negative impact on flora and fauna within the pond and poses a potential health risk for human recreational and/or consumptive use.

5. Environmental and Social Risks, Impacts and their Management

This chapter will deal with the identification of E&S related risks and actions to mitigate the potential negative impacts. The most relevant Impacts found are: Community Resettlement, Air Quality, Roads and Traffic, Noise, Geology and Soils, Hydrogeology, Hydrology, and Surface Water Quality, Ecology, Worker health and safety, Public Health and Safety including the approach to handle the COVID-19 Pandemic issues, Aesthetic, Archaeological, Historic, and Cultural Heritage, Natural Disaster Risk, Stakeholders Consultation, Management of Contractors.

The Environmental & Social impact of project activities, the Mitigation measures to avoid, reduce and/or minimize the impacts and risks and Responsibilities, are presented in more detail in the following Tables and chapters and annexes.

Assessment on fires and structural conditions of the MSW/IDS Sites was performed and two preliminary safety zones were designated. The Red Zone at 300 ft was established due the steepness of the slope located immediately to the west of the community and its anticipated proximity to fire suppression activities. The Yellow Zone or "notification zone" at 1000 ft was established whereby businesses and residences would be notified of the fire suppression activities and be prepared to evacuate if necessary.

The Red and Yellow Zones were further adjusted for easterly prevailing wind directions, and designated as the Fire Suppression Exclusion Zone (red area) and the Caution Zone (yellow area), as shown in the Figure.

A smaller portion of the Yellow or Caution Zone was identified as an area where resettlement would be required; this area was designated as the Blue Box Zone and later in the process as the Resettlement Area of Impact.

In 2018, it was observed that some of the side slopes of the MSW landfill were too steep, with slopes approaching 1:1 and potentially unstable. In addition, continuous subsurface fires had caused cracks or fissures which would further increase the risk potential. The Non-Work-Zone (NWZ) was established where specific works would not be allowed while resettlement was not completed. Works inside the NWZ could only begin after the community has been relocated.

Table 5.1 below provides a summary of the environmental & social risks associated with the proposed work activities, as was identified in the ESIA report.

Table 5.1. Project activities and associated Environmental & Social Impact

Activities	Potential Impacts
Weighbridge Truck Scale • Demolition of existing infrastructures, • Excavation and removal of old weighbridge • Excavation and works layout • rehabilitation of civil, mechanical and electric elements • Replacement and installation of the new weighbridge	**Environmental** - air emissions from machinery and vehicles - noise from construction equipment - disturbed soil from excavation processes - scrap metal and wood waste - oil and lubricant discharge seepage into soils and pond waters from repair equipment **Social** - disruption of road traffic during construction - disruption to the daily solid waste transfer during construction - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill - effects of by noise, dust and vibrations on the neighbouring community and housing + improvement in the control and management of the MSW landfill
Construction of new access road and other entrance facilities at the MSW Landfill • Road placing and layout • Clearing and excavation of road layout • Demolition and Removal of old sub-Base • Grading and Sloping. • Prepare the Sub Base • Proof Roll, Undercutting and Sub Base Repair • Binder and Surface Course • Install New Asphalt Surface (900 m2) • Demolish old structures and buildings • Construct new buildings • Construct entrance gate	Environmental - air emissions from machinery and vehicles - noise from construction equipment - disturbed soil from excavation processes - scrap metal and wood waste - oil and lubricant discharge seepage into soils and pond waters from repair equipment Social - disruption of road traffic during construction - disruption to the daily solid waste transfer during construction - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill - effect of noise, dust and vibrations on the neighbouring community and housing + improvement in the control and management of the MSW landfill
Fire Suppression Activities at the landfills (MSWS & IDS)	Environmental - smoke emissions from fires and suppressing activities - air emissions from machinery and vehicles - noise from heavy machinery equipment - oil and lubricant discharge seepage into soils and pond waters from equipment

	- increase the amount of operated equipment at the landfill - Reduction in soil infiltration capacity from compaction of ground material - leaching of spoil compounds into groundwater -surface runoff of spoils into adjacent water bodies <u>Social</u> - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill - risks for nearby communities due to underground fires at the MSW and IDS landfill site and slopes instability - Potential livelihood disruption due to physical and/or economic displacement of community in the RAI+ Improvement of health and safety level of living environment for resettled community + improvement in the control and management of the MSW and IDS landfills of Phillipsburg + improved maintenance / look of / pride in local area
Solid Waste Landfills Daily Management (MSWS & IDS) Solid Waste Landfills Daily Management and Closure (MSWS & IDS) Daily management of landfills operations including Slope recontouring, construction and maintenance the perimeter roads, management of the storm water structures, interim/final capping, landfill gas management at MSWS, waste mining at IDS.	<u>Environmental</u> - Emission of greenhouse gases - natural events negative impacts on the landfill activities - Slope instability associated with site construction and operation - odours and stench emissions from the landfill operations - Dust emission from IDS waste mining activities - Dust emissions from slope regarding (MSWS & IDS) and waste movement activities at MSWS - air emissions from machinery and vehicles - noise from heavy machinery equipment - oil and lubricant discharge seepage into soils and pond waters from equipment - increase in the amount of operated equipment at the landfill - Reduction in soil infiltration capacity from compaction of ground material - leaching of spoil compounds into groundwater -surface runoff of spoils into adjacent water bodies + Reduction of green-house gas emissions (MSWS) + Reduction of leachate discharge + Reduction of Pond pollution <u>Social</u> - potential hazard and risk to workers and operators from slope stability, explosive/dangerous gases, air quality, dust emissions, heavy equipment operation. - Risks for nearby communities due to underground fires at the MSW and IDS landfill site - Risks for nearby communities due to waste slopes instability, associated with municipal waste disposal - Risks for nearby communities due to soil quality conditions - Risks for nearby communities due to mental impacts that air quality conditions and soil quality conditions impose

	- Potential economic displacement due to changes in possibilities for waste picking activities and livelihood of waste pickers + Potential improvement of income generating activities and livelihood of waste pickers + improvement in the control and management of the MSW and IDS of Phillipsburg + improved maintenance, Aesthetics

5.1 Summary of Key Mitigation Measures

This section provides a summary of the key mitigation measures proposed to address the environmental and social impacts of the project. More detailed information and budget estimate can be found under the subsequent Chapters, as well as under Annex F.

Community Resettlement[1]

A small area adjacent to the MSWS/IDS was identified as an area where resettlement would be required; as a result of the (i) potential risk of slope collapse; (ii) general health and safety risks due to waste management activities. This area is designated as the Resettlement Area of Impact (RAI). Resettlement of the RAI has social impacts, such as physical resettlement, possible economic displacement and a disruption of livelihoods.

Measures to mitigate the social-economic effects include: i) Compensation for loss of dwellings, buildings, and other immovable assets, ii) Compensation for loss of rental houses, iii) Compensation for loss of rented businesses, iv) Compensation for loss of income and livelihoods, v) Allowance for dismantling, transportation and rebuilding of structures and assets, vi) Implementation of job training and job placement programs. More details about the resettlement impacts and mitigation measures can be found under the following section 5.2.

Economic Displacement

[1] Refer to final RAP for the most up-to-date information on resettlement. The RAP can be found at: https://nrpbsxm.org/resettlement/

- Waste pickers living in the RAI

Impacts and mitigation measures for potential livelihood disruption of residents of the RAI are described and managed through the RAP and LRP.
Any companies or individuals living in the RAI, that are generating income from waste picking, will be reflected in the RAP. The final version of the RAP will indicate if, and which, persons living in the RAI are facing economic displacement due to the landfill project.

- Waste pickers living outside of the RAI

Persons currently involved in waste picking or recycling, might face economic displacement, due to the changing of access policy (or enforcement thereof) of the MSWS and IDS and potential competition for waste materials. In principle, this is expected to be regulated by applicable legislation and policies. The responsible entity therefore, being VROMI and in the future (a) Contractor(s), will manage access to the MSWS and IDS. As such, the methodology to assess the potential social impacts on waste pickers residing outside of the RAI, is described in the Landfill ESMP. Mitigation measures for livelihood disruption will be described in the RAP and LRP.

Air Quality – Fires Smoke

Mitigation measures to minimize the impact of air emission during fire suppression activities would include the following: • Relocation of the RAI residents, • Daily cover waste with appropriate material, • Implement a fire suppression plan and have necessary recourses, • Have in place an Air Monitoring Plan for community and workers safety, • Cease works if wind conditions pose safety risks.

Odor and Dust Impacts

Mitigation measures to minimize the impact of odors during MSW landfill operations and activities would include the following: • Prioritize the covering of biodegradable waste like food or carcasses, • Daily cover of waste materials and excavated areas where applicable, • Interim and final capping of waste cells, • Monitor odors and adjust operational procedures accordingly, • Suppress dust through water spraying, • Limit traffic speed on unpaved roads.

Landfill Gases

Mitigation measures to minimize the impact of landfill gases would include the following: • Installation of landfill gas collection and flaring system, • Daily, interim and final capping of cells, • Installation of gas monitors and alarms on equipment cabs and buildings, • Installation of landfill gas monitoring wells on landfills perimeter.

Noise & Traffic

Mitigation measures would include the following: • Perform noise assessment on access road, • Maintain roads in a clean and safe condition, • Planning and managing both vehicle and pedestrian routes, • Maintain all construction equipment in accordance with manufacturer's specifications, • Schedule works during daylight hours and to minimize activity during peak periods, • All vehicles & equipment will be fitted with exhaust silencers, • Workers will wear earplugs in vicinity of loud noise.

Slopes Stability

Mitigation measures would include the following: • Re-slope the MSW and IDS landfills to meet the industry accepted criteria of 3:1, • Avoid fire suppression activities on slopes steeper than 3:1 grade, • Maintain the 3:1 grade on new waste cells, • Establish a Non-Work-Zone where activities will not be allowed before the RAI resettlement, • Compact waste .

The slope considerations and the proximity of the subsurface fires on the southeast portion of the MSW Site present a potential safety hazard to the adjacent community works and fire suppression activities should not be performed until relocation of the PAPs has been completed.

Works on the MSW Site will be performed in two phases accordingly:

- Phase 1 – to be performed in locations away from the community where it is anticipated that the works are not likely to create a deterioration of existing slope conditions and increase the risk of collapse. This work will be performed while the community is occupied and will include establishment of a "No Work Zone" (NWZ), delineating areas of the MSW where access is prohibited due to concerns of slope stability. The reconstruction of the access road and installation of a weighbridge are excluded from this NWZ. Also, the removal of tires is excluded and can commence.
- Phase 2 – to be performed in the NWZ. These works will begin after the community has been relocated.

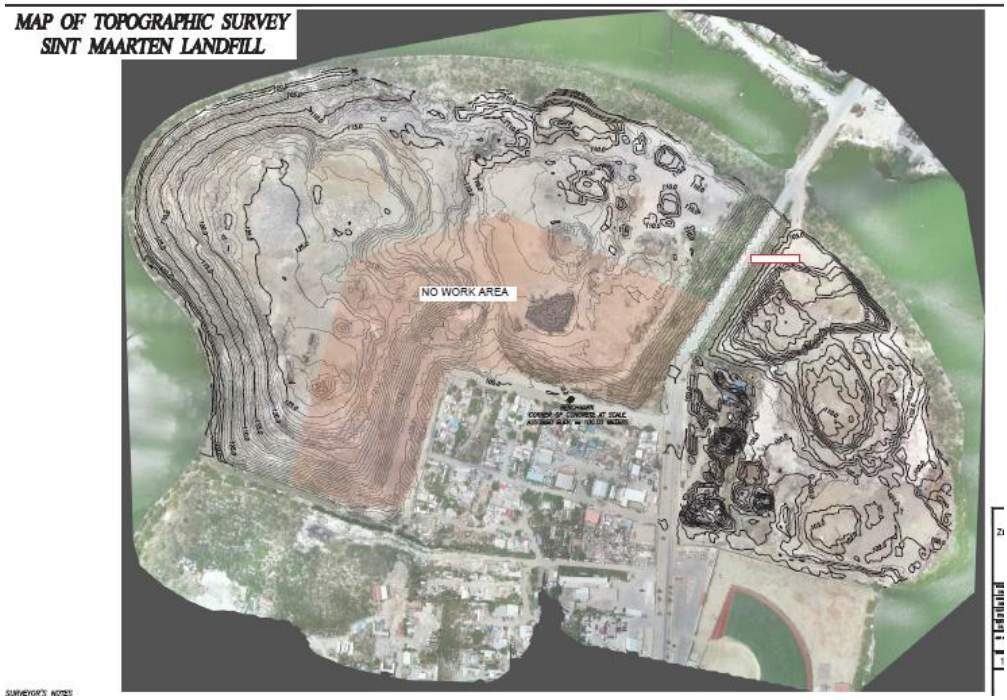

Figure 5.1 No Work Zone, as recommended by SCS Engineers April 22, 2020

<u>Pollution Protection & Ecology</u>

Mitigation measures would include the following: • Installation of stormwater management facilities, including trenches and treatment provisions, • Interim and final waste capping to prevent leachate production, • Water and sediment sampling for analysis, • Spill response preparation.

Workers Health & Safety

Mitigation measures would include the following: •Provide workers with appropriate personnel protective equipment, • Installation of gas monitors and alarms on equipment cabs and buildings, • Train workers on safe equipment operation and fire suppression activities, • Provide adequate hygiene and rest facilities, • Monitor workers health condition.

Community Health & Safety

Mitigation measures would include the following: • Prevent unauthorized site access, • Noise, traffic, odor, air, fire, noise pollution mitigation measures as described previously, • Involve stakeholders on decision making, • Installation of an urban air quality monitoring station. Mitigation measures would include the following: • Prevent unauthorized site access, • Noise, traffic, odor, air, fire, noise, pollution mitigation measures as described previously, • Involve stakeholders on decision making, • Installation of an urban air quality monitoring station.

C-ESMP

Contractor will prepare and implement an Environmental and Social Management Plan (C-ESMP), report regularly on safeguards compliance and engage qualified ESHS personnel. The C-ESMP will include as a minimum the following sub-plans: Mobilization Strategy; Traffic Management Plan; Gender Based Violence and Sexual Exploitation and Abuse (GBV/SEA) prevention and response action plan; Covid-19 prevention plan; OHS Workers Health & Safety Plan; Community Health & Safety Plan; Waste Management Plan; Wastewater Management Plan, Air & Noise Emissions Prevention Plan; Environmental Monitoring Plan, Hazardous Materials Management Plan; Vector Control Plan; Labour Grievance Redress Mechanism for Workers (Labour GRM); Labour Management Plan (LMP); Community Engagement and Consultation Plan; Emergency preparedness plan.

Other Mitigation Plans

• Stakeholder Engagement and Information Disclosure Plan, • NRPB established a Grievance Mechanism (GRM) to address any feedback and grievances associated with general Project activities, • Resettlement Action Plan (RAP) for RAI community, • GRM as part of the Stakeholder Engagement Plan developed for the EDMP RAP..

Solid Waste Management Framework

The Government of Sint Maarten will introduce an improved institutional and financial framework for managing the Solid Waste Sector. It is anticipated that an external entity will be established that will become responsible for solid waste management. This entity will coordinate and administrate all waste management activities, including financing. Until then, Government intends to outsource the management of the MSW to an external contractor. This contractor will take full management control over the disposal sites.

- **Cost Estimation for Mitigation Measures**

The detailed mitigation measures and estimated budget are included under Annex . Chapter 7 also provides specific estimates related to the monitoring plan.

5.2 Community Resettlement[2]

A small area (RAI) adjacent to the MSWS was identified as an area where resettlement would be required. A Consultancy Firm conducted a census and assets inventory in the Resettlement Area of Impact (RAI) to collect information about affected households and businesses in November 2020.

The socio-economic survey and census in November 2020 and subsequent field work during May 2021 and July-September 2021 focused on persons residing in the RAI, however because project activities will impact waste pickers who are not residing in the RAI an additional census was conducted in October 2021[3].

The summarized field findings for the Resettlement Area of Impact are presented in table 5.2 below.

#	Item	Number
Affected populations		
1	Individuals	215
1a	- *Adults*	*179*
1b	- *Children*	*36*
2	Households	**123**
2a	- *Residential*	*97*
2b	- *Residential and commercial (mixed)*	*26*
3	Vulnerable households	47
Affected businesses & income		
4	Commercial units	32
4a	- *Businesses*	***6***
4b	- *Residential and commercial (mixed)*	*26*
5	Employees	13
6	Off-site landlords	**12**
7	Individuals with landfill-related income	34

Table 5.2 Summary of the Resettlement Area of Impact Census. Affected households and businesses

[2] Refer to final RAP for the most up-to-date information on resettlement. The RAP can be found at: https://nrpbsxm.org/resettlement/

[3] The Census for the waste pickers living outside of the RAI is complete and is final. This census was in addition to the census conducted for the RAI. The census is different to the socio-economic survey for the out of RAI waste pickers, which was completed in quarter 1 of 2022.

The project-induced resettlement of the RAI has social impacts, such as physical resettlement, possible economic displacement and a disruption of livelihoods. The instruments that are being prepared to manage the resettlement of the community are the SEP and the RAP. Measures to mitigate the social-economic effects include the following:

- Compensation for those PAPs or resettled, i.e., provide housing if relocated temporary or provide resources (housing or restitution) if relocated permanently. PAPs also include businesses that operate within this area that may suffer a loss of revenue and income for their employees.
- Livelihood restoration; Implementation of job training and job placement programs for those PAPs forced to find alternative employment.
- Facilitate open forums to the public and stakeholders to freely and openly ask questions regarding impacts from resettlement processes, project timeline, or other pertinent matters.
- Assist business owners and residential property owners with relocation.

The detailed specifications on compensation which will be provided to PAPs as mitigation measures can be found in Annex H.

❖ Possible impact on livelihood – waste pickers

Background information

The MSW and IDS landfills are operated by VROMI, based on the National Decree on the organization of the Ministry of VROMI. Certain companies have access because they are contracted for heavy equipment, concrete crushing and security services. Although there is no written access policy in place, the community is allowed to dispose waste during opening hours. No formal access is currently granted to individuals to conduct any waste picking activities and/or collecting recyclables at either location, due to health and safety reasons. There is 24/7 security in place. However, it is expected that, in practice, waste picking is currently taking place on an informal basis.

The Landfill project is associated with specific social impacts, specifically livelihood disruption of individuals involved in waste picking. Individuals that are currently residing in the RAI and outside the RAI involved in waste picking at the MSWS and/or IDS, , will be included in the RAP for the Landfill project and the Livelihood Restoration Plan. Landfill recycling activities will not be restored, as the waste disposal site is anticipated to become inaccessible to the public in light of health and safety considerations.

According to the waste pickers census carried out in October 2021, 34 individuals in the RAI and 7 individuals outside the RAI are identified as generating income from waste picking/recycling. The impact on any other, currently unidentified, waste pickers residing outside the RAI, and associated mitigation measures, will be elaborated on in this memo.

The review of existing legislation and policies and drafting of policies regarding the operation of and access to the MSWS and IDS, fall outside the current scope of EDMP, as legal reform is part of technical assistance for DPO. This is outside the current scope of EDMP.

Potential social impacts as a result of the TDSR

The site where the TDSR is proposed to be located, is a vacant lot on which no unauthorized individuals are allowed. There are no risk of livelihood disruption directly associated with the TDSR, however, the potentially changing waste stream on IDS, as a result of the TDSR, may impact the availability of recyclable waste at the IDS in the future. The availability of recyclable materials is anticipated to change, considering the TDSR will affect how waste materials are managed and disposed of.

Potential specific social impacts as a result of the MSWS and IDS Landfill management project

- Resettlement

Impacts of relocation of individuals and mitigation measures are described and managed through the RAP.

- Potential livelihood disruption of waste pickers on the MSWS and IDS

- Waste pickers living in the RAI

Impacts and mitigation measures for potential livelihood disruption of residents of the RAI are described and managed through the RAP and the LRP.
Individuals living in the RAI and outside the RAI, that are generating income from waste picking, are reflected in the RAP. The final version of the RAP indicates if, and which, persons living in the RAI are facing economic displacement due to the landfill project.

- Waste pickers living outside of the RAI

The current informal access policy to the MSWS and IDS, and enforcement thereof, might be impacted due to the start of the works and environmental, health and safety considerations. The entity managing the MSWS and IDS will be responsible for ensuring safety of persons on site.
Persons currently involved in waste picking or recycling, might face economic displacement, due to the changing of access policy (or enforcement thereof) of the MSWS and IDS and potential competition for waste materials. In principle, this is expected to be regulated by applicable legislation and policies. The responsible entity therefore, being VROMI and in the future (a) Contractor(s), will manage access to the MSWS and IDS. As such, the potential social impacts and/or economic displacement on waste pickers residing outside of the RAI, will be described in the Landfill ESMP, RAP and LRP.

<u>Strategy for mitigating potential social impacts on waste pickers living outside of the RAI</u>

1. **Identify potential impacted individuals**

Any waste pickers in the MSWS and IDS and material that is being collected

a. Methodology:

- Collect information from the Ministry of VROMI, assess entry points into MSWS and IDS (apart from main entrance), interview security/access control personnel, monitor entrance and MSWS and IDS during times appropriate for waste picking for the duration of two weeks (conduct interviews on site when identified as waste pickers), conduct in person interviews with waste pickers who live in the RAI. The latter will be done in a manner which minimizes the risk of an influx of persons initiating waste picking, merely for the purpose of benefiting from any possible compensation provided through the project.

b. Questionnaire:

- During interviews with waste pickers the following information will be collected: how often waste is collected, preferred times, what type of materials they collect, what is done with the material (keep it, repair it, sell it for further processing etc.), what restrictions they experience (access to the site(s) and availability of usable materials), the income that is generated out of this activity, who is financially supported with the generated income (members of household), if there are currently other sources of income, to what extent the waste picking income forms part of the total income, the structure of their work (independent or in/for a company), how long they have been collecting waste at MSWS and/or IDS, alternatives for collecting waste elsewhere, which area they reside (RAI or outside), what suggestions they have for future arrangements for collecting waste material from the sites, if MSWS and IDS become unavailable, what their alternative activities will be.

c. Information will be recorded and kept confidential.

d. Planning: Collecting data on waste pickers who live outside RAI (with a subsequent development of RAP addenda or ARAP) may be done by the resettlement implementation consultant/firm, the scope of services for RAP implementation has such an option built in.

2. **Impact assessment**

a. Based on the collected information;

a. Determine how the Landfill management project and TDSR will impact the activities of the identified waste pickers and what the situation will be after completion of the project.

- Scope of Work, arrangements during the project, arrangements after completion of the project.

b. Determine the (level of) economic displacement due to the Landfill project and TDSR

3. **Mitigation measures**

The adverse impact on persons affected by loss of access to MSWS or IDS, for all or part of their livelihood activities, may be mitigated in different ways, depending on the needs in each individual case. For example, compensation in cash for loss of income derived from the use of the landfills (in line with the arrangements in the RAP) and livelihood restoration support to obtain alternative employment, within or outside of the waste management profession. For example, by exploring options to gain employment at existing waste management companies involved with the landfills. Furthermore, a discussion may be facilitated with the responsible waste management authority regarding alternative arrangements for waste pickers, for instance, the possibility for waste pickers to sell materials, collected outside the MSWS and IDS, to the waste management facility.

a. Waste pickers living in the RAI

i. Considered a PAP in the RAP and any impacts are mitigated through the RAP.

b. Waste pickers living outside of the RAI

i. Considered a PAP in the RAP and any impacts are mitigated through the RAP.

Table 5.3: Institutional arrangements and responsibilities in the Resettlement Process

Stakeholders	Responsibilities
Governmental	
NRPB	NRPB is in charge of implementing projects financed through a trust fund set up by The Netherlands and the World Bank (WB) for the recovery and reconstruction, following the devastation caused by hurricanes Irma and Maria. NRPB's roles and responsibilities within the resettlement process are: • Execution of the Emergency Debris Management Project. • Overseeing planning of the resettlement process in accordance with WB policies. • Approval of the Resettlement Action Plan (RAP) and Livelihoods Restoration Plan (LRP) developed by consultant. • Implementation of the RAP and LRP and ongoing monitoring of implementation • Appoint external auditor to conduct evaluation of RAP implementation
Government of The Netherlands	• Donor of the Trust Fund • Contribution to the recovery of Sint Marten
Government of Sint Maarten Council of Ministers (CoM)	• Ultimate responsible party for securing compliance with the WB OP.4.12 in resettlement operations related to the Sint Maarten: Emergency Debris Management Project (P167347), specifically in the resettlement and livelihoods restoration of a community located in the Pond Island municipal waste disposal site.
Ministry of Finance	• Monitor distribution of resettlement-related fund
Ministry of Justice	• Managing applications for residence
Ministry of Public Health, Social Development and Labour (VSA)	• Provision of socioeconomic assistance to the displaced population, with focus on protection of and assistance to highly vulnerable clusters of the community located in the Pond Island municipal waste disposal site to be displaced and resettled.
Ministry of Public Housing, Spatial Planning, Environment, and Infrastructure (VROMI)	• Definition of risk-prone zones, buffer zones of the Pond Island municipal waste disposal site. • Securement of health and safety conditions for residents of the Pond Island municipal waste disposal site. • Initiates Eminent Domain declaration • Land allocation/purchase for the permanent FOGA resettlement site
Parliament of Sint Maarten	• Adoption of national ordinance on Eminent Domain (public utility) declaration.
Resettlement Coordination Committee	• Since various high-level governmental institutions will intervene in project-induced resettlement operations, NRPB will establish a Resettlement Inter-institutional Coordination Committee to be conveyed for decision-making purposes at least on a quarterly basis.
NGOs & Vocational Institutes	
Caribbean Institute for Social Education Foundation (CIFSEF)	• Viable delivery partner for implementation of livelihood restoration programmes

Stakeholders	Responsibilities
Mental Health Foundation (MHF)	• A subsidized non-government organization which provides psychiatric care. • Potential partner for delivery of counselling services for vulnerable PAPs during relocation process
Gaston Boasman Helpdesk for Elderly	• A recreational center for elderly populations (50+ years). • Potential partner for membership to be provided to elderly PAPs who are interested, for further psychosocial support during relocation process
Women's Desk	• Unit managed by the Ministry of VSA to strengthen socioeconomic position of women. • Potential partner for delivery of services such as financial literacy training for PAPs
International institutions	
World Bank	• Financial support to the Sint Marten Emergency Recovery Program • Approval of the RAP and LRP • Monitoring of resettlement compliance

Resettlement Coordination Committee. Since various high-level governmental institutions will intervene in project-induced resettlement operations, NRPB will establish a Resettlement Coordination Committee to be conveyed for decision-making purposes at least on a quarterly basis.

The main task of the Resettlement Coordination Committee (RCC) will be to coordinate stakeholders' efforts in the resettlement implementation activities. This committee is intended to be the place where National Recovery Program Bureau (NRPB) shares information about resettlement activities. The RCC intervenes, where necessary, and participates in the decision-making process under resettlement activities. The committee will also play a key role in the public communication on the resettlement process.

The RCC will consist of 3 members. Sint Maarten Government will appoint a High-Level Focal Point (SXM COM High-Level Focal Point) who will be authorized by the Government of Sint Maarten to respond to all issues that fall within the scope of the RCC. Other two members of the RCC will be appointed by NRPB. The members appointed by the NRPB are: the NRPB Resettlement Coordinator and NRPB Communication focal point.

SXM COM High-Level Focal Point will coordinate internally on the Sint Maarten Government side the resettlement activities with various involved Ministries such as: VROMI, VSA, Ministry of General Affairs, Ministry of Justice, TEATT or any other ministry deemed necessary be involved in the resettlement process. NRPB Resettlement Coordinator will manage NRPB resettlement implementation activities among various players and staff involved in the process on NRPB side.

The RCC will contribute to resettlement implementation by:

- Coordinating Government and NRPB responsibilities under resettlement

- Coordinating resettlement activities timeline
- Coordinating resettlement budget
- Deciding on action items to be assigned to various stakeholders on Government side and NRPB side, and providing feedback on progress
- Fostering inter-institutional decision making
- Forging agreements and negotiate resolution to obstacles encountered
- Coordinating land allocation for resettlement sites
- Coordinating eminent declaration process
- Coordinating compensation mechanism design and compensation payment pre-requisites
- Coordinating specific assistance measures for vulnerable groups and include these groups, if applicable, in existing Government programs
- Coordinating specific assistance and arrangement for livelihood restoration measures
- Coordinating participation in public consultations with affected community and stakeholders
- Coordinating communication approach, key messages, and communication tools/channels

6. Implementation Arrangements for the ESMP

6.1 Institutional arrangements

The National Recovery Program Bureau (NRPB) is the Project Implementation Unit (PIU) of activities financed under the SMTF and in this capacity is responsible for administrating the contract. The NRPB will work closely with Government stakeholder to ensure compliance with local policies and legislation.

Governmental authorities that will be involved in this Project are as follows:

- VROMI –The Ministry of VROMI is responsible for waste management and disposal, which includes the material stockpiled at MSW Site and the IDS.
  Departments within VROMI that would be involved include the following: Infrastructure & Management (Public Works). Responsible for overseeing the Contractor and The Project.
- VSA – The ministry of public health, social development and labor.
- Ministry of Justice – oversees public safety, law and order and the upholding of justice.

6.2 Environmental and Social Management Capacities

The Project Implementation Unit (PIU), the National Recovery Program Bureau (NRPB), will have to implement and monitor this Environmental and Social Management Plan (ESMP). For this purpose, the NRPB assigned an Environmental Safeguards Specialist, a Social Safeguards Specialist and a Resettlement Specialist to the EDMP. Furthermore, a Community Engagement Specialist will be contracted to perform engage with the affected community in any resettlement (physical – and economic displacement) related activities. The safeguards staff will support the development and the implementation of the ESMP, which will be reviewed and adapted once the project implementation begins or within three (3) months of the Effective Date of the Project. Safeguards staff from the PIU will facilitate safeguards related capacity building for local government ministries and contractors.

The capacity building in environmental and social safeguards recommended will cover four aspects.

- Project Safeguards Staffing: The PIU will have at least 1 staff (one Environmental and Social Safeguards Specialist). The tasks will include (i) participation in meetings that will be held at different stages throughout project effectiveness (ii) participation in the monitoring of ESMP compliance, and (iii) being the local focal point for the grievance redress mechanism (GRM) and responsible for data entry into the GRM database on complaints and complaints resolution.
- Familiarization Meetings and Training: Based on this ESMP, two types of training programs on safeguards (environmental and social) will need to be developed:
- Familiarization meetings within the NRPB on the project's approach to management of environmental and social issues, the ESMP, and the GRM.
- A training course for the contractors, builders and construction workers, which covers the same topics as the overall introduction, but with much more detail to make the participants fully conversant with the approach to management of environmental and social issues through the ESMP.

6.3 Environmental Health and Safety (EHS) Specialist

The Supervising Party is responsible for the position of an EHS Specialist. The EHS Specialist ensures that the works are implemented according to applicable national laws, regulations, and rules, as well as international standards and World Bank Group standards, follows applicable good industry practice. This specialist will also ensure that the specified mitigation measures in this ESMP are appropriately implemented by the contractors.

6.4 Roles and Responsibilities

NRPB will be responsible for the overall management and monitoring. VROMI will act as the general Supervisor of the Contractor and will supervise and monitor the day to day landfill management activities under the contract.

An independent Supervisor will be engaged for the supervision of the more technical components of the works related to the recontouring of the slopes, and any other site improvements such as installation of a landfill gas management, stormwater management, and/or leachate management structures, as well as the ESHS compliance. The tasks of the independent Supervisor will cease when VROMI gains additional capacity or when the Solid Waste Management Authority is established.

The EDMP Manager will coordinate with, and manage the Supervisor with the implementation of the ESMP based on the advice of the NRPB Safeguards Specialists . The EDMP Manager and Safeguards Team will be responsible for approval or change of the site-specific environmental mitigation measures with review.

Roles and responsibilities of relevant Project staff in environmental and social management of the Project are given in **Table 6.1**:

Table 6.1: Roles and Responsibilities in the Environmental and Social Management of the Project

Staff	Responsibilities
NRPB	• Drafting the Environmental, Social, Health and Safety requirements in the bidding and contract documents in accordance with the ESMP; integrating the ESMP in to contract documents. • Review and approval of the various documents prepared by the contractor such as C-ESMP, code of conduct, labor procedures, job hazard analysis, monitoring reports, etc. • Coordinate with the supervisor to ensure contractor's compliance with the environmental, social, health and safety requirements of the bidding documents, ESMP and C-ESMP. Provide recommendations for implementation of corrective actions for any non-compliances and suggest improvements for contractor's performance. • Report to the World Bank incidents related to environmental, social and health aspects. Approve the root cause analysis report and corrective measures proposed by the Contractor. • Carry out regular consultations with the stakeholders, including ongoing communication with persons affected by displacement (physical and economic). • Prepare quarterly progress reports on the implementation of the ESMP for transmission to the World Bank throughout the Project implementation period.
Contractor	• Preparation of the C-ESMP with site-specific management plans. • Implement all mitigation measures to address potential environmental and social risks and impacts as described in the ESMP and Contractor's C-ESMP. • Implement the environmental, health and safety monitoring plan of the ESMP (applicable to MSWS & IDS). • Submit and implement its Code of Conduct (CoC) that will apply to its employees and subcontractors. The CoC will include requirements relating to Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) (see Annex K for more information). • Carry out a job hazard assessment for each worksite to assess the potential hazards and implement mitigation measures to minimize risks. • Conduct toolbox training to the laborers on health and safety risks of the Project works. • Report to Supervisor/VROMI any ESHS related incidents. Carry out root cause analysis for all major incidents, and recommend actions to be taken to rectify the actions that led to these incidents. • Prepare monthly reports on ESMP implementation.
Supervisor	• Supervise ESHS compliance of Contractor • Provide guidance to the contractor on implementation of ESHS aspects and provide training to the contractor's staff • Review Contractor's ESMP and advise NRPB/VROMI on compliance. • Review Contractor's monthly ESHS Reports and advise NRPB/VROMI on compliance. • Report to NRPB on all incidents related to environmental, social and health aspects. Review and advise NRPB on the root cause analysis and corrective measures proposed by the Contractor. • Carry out regular site inspections to ensure ESHS compliance in workplaces.
VROMI	• Supervise day to day landfill management activities. • Consult with Contractor and Supervisor on technical aspects of the works.

	• Review and comment on Contractor's safeguards instruments and mitigation measures implementation.

7.0 Environmental, Health and Safety Monitoring Plan

Monitoring and reporting on the environmental and social mitigation provisions is an essential part of an environmental and social management procedure. Corrective actions are required in the case of non-compliance, and non-conformance. During construction it is also useful to also identify actions that can improve performance.

The Project contractor will keep relevant authorities informed of the Project performance with respect to environmental, health & safety and social matters and implementation of the ESMP by submission of weekly written status reports and/or face-to-face meetings.

Contractors will also be required to provide ESHS performance reporting as relevant based on the contractor's responsibilities. VROMI and NRPB will continue the stakeholder engagement efforts described in the next section and communicate with stakeholder groups regarding Project activities and the results of environmental and social monitoring.

An environmental, health & safety monitoring plan is described in the following table with the aim of assessing the impact of the MSWS/IDS management on the surrounding natural environment, workers and communities. The plan outlines minimum requirements for the location of monitoring points, the frequency of monitoring and the parameters to be analyzed. Contractor may indicate alternative monitoring methods superseding the proposed ones.

Table 7.1Air, Soil, Water and H&S Monitoring Plan

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods	Estimated Cost ($)
Construction and Operation	Subsurface Fires	Temperature	MSWS Contractor	Weekly or as deemed necessary by VROMI	MSWS & IDS sites	Aerial (drone) thermal infrared survey with high resolution FLIR thermal sensor visual camera. The exact location of hot spots and vents will be verified via infrared thermography from ground level.	30000 Equipment (Eq.) + 15000 Operation (Op.) per year (y)
Construction and Operation	Slope stability	Slope grade	MSWS Contractor	Bi-annually	MSWS & IDS sites	Topographic survey for slope stability assessment	20000 / y
Construction and Operation	Landfill gas migration control	Methane	MSWS Contractor	Monthly	Subsurface probes on MSWS & IDS perimeter within property limits @ 300m apart	Portable methane analyzer	10000 Eq. + 3000 Op. / y
Construction and Operation	Explosion risk in buildings from landfill gas accumulation	Methane	MSWS Contractor	Continuous	Inside the scale-house/security building	Combustible gas continuous monitoring system	10000 Eq.
Construction and Operation	Personnel Health & Safety. Risk of explosion, asphyxiation or harmful gases	Gases:CH4, H2S, CO2, CO	MSWS Contractor	Continuous	On cabs of all heavy equipment operating at MSWS & IDS active site. Details will be finalized with Contractor.	Remote transmitting multi-gas analyzer	10000 per cab installed
Construction and Operation	Community health risk from air emissions	Gases:CH4, VOC, H2S, HCN, CO and	MSWS Contractor	Continuous & Yearly	One monitoring station Downwind from the MSWS	Remote transmitting multi-gas analyzer with weather sensor	40000 Eq. + 3000 Op./y + 2000 per sample

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods	Estimated Cost ($)
		Particular Matter (PM10) Dust Samples: VOC, aldehydes, PAHs, dioxins/furans, PCBs			& 3 analytical samples per year	& Dust Samples analyzed by an accredited laboratory	
Construction and operation	Noise on the community	dbA	MSWS Contractor	Daily, for a continuous period of 8 hrs. Differentiate between daytime vs nighttime data if relevant.	At the closest residence to the MSWS;	integrating sound level meter	1500 per Eq. + 3000 Op. /y
Construction and operation	Noise on working site	dbA	MSWS Contractor	Weekly	On heavy equipment cabs	Hand-held sound level meter	100 per Eq.
Construction and operation	Water pollution	Surface water quality. Analysis parameters: pH, DO, Temp, Turbidity, BOD5, COD, TDS, Chloride, TN, TP, E.Coli, PAHs, PCBs, VOC, Al, Cu,	MSWS Contractor	Three samples Quarterly	At stormwater ditches discharge points to Great Salt Pond	Analyzed by an accredited laboratory	2000 per sample

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods	Estimated Cost ($)
		Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, CN					
Construction and operation	Water pollution	Pond sediment quality. Analysis parameters: Al, Cu, Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, Dioxins/Furans, PAHs, PCBs, VOC	MSWS Contractor	One sample bi-annual	Great Salt Pond	Analyzed by an accredited laboratory	2000 per sample
Construction and operation	Soil pollution	Pond Island Soil quality. Analysis parameters: Al, Cu, Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, Dioxins/Furans, PAHs, PCBs, VOC	MSWS Contractor	One sample every 100m inside the MSWS & IDS perimeter and RAI. Bi-annually.	Pond Island	Analyzed by an accredited laboratory	2000 per sample
Construction and operation	Seawater pollution	Analysis parameters: pH, DO, Temp, Turbidity, BOD5, COD, TDS, Chloride, TN, TP, E.Coli, Intestinal enterococci, PAHs, PCBs,	MSWS Contractor	Two samples bi-annually (wet and dry season)	Great Bay	Analyzed by an accredited laboratory	2000 per sample

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods	Estimated Cost ($)
		VOC, Al, Cu, Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, CN					

8.0 Stakeholder Engagement and Information Disclosure

Project Stakeholders

The Project has a broad range of stakeholders, who directly or indirectly are being affected by the remediation activities. These stakeholders are broadly categorized into the following categories:

Residents

- Potential residential properties located in the vicinity of the MSW landfill.

Environmental & Nature Organizations

- The Nature Foundation of Sint Maarten (Nature Foundation), Environmental Protection In the Caribbean (EPIC), Sint Maarten Pride Foundation

Government Entities

- NRPB
- Ministry VROMI
- Ministry of VSA
- Ministry of TEATT
- Ministry of Justice

Commercial Businesses

- Potential commercial business owners and patrons located in the vicinity of the MSW landfill.
- Recycling Companies
- Waste Management Companies
- Utilities Companies
- Telecommunications Companies

Stakeholder Engagement Plan

The ESMP has been shared with formal implementing partners and previously identified stakeholders via email for their comments and feedback. Following the Covid-19 developments on island, and the government's measures to prevent further spread of the virus, the NRPB's policy is to limit in person group meetings where possible. Additional in person meetings to consult on the ESMP is not feasible at the particular moment. Hence the consultation on the ESMP was conducted virtually. All identified stakeholders listed above, communicate digitally and can be reached through virtual means of consultation.

- In order to provide an easily accessible overview of the mitigation measures, a separate document was created, named 'MSWS Mitigation Measures Overview', attached as Annex I. The document contains an extract of the table of mitigation measures in the ESMP and was attached along with the ESMP.

A link to the updated ESMP is published on the NRPB's Website, Facebook and LinkedIn pages to seek feedback from the Public during a period of ten days, namely from the 19th of May until the 28th of May, 2021.

The following e-mail has been sent to the stakeholders:

Dear Stakeholder,

*Attached to this email you will find the **Draft Environmental and Social Management Plan (ESMP)** for the National Recovery Program Bureau's (NRPB) Municipal Solid*

Waste landfill management and related activities component within the Emergency Debris Management Project (EDMP). For ease of reference, an extract of the environmental and social risks and the proposed mitigation measures, titled 'MSWS Mitigation Measures Overview', is accompanied.

An ESMP is an environmental and social safeguards instrument which provides the standard set of mitigation, monitoring, and institutional measures to be taken during project implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

Why are you receiving this email?
The NRPB would like to invite you to review the Draft ESMP for the Municipal Solid Waste landfill management and related activities of the EDMP project, in particular the extract, titled 'MSWS Mitigation Measures Overview, provided.

The Municipal Solid Waste landfill management and related activities component relates to construction and daily management activities at the Municipal Solid Waste landfill (MSW) in Sint Maarten, these are:

i) Installation of a Temporary Weighbridge and Reconstruction of the Access road to the MSW landfill;

ii) Daily Management of the MSW Landfill Operations including Fire Suppression and Slope Recontouring.

The objective of this public consultation period is to ensure that all affected parties are informed and able to express their perspectives. This ensures that relevant concerns and potential impacts of the project are taken into account. As a direct stakeholder, we especially want to hear your concerns, if any, and this email is thus being sent to facilitate your access to the attached draft Environmental and Social Management Plan (ESMP).

What is needed from you?
We appreciate your feedback on this Plan! If you could please review the document and send your comments/suggestions to us via ***info@nrpbsxm.org*** ***by May 28th, 2021*** *we can make sure to consider the received feedback in the preparation of the final document. The document can also be found on our website: Draft-ESMP MSW-site.pdf (nrpbsxm.org)*

Thank you in advance for your contributions to reviewing the Environmental and Social Management Plan (ESMP).

To learn more about the NRPB and the Emergency Debris Management Project please visit the webpages https://nrpbsxm.org/about-nrpb/ and https://nrpbsxm.org/edmp/

Call for feedback in the newspaper

A newspaper ad was placed in the local newspaper (see picture below), in order to invite the general public to provide feedback on the ESMP.

Results of public consultation

The Ministry of VROMI has provided feedback, which, in so far determined to be relevant, has been consolidated into the latest version of the ESMP. No further feedback from stakeholders has been received during the abovementioned period of time.

Throughout the implementation stages of the Project, engagement of stakeholders will be promoted through:

- Publishing and broadcasting the details and progress of the Project on the NRPB Website, the NRPB Facebook page, the NRPB LinkedIn page.
- NRPB Grievance Redress Mechanism, opened to the public to receive feedback and grievances on the Project

Stakeholder engagement on resettlement activities

The community which will be impacted by TDSR related activities is for the most part the same community which will be impacted as part of the proposed landfill management activities. A separate ESMP and SEP is created for the project induced resettlement of the MSW landfill community. As such, the resettlement activities regarding the MSW landfill are part of an ongoing public consultation process.

Consultations on the project and the required resettlement with the community members living in the vicinity of MSW, have been initiated in December 2018 and continued until February 2019. In February 2019, an additional round of meetings in English and Spanish was

held with residents to further discuss their resettlement preferences and to give them opportunities to ask additional questions.

After the Resettlement Area of Impact was defined, the project carried out the primary social baseline data collection. Data collection was based on a socioeconomic census survey and three focus group discussions. The socioeconomic census was carried out in 15 days from 17 to 29 November 2020. The objective of the socioeconomic survey was to obtain socioeconomic data at the household and business levels, identify how livelihoods would be affected and the types and value of livelihood restoration support for which the PAPs would be eligible. Three Focus Group Discussions (FGDS) were conducted from 5 to 6 February 2021, with the following target groups: women, elderly residents, and young people between the age of 19 and 23. The sessions focused on obtaining additional, qualitative information on the residents' views on living in the RAI, daily routines and travel routes, and perceptions and concerns about the Project.

From 5 May to 2 June 2021, the project conducted group consultations and individual consultations/negotiations with the objectives of disclosing the entitlement matrix to the PAPs and conducting individual meetings with PAPs to disclose and explain their compensation packages.

Based on feedback received during the February 2021 Focus Group Discussions, the project continuously provided updates and information to the community through WhatsApp broadcasting and also engaging with PAPs individually. A WhatsApp broadcast list was created by NRPB. Given that not all PAPs have access to smartphones or WhatsApp, the project engaged with individuals by phone or SMS. In addition, the project installed a billboard in the proximity of the RAI, there is a mailbox attached to the billboard where community members can leave messages/complaints to NRPB.

ESMP Stakeholder Consultation and Feedback Received

As previously stated, Stakeholders were consulted and invited to provide feedback digitally. In an effort to simplify the feedback process and generate more feedback, a document has been prepared that contains the core of the ESMP, namely the risks and mitigation measures. The document, titled 'MSWS Mitigation Measures Overview', has been published and sent for public consultation along with the draft ESMP. The received feedback is intended to be reported as part of the ESMP.

Stakeholders consulted in preparation of this ESMP include the following: relevant Ministries, such as VROMI, VSA and Justice. Community councils, businesses in the vicinity and waste management companies were consulted as part of the Public Consultation from May 19th until May 28th, 2021.

The draft version of the ESMP was published online on the NRPB website and social media to call for further feedback on the document. Additionally, the NRPB was open to receive feedback for ten days through the email address info@nrpbsxm.org. Furthermore, a call for feedback to the general public was been advertised in the localnewspaper 'the Daily Herald'.

Questions and feedback received from the consultation and through the email were to be summarized in an annex and were to be classified into three classes: (i) relevant to the ESMP, (ii) relevant to the Project scope, and (iii) irrelevant. Relevant feedback was to be incorporated into the final ESMP. The final ESMP version was to reflect feedback received from stakeholders.

The different channels were monitored by NRPB. No feedback was received through any of the described channels.

Access to Information

Draft version of the ESMP, along with the MSWS Mitigation Measures Overview, is publicly disclosed through the NRPB website and social media:

www.nrpbsxm.org

www.facebook.com/sxmnationalrecovery

www.linkedin.com/company/sxmnationalrecovery/

Specifically, targeted Stakeholders were approached directly via e-mail with the draft ESMP and 'MSWS Mitigation Measures Overview' included as an attachment

The final version of the ESMP will be available on the NRPB's website. Stakeholders will be informed about the availability of the ESMP on the website. Regular progress on the Project implementation will be shared through NRPB news bulletins.

Next Steps for ESMP clearance and disclosure

- The ESMP will be updated once the technical designs of the Design-Build-Operate (DBO) contract are known.
- The updated ESMP will be submitted to the WB for review and final clearance, along with the technical documents as part of the bidding package, prior to launching the bidding process for the DBO contract.
- The cleared ESMP will be disclosed on NRPB's website.

9.0 Grievance Redress Mechanism

The NRPB established a Grievance Mechanism (GRM)[4] to address any feedback and grievances associated with Project activities in good faith through a transparent and impartial process.

Specific objectives of the Grievance Redress Mechanism are to:

- Help identify issues and concerns early, so that they can be addressed quickly and proactively;
- Continuously improve Project performance; and
- Demonstrate the Project's commitment to meaningful stakeholder engagement, and respect for local opinions and concerns.

The GRM provides opportunities for the receipt, investigation, and resolution of complaints at the Project level during the pre-construction through operations phases. Stakeholders will be notified about the GRM in external publications and communications (including newspapers and social media), and contact details associated with the GRM will be placed at

[4] The GRM is currently being updated and final version will be uploaded here: Complaints Procedure – National Recovery Program Bureau (nrpbsxm.org)

the entrances to construction worksites. A dedicated telephone number and email option for public enquiries and feedback will also be shared.

The Contractor will be required to include a GRM in the C-ESMP, subject to NRPB's approval, to address worker complaints.

The Project will use the GRM as a component of the broader stakeholder engagement activities, including monitoring and reporting.

9.1 Grievance Mechanism Structure and Process

The GRM for the project is attached as Annex C. The specific arrangement for the GRM regarding resettlement complaints is described in paragraph 9.6.

9.2 Monitoring and Reporting

Monitoring

It is important to monitor stakeholder engagement and communication to ensure that consultation and disclosure efforts are effective, in particular that stakeholders have been meaningfully consulted throughout the process.

Monitoring will cover:

- Consultation activities conducted with government authorities and non-governmental stakeholders;
- The effectiveness of the engagement processes by tracking feedback received from engagement activities; and
- Any grievances received.

9.3 Tracking Stakeholder Engagement Activities

Future tracking of stakeholder engagement will be used to assess the effectiveness of the Project's stakeholder engagement activities. Indicators for tracking will include, among others:

- Place and time of formal engagement events and level of participation including by specific stakeholder categories and groups (e.g., women);
- Number of comments by topic and type of stakeholder, and details of feedback provided through the GRM or other means (office visits, emails, phone calls etc.);
- Numbers and types of grievances and the nature and timing of their resolution;
- Recording and tracking commitments made to stakeholders; and
- Community attitudes and perceptions of the Project's activities pertaining to the Project based on media reports and stakeholder feedback.

9.4 Project Reporting

Internal Reporting

- Reports on stakeholder engagement efforts will summarize all activity for the period and provide a summary of issues raised and how they have been addressed. Potential

issues include timeliness of responses and mitigation and measures taken to address grievances, and analysis of trends in Key Performance Indicators (KPIs). These may include:

- Total numbers of stakeholders engaged according to stakeholder category;
- Numbers of comments and queries received according to topic and responses;
- Issues raised and levels of support for and opposition to the Project; and
- Numbers of grievances lodged.

The ESMP be reviewed on a regular basis and revised as needed to reflect completed engagement activities and future engagement plans.

9.5 External Reporting

The Project will provide information to stakeholders that will focus on non-routine activities, after an unplanned event or incident (if one occurs), or if there is any change to company structure or practice.

9.6 Grievance Redress Mechanism for RAP

Details of the Grievance Redress Mechanism for complaints in the context of the RAP, are provided in the final RAP, that can be found at: Resettlement – National Recovery Program Bureau (nrpbsxm.org)

10.0 References

2020, EE&G Disaster Response, LLC Environmental and Social Impact Assessment (ESIA/DRAFT) for Fire Suppression Activity, Pond Island Municipal Waste Landfill and Irma Debris Site. Emergency Debris Management Project. Sint Maarten National Recovery Program Bureau (NRPB). 139 pp and 12 annexes.

2020, EE&G Disaster Response, LLC DRAFT Environmental and Social Management Plan (ESMP) For Fire Suppression Activity Pond Island Municipal Waste Landfill and Irma Debris Site. 64 pp 4 annexes

World Bank Group, Environmental, Health, and Safety (EHS) Guidelines; Main Web Page
https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

World Bank Group, Environmental, Health, and Safety (EHS) Guidelines; WASTE MANAGEMENT
https://www.ifc.org/wps/wcm/connect/456bbb17-b961-45b3-b0a7-c1bd1c7163e0/1-6%2BWaste%2BManagement.pdf?MOD=AJPERES&CVID=ls4XT4R

World Bank Group, Environmental, Health, and Safety (EHS) Guidelines; GENERAL EHS GUIDELINES: INTRODUCTION
https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

11.0 Annexes

Annex A	COVID-19 Provisions For Procurement And Contracting
Annex B	Preparation and Results of the Stakeholder Consultation
Annex C	Grievance Mechanism of the NRPB
Annex D	Applicable Policies, Legislations and Regulations of Government of Sint Maarten
Annex E	Relevant Administrative Framework
Annex F	Project Environmental, Social Impacts, Risks and Concerns with Mitigation Measures, Responsibilities and Means of Verification
Annex G	Annex H Preliminary Resettlement Action Plan Compensation Framework
Annex H	Mitigation measures overview
Annex I	Pest Management Plan Guidelines for Contractor
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Annex K	Air Monitoring Plan Guideline for Contractor

Annex A COVID-19 Provisions For Procurement And Contracting

The Employer is mindful of the current challenges that COVID-19 presents to the Contractor to execute the essential Works required for the safety of the populace of Sint Maarten. The Contractor is required to implement and enforce all the current COVID-19 safety and health legislation and directives of the government of Sint Maarten. Also, the Contractor is recommended to stay current and implement, as applicable, the international safety and health practices for COVID – 19 of the World Health Organization (WHO) – refer: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public and of OSHA – refer https://www.osha.gov/Publications/OSHA3990.pdf.

Some specific good practices include:

- Conduct regular briefings and awareness sessions of the COVID-19 health and safety practices to be followed by all persons involved in the Works including:
    - Updates with regards to directives of the government of Sint Maarten
    - How to avoid the disease spreading (cough/sneeze in the crook of elbow)
    - Keep 1.5 meter or more away from other workers
    - Use and dispose of tissues for coughs and sneezes
    - Regularly wash hands with soap and water – many times per day

- Wash stations should be provided regularly throughout the sites of the Works, including close to toilets and communal facilities, with a supply of clean water, liquid soap and paper towels/electric hand dryers, with a waste bin (for used paper towels) that is regularly emptied. Alternatively, alcohol-based hand rub should be provided.

- Enhanced cleaning arrangements should be put in place to include: interiors of vehicles which may be used by several workers, staff, etc, waste bins at key places, regular and deep cleaning using disinfectant of communal areas, eating areas, latrines/toilets and, including tools, door handles, floors and all surfaces that are touched regularly.

- The provision of Personal Protective Equipment (e.g. masks and rubber gloves), as required.

- Workers showing COVID-19 symptoms or have recently been in close contact with persons testing positive, must immediately cease involvement in the Works and seek medical direction and assistance.

- Encourage workers to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the Contractor addressing

COVID-19 related issues, how procedures are implemented, and concerns about the health of their co-workers and other staff.

Bidders are to include, in the ESHS Management Strategies and Implementation Plans, the measures proposed to be implemented for the duration of the Contract to prevent or minimize the possibilities of an outbreak of COVID-19 amongst management, staff, (sub-) contractors and neighboring communities

Annex B Preparation and Results of the Stakeholder Consultation

Public consultation on the Environmental and Social Management Plan
Municipal Solid Waste Site management and related activities
National Recovery Program Bureau

Date: 19th of May until 28th of May 2021
Place: Consultation took place digitally due to the restriction of gatherings in light of the Covid19-pandemic

Objective
Gather input and feedback from stakeholders on planned Municipal Solid Waste Site management and related activities and this ESMP.

Expected result
Input and feedback from the participating stakeholders on the proposed MSW Site management and related activities and the mitigation measures proposed in the ESMP. Input and feedback from the participating stakeholders on the proposed MSW Project and the mitigation measures proposed in the ESMP. Feedback gathered from stakeholder consultation will be used to finalize the **ESMP.**

Participants consulted
General public through the NPRB website and social media (LinkedIn, Facebook).
Targeted stakeholders via email addresses of the respective individuals and entities.

Preparations
Consultations will take place digitally in light of the restrictions related to the COVID-19 Pandemic and as a general precautionary measure. Contact information of the stakeholders to be targeted directly was gathered. Text for Public Consultation via email, website and social media drafted in coordination with the NRPB Communications Department.

Results
The Ministry of VROMI has provided feedback on the ESMP, which has been, as far as deemed reasonable, included in the latest version of the ESMP.

Annex C Grievance Mechanism of the NRPB[4]

COMPLAINTS PROCEDURE - NATIONAL RECOVERY PROGRAM BUREAU

Introduction

Complaints are a valuable source of feedback and a valuable tool for organizational development. Diligent and prompt attention to complaints can help identify the needs of persons that encounter the National Recovery Program Bureau, understand the shortcomings, increase satisfaction and improve overall performance of the staff of the Bureau.[5]

This objective of this complaint procedure is to ensure that the National Recovery Program Bureau handles complaints fairly, efficiently and effectively. The Bureau aims to provide quick and effective resolution to concerns and complaints.

Our complaint procedure intents to:

1) enable us to respond to complaints in a timely and cost-effective way
2) boost public confidence in our work and administrative processes, and
3) provide information on complaints to enhance and give a quality impulse to our products and services.

What is a complaint?

A complaint is a written formal expression of dissatisfaction made to or about our services, products or staff. Requests for information, service requests and reports of problems or wrongdoing merely intended to bring a problem to our notice with no expectation of a response are to be distinguished from complaints.

This procedure applies to complaints filed against the staff at all levels within the Bureau. In case of doubt, the complaint officer will get in contact to clarify the merits of the request, report or complaint.[6]

A complaint cannot be filed if:

you already filed a complaint about the same service, product or staff at the Bureau, or a complaint has been filed at the Ombudsman

1. the service, product or staff that caused the grievance took place over a year ago

[5] Until the National Ordinance on the Bureau is in effect, complaints will be handled by the Interim Recovery Committee under the responsibility of the Minister of General Affairs.

[6] A service request includes, but is not limited to: requests for approval, requests for action, routine inquiries on planning or state of affairs, reports of failure to comply with laws regulated by the Bureau, requests for explanation of policies, procedures and decisions.

2. there is a different way or procedure to address your grievances, for example through an appeals procedure based on a formal decision of government
3. the complaint should be addressed to a different entity within government, the Bureau will send the complaint to the right entity
4. your complaint is part of a court case, or part of a criminal investigation by the Public Prosecutor
5. your complaint does not address the products, service, or conduct by our staff
6. your complaints is about personal and general conduct of one of the staff members of the Bureau that is not directly related to a provided service

A complaint should be done by filling the online form provided below:

https://goo.gl/forms/9qMpmJeLf0sTuaUk2

Complaints can also be sent via email to complaints@nrpbsxm.org with "Complaint [name] Project'' in the title of the e-mail. For example, "complaint Emergency Recovery Project I".

In the case that the person does not have access to internet or does not wish to submit an online form:

A complaint can be done in person at the address below. In such case the person will be asked to fill out a form that will contain the following information:

- personal and contact information: name, address, phone number, email address
- date
- merits and nature of the complaint: what happened, when it happened, who was involved
- the consequences of the occurrence: damage, or other grievance

Complaints can be addressed to:

National Recovery Program Bureau

#57 Walter A. Nisbeth Road

Philipsburg

Sint Maarten

Are there costs involved?

No, filing a complaint is free of charge.

Who is handling your complaint?

A complaint officer together with the legal counsel to the Bureau is handling your complaint.[7] [8]

This way it is ensured that the person handling the complaint is different from any staff member whose conduct or service is related to the complaint. Conflicts of interests, whether actual or perceived, will be managed responsibly.

How will the complaint be addressed?

Process:

[7] Until the NRPB is established and both a complaint officer and a legal counselor are appointed, the majority of the complaints will be handled by the IRC´s legal advisors with support from the office assistant and other relevant teams. In some cases, this may also involve the assistance of Judicial Affairs.

[8] In the case that the complaint is related to the Director of the NRPB, it will be handled by the Cabinet of the Prime Minister.

Receipt

We will acknowledge receipt of each complaint promptly, and preferably **within 5 working days**. Consideration will be given to the most appropriate medium (e.g. email, letter) for communicating with the person making a complaint. The complaint officers and legal counsel will consider any relevant legislation and/or regulations when responding to complaints and feedback.

Where possible, complaints will be resolved at first contact with the Bureau. We will address each complaint with integrity and in an equitable, objective and unbiased manner.

Unless the complaint has been resolved at the outset, we will record the complaint and its supporting information. We will also assign a unique identifier to the complaint file.

The record of the complaint will document:

1. the contact information of the person making a complaint
2. issues raised by the person making a complaint and the outcome/s they want
3. any other relevant and
4. any additional support the person making a complaint requires

We will protect the identity of people making complaints where this is practical and appropriate. Personal information that identifies individuals will only be disclosed or used by the Bureau as permitted under the relevant privacy Ordinance (*National Ordinance on the Protection of Privacy*), and any relevant confidentiality obligations.

Complaints filed against the Director of the Bureau, will be handled outside the Bureau, by the Ministry of General Affairs, to ensure an independent procedure.

Initial assessment

Complaining is free of charge. After acknowledging receipt of the complaint, we will confirm whether the issue/s raised in the complaint is/are within our control. We will also consider the outcome/s sought by the person making a complaint and, where there is more than one issue raised, determine whether each issue needs to be separately addressed.

Conflicts of interests, whether actual or perceived, will be managed responsibly. In particular, internal reviews of how a complaint was managed will be conducted by a person other than the original decision maker.

We will advise the complaintive as soon as possible when we are unable to deal with any part of their complaint and provide advice about where such issues and/or complaints may be directed (if known and appropriate).

Addressing the complaint

After the initial assessment of the complaint, we will consider how to address it. **Within 6 weeks, the complaint will be addressed**. Only in complex cases, this period can be extended. The complaintive will be informed accordingly.

If a person prefers or needs another person or organization to assist or represent them in the making and/ or resolution of their complaint, we will communicate with them through their representative if this is their wish. We will take all reasonable steps to ensure that people

making complaints are not adversely affected because a complaint has been made by them or on their behalf.

When determining how a complaint will be addressed, we will consider:

- How serious, complicated or urgent the complaint is
- Whether the complaint raises concerns about people's health and safety
- How the person making the complaint is/has been affected
- The risks involved if resolution of the complaint is delayed, and
- Whether a resolution requires the involvement of other organizations

To address a complaint, we may:

1. Give the person making a complaint information or an explanation
2. Gather information from the product, person or area that the complaint is about, or 3. Investigate the claims made in the complaint.

Notably:

- We will keep the person making the complaint up to date on our progress, particularly if there are any delays. We will also communicate the outcome of the complaint using the most appropriate medium. Which actions we decide to take will be tailored to each case.
- We will assess each complaint on its merits and involve people making complaints and/or their representative in the process as far as possible.
- We will assess and priorities complaints in accordance with the urgency and/or seriousness of the issues raised. If a matter concerns an immediate risk to safety or security the response will be immediate and will be escalated appropriately.
- When similar complaints are made by related parties we will try to arrange to communicate with a single representative of the group, if the parties agree to this.
- Where a complaint involves multiple organizations, we will work with the other organization/s where possible, to ensure that communication with the person making a complaint and/or their representative is clear and coordinated.
- Subject to privacy and confidentiality considerations, communication and information sharing between the parties will also be organized to facilitate a timely response to the complaint.
- Where a complaint involves multiple areas within our organization, responsibility for communicating with the person making the complaint and/or their representative will be coordinated.

Provide reasons for decision

Following consideration of the complaint and any investigation into the issues raised, we will contact the person making the complaint and advise them:

1. the outcome of the complaint and any action we took
2. the reason/s for our decision
3. the remedy or resolution/s that we have proposed or put in place, and
4. any options for review that may be available to the complainant, such as filing a complaint at the National Ombudsman

If during an investigation, we make any adverse findings about a particular individual, we will consider any applicable privacy obligations under the *Landsverordening Bescherming*

Persoonsgegevens (National Ordinance on the Protection of Privacy) and any applicable exemptions in or made pursuant to that Act, before sharing our findings with the person making the complaint.

Close complaint and follow up

After addressing the complaint and informing the complaintive (including options for review if the complaint is not addressed to the satisfactory of the complaintive) we close the complaint.

We will keep comprehensive records about:

1. How we managed the complaint
2. The outcome/s of the complaint (including whether it or any aspect of it was substantiated, any recommendations made to address problems identified and any decisions made on those recommendations, and
3. Any outstanding actions that need to be followed up.
4. We will ensure that outcomes are properly implemented, monitored and reported to the complaint handling officer and/or senior management.
5. We will ensure that complaints are recorded in a systematic way so that information can be easily retrieved for reporting and analysis in an aggregated and anonymous form. Those records are kept for a maximum duration in accordance with the law.

Regular reports will be run on:

1. the number of complaints received
2. the outcome of complaints, including matters resolved at the frontline
3. issues arising from complaints
4. systemic issues identified, and

   the number of requests we receive for internal and/or external review of our complaint handling.

Regular analysis of these reports will be undertaken to monitor trends, measure the quality of our services and make improvements. Both reports and their analysis will be provided to the Bureau's senior management for review. Any information provided on the complaints at the Bureau to Parliament will be anonymous.

Annex D Applicable Policies, Legislations and Regulations of Government of Sint Maarten

Sint Maarten, previously part of the Netherlands Antilles, became an autonomous territory within the Kingdom of the Netherlands on October 10, 2010. Sint Maarten has full autonomy for internal affairs including the environmental legislation, the Dutch government being responsible for defense and foreign affairs.

According to Article 22 of the 'Constitution of the Country of Sint Maarten,' It shall be the constant concern of the government of Sint Maarten to keep the country habitable and to protect and improve the natural environment and the welfare of animals.

The government is strongly committed to sustainable development and the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (Ministry VROMI) is working towards the preparation of draft legislation on (i) environmental policy and management plan, (ii) nature policy plan, (ii) establish noise, air and water quality norms, and (iv) develop standard environmental regulations to include permits.

The government has some existing policies and regulations on the management of waste and labor issues. These regulations and their applicability to the Project are indicated in the following sections.

1. Waste Ordinance, 1993

Sint Maarten Waste Ordinance of February 23, 1993, provides regulations regarding the collection and disposal of residential waste, bulky wastes, liquid wastes, commercial waste, car wrecks and other categories of waste. The government is responsible for the collection of wastes generated from residential sites and dispose of it in the government operated landfill site in the island.

Collection of the waste generated from the commercial activities and its disposal in the government's landfill site is the responsibility of the owners of the commercial enterprises. The wastes generated during the proposed activities of the Project will also fall under the category of commercial waste. The Ordinance provides the following key actions for management of commercial waste:

a) Those who produce commercial waste must bring it to the government indicated dumpsite on a regular basis and at their own expense.
b) They are authorized to place a third party in charge of this.
c) The Minister establishes regulations regarding the days, times and manner in which commercial waste can be collected and transported.
d) It is forbidden to throw, put down or leave behind trash or remnants of provisions, paper, cans, bottles or another packaging on or by the road that is open to the public or a place nearby.
e) Violation of one of the prohibitions as determined by this Ordinance and failure to uphold one of the obligations as established by this Ordinance is punished by imprisonment for a maximum of two months or a maximum monetary fine of Netherlands Antillean Guilder (ANG) 1,000.
f) If as the violation or the failure to uphold the obligation takes place not a year as passed since an earlier conviction of the guilty party for a similar violation became irrevocable or since the voluntary compliance with a condition as set by the authorized civil servant of the Public Prosecutor on the basis of Article 76 of the Criminal Code of the Netherlands Antilles, the maximum term of imprisonment or monetary fine for sentencing can be doubled.

2. The Labor Regulations 2000

The Labor Regulation 2000 describe provisions concerning the work-times, periods of rest, overtime, nightshift, standby shift, holidays, prohibition of child labor, the prohibition of night work and dangerous work for youths. A copy of the regulations can be obtained from the GoSM website.[2]

According to this regulation, Children under the age of 15 years are prohibited from working, whether or not in exchange for wages of compensation.

The regulations also propose some restriction on the labor involving youth. Boys and girls who have reached the age of 15 years but still not the age of 18 years are considered 'youthful persons' under this regulation. The restrictions towards youth labor are:

a) It is prohibited for youthful persons to perform night work (between 7.00 p.m. and 7.00 a.m.), whether or not in exchange for wages or compensation.

b) It is prohibited for youthful persons to perform dangerous work. The definition of 'danger' does mean not only danger as in being killed or wounded but also other kinds of danger to their health, like poisoning or contamination. For instance, youthful persons are not allowed to perform work where they have to,

- make use of a pneumatic drop stamp or compacting beam;
- carry or lift heavy loads frequently;
- operate a concrete mixer with mechanic hoisting gear, circular saws and bending- and shearing machines;
- operate cranes, platform hoists, fork-lift trucks and tractors;
- nurse or care for patients who are infected with an infectious disease.

The head or director of an enterprise has an obligation to report occupational injuries to the Department of Labor and the police among others. The injuries should be reported as soon as possible, but no later than 24 hours. For the reporting of injuries, but also other labor-safety matters, the following should be contacted:

c) Department of Labor/safety Inspection, Vineyard Building, W. G. Buncamper Road, Third Floor, Philipsburg | Sint Maarten, W.I., Phone: +1-721-5422059/5422079

The contractors to be procured under the Project will be responsible for complying with the Labor Regulations.

3. National HIV and AIDS Workplace Policy

The purpose of this policy is to ensure a uniform and fair approach to the effective prevention of new HIV infections among employees, their families and dependents, and provide social protection within the workplace to employees directly impacted by HIV. The principles of the policy are aligned to the International Labour Organization (ILO) Code of practice on HIV/AIDS and Recommendation No. 200 concerning HIV and AIDS and the World of Work and include the recognition of HIV as a workplace issue, non-discrimination in employment, no screening, no forced disclosure, protection of confidentiality, social dialogue, gender equality, HIV prevention, treatment, care and support measures as critical components for addressing the epidemic in the workplace.

The contractors to be procured under the Project will be responsible for complying with the National HIV and AIDS Workplace Policy.

Annex E Relevant Administrative Framework

1. Ministry of VROMI

The Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI) is responsible within the GoSM for all affairs related to environmental with an intention to provide good quality of life for the citizens of Sint Maarten. Tasks of VROMI relevant to environmental management are:

- Garbage collection management;
- Sanitary landfill management;
- Maintenance of public areas;
- Districts, roads, beaches, upkeep management;
- Management of public lighting (streets);
- Public parking areas;
- Surface drainage works (trenches);
- Water management (ponds);
- Part of disaster response team for logistical support;
- Management of sewage facilities and network;

The Ministry issues the permits for construction of any new infrastructure and buildings; and dredging and excavation activities.

The 'Department of Inspection' in the VROMI is responsible for the inspection and control of activities within the sphere of domain land, building, environment and work safety to safeguard environmentally responsible, structured and safe living and work surroundings for the public.

2. Ministry of VSA

The Ministry of VSA is charged with health and prevention of public health risks via the Department of Collective Preventive Services and safeguarding proper execution of the diverse labor laws via the Inspectorate of VSA. The Department of Labor Affairs is charged with the tasks in the area of policies on labor. The Department of Labor Affairs has the following tasks:

- Formulating policy memorandums and recommendations and making proposals for the development, adjustment, monitoring and implementation of national policy concerning labor and the policy in the area of safety and labor inspection;
- Preparing, implementing and monitoring the national legislation concerning labor and monitoring the compliance with this legislation;
- Promoting international, social and labor affairs, such as the relationship with the International Labor Organization

The Department of Labor Affairs is the executing division of the Ministry of VSA, and is tasked with monitoring and settling complaints deriving from labor agreements between employers and employees, handling requests for dismissals and for work permits.

Annex F Project Environmental, Social Impacts, Risks and Concerns with Mitigation Measures, Responsibilities and Means of Verification

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
Community Resettlement Impacts of land acquisition (RAP) on households; Impacts of land acquisition (RAP) on local businesses; Impacts on local social structure; Impacts on local employment Works will generate disruptions of existing daily activities on families and businesses located within the resettlement area. Business owners, who are required to resettle, will potentially risk losing customers and operation hours. Residents within the RAI that make a livelihood working in the MSW/IDS Sites namely material salvagers (waste pickers) that gather recyclables, could potentially	Mitigation: • Compensation for those PAPs resettled, i.e., provide housing if relocated temporary or provide resources (housing or restitution) if relocated permanently. PAPs also include businesses that operate within this area that may suffer a loss of revenue and income for their employees. • Implementation of job training and job placement programs for those PAPs forced to find alternative employment. • Facilitate open forums to the public and stakeholders to freely and openly ask questions regarding impacts from resettlement processes, project timeline, or other pertinent matters. • Assist business owners and residential property owners with relocation. • Implement RAP procedure.	NRPB with support from VROMI	NRPB/ Monitoring, supervision and inspections	MSWS/IDS operation	12366238(sum)

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
be forced to seek employment elsewhere.					
Air quality - Smoke: The fire suppression activities may result in increased emissions from the site that represent potential inhalation and skin contact hazards to the fire suppression contractor employees, government and landfill contractor employees working at the MSW and IDS Site, visitors and the resident population in the surrounding communities. The fire suppression methods chosen to be implemented will impact the magnitude of potential air emissions exposure scenarios.	Mitigation measures to minimize the impact of air emission during fire suppression activities would include the following: a Implementation of the relocation for the residents and businesses within the Resettlement Area of Impact (RAI) during the fire suppression activities b Implementation of a fire suppression strategy that will promote the best-case scenario for long term improved air quality. c Implementation of the Environmental, H&S Monitoring Plan to monitor air, water, soil emissions during fire suppression at both the MSW and IDS as well as the surrounding communities. d Cease work if wind direction and speed are detrimental to safe management of emissions risks. e Strict adherence to the Site-Specific Health and Safety Plan (will be drafted as part of the C-ESMP) for all fire suppression workers and landfill workers. Specifically, with regard to training, personal protective equipment, safe work practices, and decontamination. f Daily cover of waste materials and excavated areas where applicable, preferably with ADC.	VROMI/MSWS operato	NRPB & VROMI/ Monitoring, supervision and inspections	MSWS/IDS operation	a Included (Inc.) b 30000 per year c Inc. in Table 7.1 d 10000 per day e 3000 per year f 10000 per year
Odor impacts Nuisance odors may cause sensitivity reactions in susceptible individuals. The presence of odors downwind of the MSW/IDS Site does not	Mitigation measures to minimize the impact of odors during MSW and IDS landfill operations and activities would include the following: a Water spraying/misting will be utilized to suppress dust emissions. b Daily air monitoring for odors/stench	VROMI/operators	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	a 25000/y b 3000/y c 150000 per year d Included

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
correlate to a public health concern.	c Daily cover of waste materials and excavated areas where applicable. Alternative Daily Cover is very effective at odors control on landfill sites. d Prioritize the covering of biodegradable waste like food or other organic material.				
Landfill Gasses Landfill gas emissions are common by products of the decomposition of landfill waste, primarily in the form of methane, an odorless, explosive gas. In addition, other gases that are typically considered harmful at elevated concentrations may be released from the burning waste within landfill gasses.	Mitigation measures to minimize the impact of landfill gases would include the following: a Implementation of a fire suppression strategy that will promote the best-case scenario for long term reduction of the emission of landfill gases. b Daily cover of waste materials and excavated areas where applicable. c Implementation of worker respiratory protection. d CO and methane alarm monitors in enclosed spaces and equipment cabs on the MSW and IDS	VROMI/ MSWS operators	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	a 10000/y b Inc. c 1000/y d Inc.
Traffic: Increased traffic loading and traffic congestion during fire suppression activities; Traffic Accidents; Littering and cleanliness during waste transit	Mitigation measures to minimize the impact of traffic for the MSW/IDS landfill, during fire suppression and construction activities are: a Implementation of the Traffic Safety and Management Plan by the Contractors as part of the C-ESMP with proper and adequate staffing and equipment for the fire suppression activity and construction of infrastructures b Manage onsite parking and the congestion of traffic onsite and offsite. c Provide security at the access gates/control points. d Maintain roads in a clean and safe condition. e Planning and managing both vehicle and pedestrian routes.	VROMI/MSWS operators contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	a Inc. b Inc. c 30000/y d 5000/y e Inc. f Inc. g Inc. h Inc. i Inc. j 30000/y k 60000

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	f Elimination of blind spots and reversing where possible. g Ensure routes provide adequate space for vehicles to maneuver safely. If needed, vehicles not fitted with reversing aids must be guided when reversing. h Adequate vision and lines of sight. i Adequate parking and off-loading/storage areas. j Providing wheel wash facilities or other suitable alternatives. k Construct a security fence and maintain signs and barriers. l Depending upon the selected alternative(s) and evolution of fires at the site, care should be taken to minimize disturbances and potential contaminant releases into the environment				l Inc.
Noise: Noise arising from operations at the MSW/IDS. Noise from vehicle and equipment operations; Noise arising from fire suppression activities	Mitigation measures to minimize the impact of noise during fire suppression and construction activities would mirror those measures implemented for roads and traffic. They will be mitigated by work plan design/schedule and regulating onsite working hours, and the following dispositions a Maintain all construction equipment in accordance with manufacturer's specifications. b Schedule construction and rehabilitation work during daylight hours and to minimize activity during weekends, holidays, etc.. c Develop and implement a Construction Communications Plan to inform businesses and residents of construction activities.	VROMI/ MSWS operators/ contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	a Inc. b Inc. c Inc. d Inc. e Inc. f 3000/y g Inc. h Inc. i Inc. j 1000/y

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	d Limit construction noise levels to applicable standards such as EHS Guidelines e The plants and equipment used in construction (including the aggregates crushing plant) must strictly conform to noise standards. f All vehicles & equipment used in construction must be fitted with exhaust silencers. g During routine servicing operations, the effectiveness of exhaust silencers will be checked and if found to be defective will be replaced. h Limits for construction equipment used in this project (measured at one meter from the edge of equipment in the free field) such as compactors, rollers, front loaders, concrete mixers, pneumatic drills, cranes (moveable), vibrators and saws as specified in the EHS Guidelines. i Maintenance of vehicles, equipment and machinery will be regular and to the satisfaction of the Project Supervisor to keep noise from these at a minimum. j Workers will wear earplugs or other acceptable noise reduction gear in vicinity of loud noise, and working with or in crushing, compaction, or concrete mixing operation.				
Emissions Dust and engine emissions from construction vehicles and equipment	Mitigation measures to minimize the impact of traffic for the MSWS/IDS, during fire suppression and construction activities are a Maintain all construction equipment in accordance with manufacturer's specifications. b Suppress dust as needed in unpaved areas, by watering, putting gravel or other means.	VROMI/ MSWS operators/ Contactors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	a 50000/y b 25000/y c Inc. d Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	c Avoid burning non-vegetative wastes (refuse, etc.) at construction sites. d Avoid unnecessary idling of construction equipment or delivery trucks when not in use.				
Geology and Soils: The stability of the slopes surrounding the MSWS/IDS site, do not meet industry-accepted design criteria. Fire suppression activities and other factors may contribute to instabilities and pose a safety hazard to the RAI. An increase in the air emissions associated with the proposed activities would undoubtedly increase the amount of dust particles accumulating in the RAI which in turn could result in soil impacts.	Mitigation measures to improve and promote slope stability at the MSW and IDS would typically include the following, however these may not be feasible due to the lack of space at the sites: a Fire Suppression of the subsurface fires to prevent void spaces from impacting slope stability. b Proper placement of incoming waste material and hurricane debris to maintain the slopes at 3:1. c Waste material that is excavated during fire suppression activities must be properly placed into the MSW and IDS sites so to adhere to the 3:1 ratio. In addition, in the event that a slope is disturbed during fire suppression activities, the slope will be restored to its previous condition. d Monitoring of slopes adjacent to heavy equipment use and fire suppression activities. e Mitigation measures for air emissions/dust/smoke control, fire suppression, slopes stability, MSWS daily management are also relevant to soil quality impact on the surrounding areas. f The slope recontouring and the proximity of the subsurface fires on the southeast portion of the MSW Site presents a safety hazard to the adjacent community and fire suppression should not be performed until relocation of the PAPs has been completed.	VROMI/ MSWS operators/ Contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	a 30000/y b Inc. c Inc. d 60000/y e Inc. f 1500000 (sum)

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
Hydrogeology, Hydrology, and Surface Water Quality. Existing runoff, leachate, and groundwater discharges to the Great Salt Pond from the MSWS/IDS, during normal operations, during and post fire suppression activities, are and will all be affecting Great Slat Pond's water quality. During a landfill fire, because of the diversity and chemical composition of waste in general, hundreds or more compounds can be produced and released into the environment. In addition, firefighting activities such as the application of water and foam generate runoff that can mobilize and transport contaminants to sensitive receptors as well as generate more contamination.	Mitigation measures to improve and promote slope stability at the MSWS and IDS would typically include the following a Use of Alternate Daily Cover (ADC) or Increase daily soil cover usage from 6-inches (15 cm) of dredged sand to 12-inches (30 cm) of dredged sand to adequately cover deposited waste material therefore reducing the potential of contaminated stormwater runoff. b Use of temporary erosion control in areas of work. c Install temporary storm water controls in areas where storm water runoff is discharging directly into the Great Salt Pond	VROMI/ MSWS operators/ Contactors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	a Inc. (150000) b 25000 (sum) c 300000 (sum)
Ecology: The proposed fire suppression activities have the potential to increase both airborne emissions and surface water discharges to the surrounding	Mitigation measures to prevent the impacts to the surrounding hydrological environment include the following	VROMI/ MSWS operators/ contractors	NRPB & VROMI / Monitoring, supervision	MSWS/IDS operation	a 5000/y b Inc. c Inc. d Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
terrestrial and marine environments. In addition, COCs detected in the airborne environments can affect terrestrial and avifauna, specifically: nesting birds, migratory birds, and seabirds, while the surface water discharges to the Great Salt Pond have the potential to materially impact the terrestrial and aquatic flora and fauna.	a Continuation of the biological surveys to monitor the flora and fauna species located along the perimeter of the MSWS and IDS. b Use of ADC for daily cover c Use of temporary erosion control in areas of work. d Implementation of increased soil cover and construction of stormwater retention ponds to reduce contaminated stormwater runoff into Great Salt Pond (refer to Hydrogeology, Hydrology, and Water Quality section above). e Implementation of the Environmental Monitoring Plan to monitor air emissions during fire suppression activities.		and inspections		e Inc.
Worker health and safety: Direct exposure to hazardous material; Exposure to smoke/dust emissions; Accidents during fire suppression activities; Soil instability;Exposure to vermin acting as disease vectors; Risk of traffic accidents	a Mitigation measures to prevent the impacts to the worker health and safety include the following: b Material salvagers and visitors will be prohibited from entry into the designated Contamination Reduction and Exclusion Zones. c Limit the duration that waste material is exposed during fire suppression activities, therefore, reducing the potential for increased pestilence. d Daily cover of waste materials and excavated areas where applicable. e Implementation of incident command structure with strict stop work authority should hazards occur that are difficult to manage or control. f Provide workers with appropriate protective clothing, gloves, respiratory face masks and slip-resistant shoes for waste transport workers and hard-soled safety shoes for all workers to avoid puncture wounds to the	VROMI/MSWS operators/ contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	a Inc. b Inc. c Inc. d Inc. e 5000/y f 10000 g 5000 h Inc. i 2000 j Inc. k 40000 l Inc. m 2500/y n Inc. o 10000

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	feet. For workers near loud equipment, include noise protection. For workers near heavy mobile equipment, buckets, cranes, and at the discharge location for collection trucks, include provision of hard hats; g Provide all landfill equipment with enclosed air conditioned cabs and roll-over protection; h Provide refuse collection vehicles and landfill equipment with audible reversing alarms and visible reversing lights; i Restrict access to disposal sites such that only safety-trained personnel with protective gear are permitted to high-risk areas; j Provide workers with communications tools, such as radios. Special signaling codes have been developed for communications on landfill sites; k Control and characterize incoming waste to avoid chemical exposure; l Provide adequate personnel facilities, including washing areas and areas to change clothes before and after work; m Prohibit eating, smoking, and drinking except in designated areas; n Provide worker immunization and health monitoring (e.g.for Hepatitis B and tetanus); o Maintain good housekeeping in waste processing and storage areas; p Clean and wash with disinfectant the cabins of heavy mobile equipment used at regular intervals; q Monitor breathing zone air quality in work areas				p Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
Public Health and Safety: Direct exposure to hazardous material; Exposure to smoke/dust emissions; Exposure to vermin acting as disease vectors; Traffic increase and road accidents potential	Measures to mitigate the impacts to the public health and safety include the following: a Facilitate open forums to the public and stakeholders to freely and openly ask questions regarding impacts from air emissions, stormwater runoff/water quality, dust control, increased traffic on roadways, project timeline, or other pertinent matters. b Implement the Environmental, H&S Monitoring Plan as part of the fire suppression activity and action levels set at the landfill perimeters to be conservative and protective of public health during the fire suppression project. c Strict adherence to the Traffic Management Plan to decrease the potential of vehicular accidents both at the MSW and IDS sites and the surrounding roadways. d Limit the duration that waste material is exposed during fire suppression activities, therefore, reducing the potential for increased pestilence. e Implementation of incident command structure with strict stop work authority should hazards occur that are difficult to manage or control.	VROMI/MSWS landfill operators/ contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	a Inc. b Inc. c Inc. d Inc. e Inc.
Aesthetic: Current effects of subsurface fires and fire suppression activities at MSW and IDS upon aesthetic qualities	Mitigation measures to improve aesthetics are to be addressed via the measures implemented to reduce visible impact by the construction activities and reduce gas emission and odor	VROMI/MSWS operators/ contractors	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
Natural Disaster Risk: Additional instability of the landfill slopes in the event of a significant rain and wind event	a Maintain the MSWS/IDS landfill slope stability and profiling practices under the best practices and standards b Have in place a rapid response for emergency and protocols to comply with the national emergency plan. c Conduct regular training and exercises for site staff regarding emergency procedures.	VROMI/MSWS operators	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation	a Inc. b Inc. c 2000/y
Pandemic COVID -19	The Contractor is required to implement and enforce all the current COVID-19 safety and health policy, legislation and directives of the government of Sint Maarten. Also, to implement, as applicable, the international safety and health practices for COVID – 19 of the World Health Organization (WHO) – refer: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public and of OSHA – refer https://www.osha.gov/Publications/OSHA3990.pdf. Contractors are to include, in the Health and Safety Plan, the measures proposed to be implemented for the duration of the Contract to prevent or minimize the possibilities of an outbreak of COVID-19 amongst management, staff, (sub-) contractors and neighbouring communities	VROMI/MSWS operators	NRPB & VROMI / Monitoring, supervision and inspections	MSWS/IDS operation and Weighbridge/Road construction	30000/y
Contractor: Risk of MSWS/IDS operation Contractor not performing according to required E&S standards	The Bidder shall submit Management Strategies and Implementation Plans (MSIP) and the Contractor shall be subsequently required to submit a Contractor's Environmental and Social Management Plan (C-ESMP) prior to their mobilization for NRPB approval. The MSIP and C-ESMP will include as a minimum the following sub-plans:	NRPB/ VROMI	NRPB/ VROMI/ bidders evaluation	MSWS/IDS operation	a Inc. b Inc. c Inc. d 150000/y e Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	Mobilization Strategy; Traffic Management Plan; Gender Based Violence and*Sexual Exploitation and Abuse (GBV/SEA) prevention and response action plan; Covid-19 prevention plan; OHS Workers Health & Safety Plan; Community Health & Safety Plan; Waste Management Plan; Wastewater Management Plan, Air & Noise Emissions Prevention Plan; Environmental Monitoring Plan, Hazardous Materials Management Plan;* Vector Control Plan; *Labour Grievance Redress Mechanism for Workers (Labour GRM); Labour Management Plan (LMP); Community Engagement and Consultation Plan; Emergency preparedness plan.* a Contractor will review the C-ESMP periodically, at least bi-annually, and update in a timely manner. b Contractor will prepare monthly ESHS reports c Contractor shall submit its Code of Conduct (CoC) that will apply to its employees and subcontractors. The CoC shall include requirements relating to Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) (see Annex J for more information). d Contractor will engage an ESHS Specialist, who will be responsible for implementing the contractors' environmental, social, health and safety responsibilities. This expert will be on island during works implementation and operational phase. e Relevant aspects of the ESMP will be included in the tender documents. f The Bidder will submit a ESHS Performance Security in the form of a "demand guarantee" in the amount of one percent (1%) of the Contract Amount. g Contractor will obtain all necessary permits from the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI) for project execution.				f 15000 g 10000 h 600000 (sum inc.) i Inc. j Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	h The cost of the delivering the ESHS requirements will be a subsidiary obligation of the Contractor covered under the prices quoted for other Bill of Quantity items. No separate payments will be made for implementation of ESHS requirements i For developing the C-ESMP, Contractor will consult the World Bank EHS General and Waste Management Facilities Guidelines, and other guidelines listed in Section 3.0. j For developing the Vector Control sub-Plan, contractor will refer to the Pest Management Guideline (see Annex I) k For developing the Environmental Monitoring sub-plan, Contractor will consult and comply with the Air Monitoring Plan guideline (see Annex K)				
Contractor: Risk of Weighbridge/Road repair Contractor not performing according to required E&S standards	The Bidder will submit Management Strategies and Implementation Plans (MSIP) and the Contractor will be subsequently required to submit a Contractor's Environmental and Social Management Plan (C-ESMP) prior to their mobilization for NRPB approval. The MSIP and C-ESMP will include as a minimum the following sub-plans: *Mobilization Strategy; Traffic Management Plan; Gender Based Violence, Sexual Exploitation and Abuse (GBV/SEA) prevention and response action plan; Covid-19 prevention plan; OHS Workers Health & Safety Plan; Community Health & Safety Plan; Waste Management Plan; Wastewater Management Plan, Air & Noise Emissions Plan;* H*azardous Materials Management Plan; Redress Mechanism for Workers (Labour GRM); Community Engagement and Consultation Plan; Emergency preparedness plan.* a Contractor will review the C-ESMP periodically, at least quarterly, and update in a timely manner.	NRPB/ VROMI	NRPB/ VROMI/ bidders evaluation	Weighbridge/Road construction	a Inc. b Inc. c Inc. d Inc. e Inc. f Inc. g Inc. h Inc.

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
	b Contractor will prepare monthly ESHS reports c Contractor will submit its Code of Conduct (CoC) that will apply to its employees and subcontractors. The CoC will include requirements relating to Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) (see Annex J for more information). d Contractor will engage an ESHS Specialist, who will be responsible for implementing the contractors' environmental, social, health and safety responsibilities. This expert will be on island during works implementation phase. e Relevant aspects of the ESMP will be included in the tender documents. f Contractor will obtain all necessary permits from the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI) for project execution. g The cost of the delivering the ESHS requirements will be a subsidiary obligation of the Contractor covered under the prices quoted for other Bill of Quantity items. No separate payments will be made for implementation of ESHS requirements h For developing the C-ESMP, Contractor will consult the World Bank EHS General and Waste Management Facilities Guidelines.				
Grievance Raising Lack of a grievance mechanism available for all workers to raise workplace concerns	The Contractor is required to have an approved GRM in place that allows workers to raise workplace concerns and to have a procedure in place to address those concerns, including a referral procedure to NRPB in case the complaint contains elements of GBV.	Contractors	Supervisor, NRPB	All activities that involve workers	Inc.
Stakeholders Consultation **Poor engagement of stakeholders**	Inform and consult the general public and any directly affected persons. A Stakeholder Engagement Plan with regards to the activities	NRPB, VROMI	Supervisor, NRPB	All activities	2000

Construction and Operations Phases					
Environmental, Social Impact Risks and Concerns	**Mitigation Measures**	**Responsibility**	**Means of Verification/ supervision**	**Activity**	**Estimated Cost ($)**
Labor Conditions **Poor labor conditions, wellbeing and safety of workers**	The Contractor is required to adhere to local legislation and World Bank guidelines regarding labor conditions and is required to provide mitigation measures and plan on the implementation thereof in writing in the C-ESMP.	Contractors	Supervisor, NRPB, VROMI, VSA (Labor Inspection); Monitoring, supervision and inspections	All activities that involve workers	Inc.
Vector Control Practices	a. Implement practices and procedures at the processing and storage areas to promote vector management b. Avoid stockpiling of non-MSW debris by replacing containers within 24 hours of being filled c. Promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides. d. Select and apply pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment. e. Applied pesticides must have negligible adverse human health effects, be effective against the target species and minimal effect on nontarget species and the natural environment. f. Any pesticides that will be handled, stored, disposed of, and applied for vector control will comply with the minimum standards described in Chapter 3. g. Contractor will develop and implement a Vector Control sub-Plan. Contractor will refer to the Pest Management Guideline (see Annex I)	Contractor	VROMI, Supervisor, NRPB	MSWS/IDS operation	a 50000/y b 50000 c Inc. d Inc. e Inc. f Inc. g Inc.

*Included (Inc.) may refer to inclusion of cost under another mitigation measure or as part of standard operation practices.

Annex G Preliminary Resettlement Action Plan Compensation Framework[9]

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
Loss of land	1	Loss of parcels of land (government land)	Landowner	m^2	Since Government owns the land, and there is no leasehold agreement in place, all of the residents are squatters. Based on current laws and WB OP 4.12, Government only has a legal obligation toward residents to reimburse for value of immovable property on Government land.	• Transversal program for the process of formulation, implementation, monitoring and evaluation of the RAP. • The program will inform about the eminent domain of the government land and support the negotiation of the alternatives with each household. • Support from the government: legal procedure to declare eminent domain.
Loss of structures – permanent	2	Loss of dwellings, buildings and other immovable assets owned and/or used	Homeowner; Non-titled / informal user	m^2 and quantity in numbers	The loss of dwellings, buildings, and other immovable assets will be compensated for the full replacement cost. The compensation will be paid in kind with a replacement home (new or used) or in cash at replacement value. The owner of rented dwellings, buildings, and other immovable assets who does not reside in the resettlement area of impact (squatter landlord) will be compensated in cash (only) for the full replacement cost. Financial support (cash allowance) with logistical arrangements will be provided by NRPB to	• Provision of affordable housing, business buildings, and rental spaces. • Support from the government: affordable housing program in the resettlement site for PAPs experiencing permanent loss of dwelling • Payment of any transaction costs required to acquire new housing, such as legal and administrative fees

[9] See the Final RAP section 8.3 - https://nrpbsxm.org/resettlement/

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
					coordinate the dismantling, relocation and reinstallation of assets.	
	3	Loss of rented home	Tenant	Households	The loss of home rented will be compensated in cash as per below: - For tenants with a rent of at least one year: Equivalent value of two-year rent. In case the value of two-year rent is lower than the replacement value of assets/improvements made on the property by the tenant, the tenant will be compensated at the replacement value of assets/improvements made on the property by the tenant - For tenants with a rent duration of one year or less: Equivalent of one-year rent. In case the value of one-year rent is lower than the replacement value of assets/improvements made on the property by the tenant, the tenant will be compensated at the replacement value of assets/improvements made on the property by the tenant All tenants will receive prior notice of minimum two months and financial support (cash allowance) to relocate and secure new housing Financial support (cash allowance) with logistical arrangements will be provided by NRPB to coordinate the dismantling, relocation and reinstallation of assets.	

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
	4	Loss of rented structure (land) used for business	Business owners/operators (formal and informal) who rent –	Businesses	The loss of rented structure (land) used for business rented will be compensated in cash as per below: - For tenants with a rent of at least one year: Equivalent value of two-year rent. In case the value of two-year rent is lower than the replacement value of assets/improvements made on the property by the tenant, the tenant will be compensated at the replacement value of assets/improvements made on the property by the tenant - For tenants with a rent duration of one year or less: Equivalent of one-year rent. In case the value of one-year rent is lower than the replacement value of assets/improvements made on the property by the tenant, the tenant will be compensated at the replacement value of assets/improvements made on the property by the tenant In addition, the PAPs will be provided financial support (cash allowance) to relocate. For business owners which leased land for their business, and which choose to re-establish their business, in case land is required to re-establish the business, cash compensation to cover for 6 months' rent for a similar land plot (to be determined on an individual basis)	

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
					Financial support (cash allowance) with logistical arrangements will be provided by NRPB to coordinate the dismantling, relocation and reinstallation of assets.	
Loss of income and livelihoods	5	Loss of formal and informal businesses (income)	Business owner/operator (formal and informal)	Businesses	The loss of business income will be compensated in cash for the cost of identifying a viable alternative location; for re-establishing commercial activities and for lost net income during the period of transition of 6 months or longer the until the business re-establishes the previous level of profitability; and for re-establishing commercial activities. Additionally, business owners will obtain specialized support to reinstall their businesses. If the business owner does not want to re-establish the activity, they will be given the option of receiving a one-time compensation amount for the value of the business, to be determined per the precise value of the commercial assets, investments, customer base and future revenues The income for informal business will be determined by comparing the average monthly incomes of businesses registered in the census (which will be weighed considering size and type of business operation)	Livelihood Restoration program: • Business, economic activities and employment. Support from the government: • programs to restart and strengthen economic activities (automotive mechanics; beauty, shops, car wash, recycling materials etc.), and employment programs. • Support to formalize and register business for informal business owners/operators (if desired)
	6	Loss of income from rent	Residential landlord	Persons / households	The loss of income from rent will be compensated in cash with a monthly payment rent for 6 months.	

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
					This is not applicable to squatter landlords (off-site landlords).	
	7	Permanent closure of informal income-generating activities dependent on the Project Area	Informal workers dependent on resettlement area for income	Persons	PAP affected by the prohibition of informal business activities (i.e. Businesses that are not formally licensed/registered)* to take effect as part of the Project will obtain support to formalize income-generating activities. PAP affected by loss of access to landfill for all or part of their livelihood activities will be compensated in cash for loss of income derived from the use of the landfill (for six months of loss of income), and be provided livelihood support to obtain alternative employment opportunities.	
	8	Loss of formal and informal employment income due to the permanent closure or relocation of productive activities	Employees or hired laborers with income dependent on resettlement area (formal and informal)	Employees	Affected employees will receive assistance in cash for six (6) months of loss of wages.	Affected employees will be eligible for livelihood restoration support and assistance in identifying alternative employment opportunities and skill training.
Re-establishment costs	9	Costs and disruptions associated with dismantling, transportation and rebuilding of structures and assets	Relocated PAPs (residents and business owner/operators)	Households and businesses	The PAP will receive in-kind and in-cash allowances to dismantle their homes and/or businesses, transport and reinstallation of the movable assets such as plant, machinery, or other equipment. Support with logistical arrangements will be provided by NRPB to coordinate the dismantling, relocation and reinstallation of assets.	Confirm if PAP qualifies for a social support program offered by Government authorities or NGOs on Sint Maarten and enrol on programs if qualifies Confirm if PAP qualifies for support from the government: specialized programs for

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
Undocumented legal status	10	Visibilization of illegality in immigration status	Undocumented PAPs	Persons	Offer legal support to inform affected persons on residency application procedures and to identify eligibility for a residence permit. Offer legal and administrative support during the residency permit application phase.	vulnerable people and enrol on programs if qualifies Social/psychosocial support for disruptions to lives caused by relocation Monitoring of socioeconomic conditions for one year after the permanent move to verify restoration of livelihoods and/or living conditions
Access to services	11	Disruption of access to local/familiar educational resources	Relocated PAPs (residents)	Persons	Social support e.g. Transport to school and health centres during transitional period, if they are not located within reasonable walking distance from the temporary accommodation.	
	12	Alteration of social networks	Relocated PAPs (residents)	Persons	Social support e.g. Optional paid membership for elderly PAPs at a local recreational center for the elderly	
	13	Disrupted access to local/familiar health services	Relocated PAPs (residents)	Persons	Health support e.g. Transport to health centres during transitional period, if they are not located within reasonable walking distance from the temporary accommodation.	
Impacts on vulnerable PAPs	14	Risk of increased vulnerability	Vulnerable PAPs[10]	Persons / households	Special measures for vulnerable people will include prioritisation in selection of livelihood restoration activities, prioritisation in selection of replacement dwellings (dwellings for PAPs with mobility challenges will consider universal access), and access to mental health counselling support according to their necessities.	Vulnerable people program Support from the government: specialized programs for vulnerable people

[10] Vulnerable groups include people who, by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage or social status may be more diversely affected by displacement than others and who may be limited in their ability to claim or take advantage of resettlement assistance and related development benefits – households with disabled members, elderly head of household, women head of household, illiterate households

Category of Loss	#	Impacts	PAP Category	Unit	Resettlement Compensation Measures	Other Measures: Livelihood Restoration & Community Development Support
					Households with disabled members, elderly head of household, women head of household will be offered assistance physically moving and assistance in physical displacement Illiterate PAPs will obtain information verbally and, if requested by the PAP, in the presence of a trustee (the person the PAP trusts)	Vocational skills training (women headed households)
Loss of housing	15	Temporary resettlement (if necessary)	PAPS (residents) to be temporarily relocated (to be confirmed)	Households	Due to the debris emergency, it will be necessary to relocate PAP as soon as possible with a temporary resettlement. These PAP will receive allowances in cash and in-kind to cover for housing, feeding, and other necessities during this period while the permanent resettlement arrangement is in place.	Temporary resettlement program. Support from the government: agreements with the touristic sector to identify alternatives for temporary resettlement. Payment of any transaction costs required to acquire new housing, such as legal and administrative fees

Annex H Mitigation Measures Overview

Environmental and Social Management Plan

(ESMP)

Municipal Solid Waste Site management and related activities

Mitigation Measures Overview

18 May 2021

1. Introduction

This Environmental and Social Management Plan (ESMP) relates to construction and operational activities at the Municipal Solid Waste landfill (MSW) in Sint Maarten, these activities are as follows :

- Installation of a Temporary Weighbridge and Reconstruction of the Access road to the MSW landfill
- Daily Management of the MSW Landfill Operations including Fire Suppression and Slope Recontouring

This ESMP describes a set of mitigation, monitoring, and institutional measures to be taken during implementation of the construction of a new access road, the construction and installation of a new weighbridge and the improvement of management at the MSW landfill, in order to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. This ESMP also includes the actions needed to implement these measures.

2. Baseline Environmental and Social Conditions

1.1. The Great Salt Pond and Pond Island Biological Environment

The Great Salt Pond is located in south-central St. Maarten, north of Philipsburg. It is bordered by Philipsburg on the South side. It is the largest permanent saltwater pond on the island; it covers an area of 2.25 km² (225 hectares) and is up to 1,5 meters deep. The Great Salt Pond serves as a natural water catchment basin for much of the runoff water from the surrounding hills. Mangroves can be found around the Great Salt Pond, which provides the necessary habitat for roosting, nesting and migrating birds. Despite the development of the surrounding area and subsequent stress to the ecosystem, the Great Salt Pond provides important foraging areas for many birds and the brackish and sometimes hypersaline conditions give rise to a unique wildlife community that includes several fish species, turtles, snails and insects. The Great Sal Pond is also an Important Bird Area (IBA) and has also been designated as a national monument based on its cultural and historical significance.

There is periodic mechanically induced water exchange between the Great Salt Pond and the marine environment accessed through Great Bay. There is also constant exchange between each habitat for feeding and reproduction and continuous movement of water and animals between the deep waters surrounding St. Maarten, the coral reefs, seagrass and mangrove areas. As the waters around St. Maarten are relatively shallow, without much exchange between coastal and deep-water currents, corals and other organisms on reefs are exposed to any terrestrial influences including: freshwater runoff, sedimentation, nutrients, etc.

<u>Terrestrial Flora</u>

Species diversity surrounding the MSW Site and the Great Salt Pond is low and typically only one species will form the canopy. The communities consist mainly of Sea Grape (*Coccoloba uvifera*), Button Wood (*Conocarpus erecta*), Flambeau or Blactorch (*Erithalis fruticosa*) and the Portia Tree (*Thespesia populnea*).

Mangroves

Around the Great Salt Pond four species of mangroves can be found; *Rhizophora mangle* (Red Mangrove), *Avicennia germinans* (Black Mangrove), *Laguncularia racemosa* (White Mangrove) and *Conocarpus erectus* (Buttonwood).

Terrestrial Fauna

Great Salt Pond is classified as an important breeding and nesting area for nesting birds, migratory birds, and seabirds. One hundred and seventy species of birds can be found in or around the Great Salt Pond, of which 47 are resident and nesting birds, and 123 are migrants and non- nesting visitors. There are no endemic bird species on St. Maarten since birds can move easily between the islands, and there is a lack of habitat on St. Maarten, particularly undisturbed forest.

Aquatic Fauna and Flora

Very little is known about the composition, distribution and density of aquatic fauna and flora in the Great Salt Pond wetland. The invasive tilapia or Nile perch (O. niloticus) seems to be the dominant fish in the wetland followed by Mullet and Tarpon, respectively. The same goes for the possible presence of algae.

1.2. Pond Island Surface Soil

Surficial soils tested in the "Blue Box" Zone contained detectable concentrations of heavy metals, PCB, TPHs and dioxins/furans. The heavy metals identified above this assessments comparison criterion included arsenic, barium, cadmium, chromium, cobalt, chromium, copper, iron, lead and zinc. Of these heavy metals, elevated arsenic, copper and zinc were persistent in nearly all of the analyzed soil samples. Concentrations of heavy metals including arsenic, copper and zinc were noted in select samples above their commercial criteria and/or Dutch Target & Intervention Values.

The source of these constituents was attributed to a combination of runoff & ash deposition from the MWS landfill, ongoing discharges from commercial activities ongoing in the "Blue Box" Zone (i.e., leaking oils/grease from stored/dumped vehicles & equipment, along with the storage and recycling of metals in the general assessment area), runoff from the adjoining Soualiga Road, the creation of the island using landfilled materials, and naturally occurring processes.

A toxicologist expert concluded that affected people are at not at risk with regard to the exposure concerns for the constituents tested with the exception of copper which may require further evaluation.

1.3. Great Salt Pond Surface Water Quality

The Great Salt Pond is impacted by sewage runoff the from surrounding neighborhoods, and by runoff and seepage of uncontrolled leachate from the MSW Site located on Pond Island, in the middle of Great Salt Pond. The Pond also accepts stormwater runoff from the MSW landfill as well as the surrounding areas, there are numerous inflow/outflow points where water can intermingle with adjacent bodies of water.

Surface water sampling of the Great Salt Pond contained detectable concentrations of aluminum, copper and iron, along with Total Dissolved Solids (TDS) and chlorides. The surface water samples also revealed high levels of total coliform bacteria and *E. coli* at levels too numerous/elevated for the laboratory to quantify. This suggests that sewage is being discharged into the Great Salt Pond. Based upon the testing results, baseline conditions within the Great Salt Pond suggest that the water quality may have a negative impact on flora and fauna within the pond and poses a potential health risk for human recreational and/or consumptive use.

1.4. Demographics of the Resettlement Area of Impact

The southern half of Pond Island is comprised of residential areas, government buildings, a university, a baseball field, and various businesses. Specific businesses include but are not limited to the following: University of Sint Maarten, Sint Maarten Government Building/Census Office, Carnival Village, Telem Group, numerous bars/restaurants, scrap yards, a pump house facility, GEBE electricity substation, Sint Maarten Festival Village Turning Point, Safe Haven, parking lots and residences.

A small area adjacent to the MSWS was identified as an area where resettlement would be required; as a result of the (i) potential risk of slope collapse; (ii) general health and safety risks due to waste management activities. This area is designated as the Resettlement Area of Impact.

A Consultancy Firm and NRPB conducted a census and assets inventory in the Resettlement Area of Impact to collect information about affected households and businesses in November 2020, May 2021, and July-September 2021. The summarized field findings for the Resettlement Area of Impact is presented in table 4.2 below:

#	Item	Number
Affected populations		
1	Individuals	213
1a	- *Adults*	*177*
1b	- *Children*	*36*

#	Item	Number
2	Households	**110**
2a	- *Residential*	*96*
2b	- *Residential and commercial (mixed)*	*14*
3	Vulnerable households	45
Affected businesses & income		
4	Commercial units	30
4a	- *Businesses*	***16***
4b	- *Residential and commercial (mixed)*	*14*
5	Employees	14
6	Off-site landlords	**11**
7	Individuals with landfill-related income	24
Non-responses/refusals		
8	PAPs who declined to participate	1
9	PAPs who were not present at the time of surveys in November 2020 and May 2021	3

Table 4.2 Summary of the Resettlement Area of Impact Census. Affected households and businesses

3. Summary of Project activities and associated Environmental & Social Impact

Activities	Potential Impacts
Weighbridge Truck Scale • Demolition of existing infrastructures,	Environmental - air emissions from machinery and vehicles - noise from construction equipment

• Excavation and removal of old weighbridge • Excavation and works layout • rehabilitation of civil, mechanical and electric elements • Replacement and installation of the new weighbridge	- scrap soil from excavation processes - scrap metal and wood waste - oil and lubricant discharge seepage into soils and lagoon waters from repair equipment <u>Social</u> - disruption of road traffic during construction - disruption to the daily solid waste transfer during construction - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill - affectation by noise, dust and vibrations to the neighbouring community and housing + improvement in the control and management of the MSW landfill
Construction of new access road at the MSW Landfill (1500 m2) • Road Emplacing and layout • Clearing and excavation of road layout • Demolition and Removal of old sub-Base • Grading and Sloping. • Prepare the Sub Base • Proof Roll, Undercutting and Sub Base Repair • Binder and Surface Course • Install New Asphalt Surface	<u>Environmental</u> - air emissions from machinery and vehicles - noise from construction equipment - scrap soil from excavation processes - scrap metal and wood waste - oil and lubricant discharge seepage into soils and lagoon waters from repair equipment <u>Social</u> - disruption of road traffic during construction - disruption to the daily solid waste transfer during construction - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill - affectation by noise, dust and vibrations to the neighbouring community and housing + improvement in the control and management of the MSW landfill
Fire Suppression Activities at the landfill	<u>Environmental</u> - smoke emissions from fire and suppressing activities - air emissions from machinery and vehicles - noise from heavy machinery equipment - oil and lubricant discharge seepage into soils and lagoon waters from equipment - increase the amount of working equipment at the landfill - Reduction in soil infiltration capacity from compaction of ground material - leaching of spoil compounds into groundwater -surface runoff of spoils into adjacent water bodies <u>Social</u> - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the landfill + improvement in the control and management of the MSW landfill of Phillipsburg + improved maintenance / look of / pride in local area
Solid Waste Landfill Daily Management Daily management of landfill operations including Slope recontouring, construction and maintenance the perimeter roads as well as the management of the storm water structures.	<u>Environmental</u> - Emission of greenhouse gases - natural events negative impacts on the landfill activities - Slope instability associated with site construction and operation - odours and stench emissions from the landfill operations - air emissions from machinery and vehicles - noise from heavy machinery equipment - oil and lubricant discharge seepage into soils and lagoon waters from equipment - increase the amount of working equipment at the landfill

	- Reduction in soil infiltration capacity from compaction of ground material - leaching of spoil compounds into groundwater -surface runoff of spoils into adjacent water bodies <u>Social</u> - potential hazard and risk to workers and operators from the proximity of the solid waste pile at the MSW landfill - Risks for nearby human settlements due to underground fires at the MSW landfill site - Risks for nearby human settlements due to waste slopes instability, associated with municipal waste disposal - Risks for nearby human settlement due to soil quality conditions - Risks for nearby human settlement due to mental impacts that air quality conditions and soil quality conditions impose + improvement in the control and management of the MSW landfill of Phillipsburg + improved maintenance / look of / pride in local area

4. Project Environmental, Social Impacts, Issues and Concerns with Mitigation Measures

Environmental, Social Impact Issue and Concern	Mitigation Measures
Community Resettlement : Impacts of land acquisition (RAP) on households; Impacts of land acquisition (RAP) on local businesses; Impacts on local social structure; Impacts on local employment Works will generate disruptions of existing daily activities on families and businesses located within the resettlement area. Business owners, who are forced to resettle, will risk losing customers and operation hours. Residents within the RAI that make a livelihood working in the MSW Site namely material salvagers (waste pickers) that gather recyclables, could potentially be forced to seek employment elsewhere.	Mitigation: • Compensation for those PAPs evacuated or resettled, i.e., provide housing if relocated temporary or provide resources (housing or restitution) if relocated permanently. PAPs also include businesses that operate within this area that may suffer a loss of revenue and income for their employees. • Implementation of job training and job placement programs for those PAPs forced to find alternative employment. • Facilitate in open forums to the public and stakeholders to freely and openly ask questions regarding impacts from resettlement processes, project timeline, or other pertinent matters. • Assist business owners and residential property owners with relocation. • Implement RAP procedure as described in Annex A
Air quality - Smoke: The fire suppression activities may result in increased emissions from the site that represent potential inhalation and skin contact hazards to the fire suppression contractor employees, government	Mitigation measures to minimize the impact of air emission during fire suppression activities would include the following: • Implementation of the relocation for the residents and businesses within the Blue

and landfill contractor employees working at the MSW Site, visitors and the resident population in the surrounding communities. The fire suppression methods chosen to be implemented will impact the magnitude of potential air emissions exposure scenarios.	Box Zone during the fire suppression activities; if fire suppression involves excavation, trenching, waste re-contouring, or side slope modification up wind of the Blue Box Community. • Implementation of a fire suppression strategy that will promote the best-case scenario for long term improved air quality. • Cease work if wind direction and speed are detrimental to safe management of emissions risks. • Strict adherence to the Site-Specific Health and Safety Plan (part of C-ESMP) for all fire suppression workers and landfill workers. • Daily cover of waste materials and excavated areas where applicable, preferably with ADC.
Odor impacts Nuisance odors may cause sensitivity reactions in susceptible individuals. The presence of odors downwind of the MSW Site does not correlate to a public health concern.	Mitigation measures to minimize the impact of odors during MSW landfill operations and activities would include the following: • Water spraying/misting will be utilized to suppress dust emissions. • Daily air monitoring for odors/stench • Daily cover of waste materials and excavated areas where applicable. Alternative Daily Cover is very effective at odors control on landfill sites. • Prioritize the covering of biodegradable waste like food or carcasses.
Landfill Gasses Landfill gas emissions are common from the decomposition of landfill waste, primarily in the form of methane, an odorless, explosive gas. In addition, other gases that are typically considered harmful at elevated concentrations may be released from the burning waste and contained within landfill gasses.	Mitigation measures to minimize the impact of landfill gases would include the following: • Implementation of a fire suppression strategy that will promote the best-case scenario for long term reduction of the emission of landfill gases. • Daily cover of waste materials and excavated areas where applicable. • Implementation of worker respiratory protection. • CO and methane alarm monitors in enclosed spaces and equipment cabs on the MSW
Traffic: Increased traffic loading and traffic congestion during fire suppression activities; Traffic Accidents; Littering and cleanliness during waste transit	Mitigation measures to minimize the impact of traffic for the MSW landfill, during fire suppression and construction activities are: • Implement the Traffic Safety and Management Plan by the Contractors as part of the C-ESMP with proper and

	adequate staffing and equipment for the fire suppression activity and construction of infrastructures • Provide security at the access gates/control points. • Maintain roads in a clean and safe condition. • Planning and managing both vehicle and pedestrian routes. • Elimination of blind spots and reversing where possible. Ensure routes provide adequate space for vehicles to maneuver safely. If needed, vehicles not fitted with reversing aids must be guided when reversing. • Adequate vision and lines of sight. • Adequate parking and off-loading/storage areas. • Providing wheel wash facilities or other suitable alternatives. • Construct a security fence and maintain signs and barriers. • Depending upon the selected alternative(s) and evolution of fires at the site, care should be taken to minimize disturbances and potential contaminant releases into the environment
Noise: Noise arising from operations at the MSW; Noise from vehicle and equipment operations; Noise arising from fire suppression activities	Mitigation measures to minimize the impact of noise during fire suppression and construction activities would mirror those measures implemented for roads and traffic. They will be mitigated by work plan design/schedule and regulating onsite working hours, and the following dispositions • Maintain all construction equipment in accordance with manufacturer's specifications. • Schedule construction and rehabilitation work during daylight hours and to minimize activity during peak periods of tourism and recreation (weekends, holidays, etc.). • Develop and implement a Construction Communications Plan to inform businesses and residents of construction activities. • Limit construction noise levels to applicable standards such as EHS Guidelines • The plants and equipment used in construction (including the aggregates crushing plant) shall strictly conform to noise standards.

	• All vehicles & equipment used in construction shall be fitted with exhaust silencers. • Workers shall wear earplugs in vicinity of loud noise, and working with or in crushing, compaction, or concrete mixing operation.
Emissions Dust and engine emissions from construction vehicles and equipment	Mitigation measures to minimize the impact of traffic for the MSW landfill, during fire suppression and construction activities are • Maintain all construction equipment in accordance with manufacturer's specifications. • Suppress dust as needed in unpaved areas. • Avoid burning non-vegetative wastes (refuse, etc.) at construction sites.
Geology and Soils: The stability of the slopes surrounding the MSW site, do not meet industry-accepted design criteria. Fire suppression activities and other factors may contribute to instabilities and pose a safety hazard to the Blue Box Zone. An increase in the air emissions associated with the proposed activities would undoubtedly increase the amount of dust particles accumulating in the Blue Box Zone which in turn could result in soil impacts.	Mitigation measures to improve and promote slope stability at the MSW would typically include the following, however these may not be feasible due to the lack of space at the sites: • Fire Suppression of the subsurface fires to prevent void spaces from impacting slope stability. • Proper placement of incoming waste material and hurricane debris to maintain the slopes at 3:1. • Mitigation measures for air emissions/dust/smoke control are also relevant to soil quality impact on the Blue Box Zone.
Hydrogeology, Hydrology, and Surface Water Quality. Existing runoff, leachate, and groundwater discharges to the Great Salt Pond from the MSW, during normal operations, during and post fire suppression activities, are all affecting Great Slat Pond's water quality. During a landfill fire, because of the diversity and chemical composition of waste in general, hundreds or more compounds can be produced and released into the environment. In addition, firefighting activities such as the application of water and foam generate runoff that can mobilize and transport contaminants to sensitive receptors as well as generate more contamination.	Mitigation measures to improve and promote slope stability at the MSW would typically include the following • Use of Alternate Daily Cover (ADC) or Increase daily soil cover usage from 6-inches (15 cm) of dredged sand to 12-inches (30 cm) of dredged sand to adequately cover deposited waste material therefore reducing the potential of contaminated stormwater runoff. • Use of temporary erosion control in areas of work. • Install temporary storm water controls in areas where storm water runoff is discharging directly into the Great Salt Pond
Ecology: The proposed fire suppression activities have the potential to increase both airborne emissions and surface water discharges to the surrounding terrestrial and marine environments. In addition,	Mitigation measures to prevent the impacts to the surrounding hydrological environment include the following

COCs detected in the airborne environments can affect the terrestrial fauna, specifically: nesting birds, migratory birds, and seabirds, while the surface water discharges to the Great Salt Pond have the potential to materially impact the terrestrial and aquatic flora and fauna.	• Continuation of the biological surveys to monitor the flora and fauna species located along the perimeter of the MSW. • Prevent rain water runoff and erosion • Monitor the environmental quaility • Use of ADC for daily cover
Worker health and safety: Direct exposure to hazardous material; Exposure to smoke/dust emissions; Accidents during fire suppression activities; Soil instability;Exposure to vermin acting as disease vectors; Risk of traffic accidents	• Mitigation measures to prevent the impacts to the worker health and safety include the following: • Material salvagers and visitors will be prohibited from entry into the designated Contamination Reduction and Exclusion Zones. • Daily cover of waste materials and excavated areas where applicable. • Provide workers with appropriate protective clothing, gloves, respiratory face masks and slip-resistant shoes for workers • Provide all landfill equipment with enclosed air conditioned cabs and roll-over protection; • Provide refuse collection vehicles and landfill equipment with audible reversing alarms and visible reversing lights; • Restrict access to disposal sites such that only safety-trained personnel with protective gear are permitted to high-risk areas; • Provide workers with communications tools, such as radios. Special signaling codes have been developed for communications on landfill sites; • Control and characterize incoming waste to avoid chemical exposure; • Provide adequate personnel facilities, including washing areas and areas to change clothes before and after work; • Prohibit eating, smoking, and drinking except in designated areas; • Provide worker immunization and health monitoring (e.g.for Hepatitis B and tetanus); • Maintain good housekeeping in waste processing and storage areas; • Clean and wash with disinfectant the cabins of heavy mobile equipment used at regular intervals; • Monitor breathing zone air quality in work areas

Public Health and Safety: Direct exposure to hazardous material; Exposure to smoke/dust emissions; Exposure to vermin acting as disease vectors; Traffic increase and road accidents potential	Measures to mitigate the impacts to the public health and safety include the following: • Facilitate open forums to the public and stakeholders to freely and openly ask questions regarding impacts from air emissions, stormwater runoff/water quality, dust control, increased traffic on roadways, project timeline, or other pertinent matters. • Implement the Environmental Monitoring Plan and take actions accordingly • Decrease the potential of vehicular accidents both at the MSW site and the surrounding roadways.
Aesthetic: Current effects of subsurface fires and fire suppression activities at MSW upon visual amenity	Mitigation measures to improve aesthetics are to be addressed via the measures implemented to reduce visible impact by the construction activities and reduce gas emission and odor
Archaeological, Historic, and Cultural Heritage: Neglect of the historical and cultural significance of The Great Salt Pond	Improve communications with community and stakeholders
Natural Disaster Risk: Additional instability of the landfill slopes in the event of a significant rain and wind event	Maintain the MSW landfill slope stability and profiling practices under the best practices and standards Have in place a rapid response for emergency and protocols to comply with the national emergency plan. Conduct regular training and exercises for site staff regarding emergency procedures.
Pandemic COVID -19	The Contractor is required to draft a Covid-19 plan, implement and enforce all the current COVID-19 safety and health legislation and directives of the government of Sint Maarten and WHO.
Contractor: Risk of Contractor not performing according to required E&S standards	The Bidder shall submit Management Strategies and Implementation Plans (MSIP) and the Contractor shall be subsequently required to submit a Contractor's Environmental and Social Management Plan (C-ESMP) prior to their mobilization for NRPB approval and ensure adequate personnel capacity for E&S compliance.

5. Environmental, Health & Safety Monitoring Plan

Impact	Monitoring Method
Subsurface Fires	Use aerial thermal infrared survey

Landfill gas migration and explosion risk	Measure landfill gas presence around the landfill and onsite buildings
Great Salt Pond Pollution	Take samples of surface water and pond sediment for analysis
Great Bay Pollution	Analyze seawater quality
Pond Island Soil Pollution	Analyze soil samples
Noise	Measure noise impact on surrounding community
Workers safety	Measure hazardous gases and alarm workers

Annex I Pest Management Plan Guidelines for Contractor

For

Nuisance Pest & Vector Control

Contractor shall prevent or control on-site populations of nuisance pests and disease vectors using techniques appropriate for the protection of human health and the environment. Contractor shall prepare and implement a Pest & Vector Control sub-plan as part of the C-ESMP.
Nuisance pests & disease vectors in a landfill means any rodents, flies, mosquitoes, cockroaches, birds, dogs, cats or other animals, including insects, capable of transmitting disease to humans or by any way causing nuisance to nearby communities.
Disease vectors such as rodents, birds, flies, and mosquitoes typically are attracted by putrescent waste and standing water, which act as a food source and breeding ground.

- HIERARCHY OF CONTROL

Vectors shall be controlled by a hierarchy of control methods, all aimed at eliminating vectors to the greatest practical extent. This hierarchy includes:

1. Environmental Control Methods & Operational Practices
   - ✓ Promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides.
   - ✓ Implement practices and procedures at the processing and storage areas to promote vector management.
   - ✓ Avoid stockpiling of non-MSW debris by replacing containers within 24 hours of being filled.
   - ✓ Daily cover of lightly compacted soil or similar material or an effective layer of alternate daily cover (ADC) should be applied on finished portions of the daily cell during operations and at the conclusion of daily operations.
   - ✓ Intermediate cover should be used on all areas not at finished levels, but not to be further landfilled for a period of 30 days or more. Final cover is typically applied as each area is brought to finished level through the operational life of the landfill.
   - ✓ The waste must be compacted and graded at reasonable maximum slopes to minimize voids within the waste that can harbor rodents.
   - ✓ Keep stormwater trenches and other relevant structures free from stagnant water. Water pooling shall not be allowed except as part of the designated runoff/sediment control system.
   - ✓ There should be no uncontrolled or uncovered stockpiled waste.
   - ✓ Birds are attracted by landfills and may cause local nuisance or sometimes carry pathogens. Control methods that can be used for minimizing their presences is by order of preference: • Operational Practices (e.g. daily cover) • Gas Guns • Heli-kites and Balloons • Distress Calls • Signal Pistols and Cartridges• Falcons and Raptors •

Wires and Screens • Culling . Bird deterrent strategies shall variate over time because they become ineffective.

2. Monitoring

- ✓ Landfill staff should monitor the levels of key vectors daily as part of daily management.
- ✓ Frequent site walk-overs can provide a baseline of vector activity so changes can be noted and translated into action.
- ✓ Observations of various droppings, siting, tracks, insect counts, etc. are useful indicators of activity. Written reports shall be drafted for tracking performance.
- ✓ Contractor shall train on-site personnel or engage pest control experts to monitor and control vectors, as necessary.

3. Eradication – Use of Pesticides

- ✓ Baits, traps, scare and other alternative means of eradication shall be preferred over the widespread use of chemicals.
- ✓ Select and apply pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment.
- ✓ Applied pesticides must have negligible adverse human health effects, be effective against the target species and minimal effect on nontarget species and the natural environment.
- ✓ Training and Personal Protective Equipment shall be provided to personnel engaged in pesticides use.
- ✓ Any pesticides that will be handled, stored, disposed of, and applied for vector control shall comply with the minimum standards described in the ESMP.

Contractor shall not use any pesticide that is banned in USA or EU. Contractor shall not use any formulated products that fall in WHO classes IA and IB (World Health Organization's *Recommended Classification of Pesticides by Hazard and Guidelines to Classification).*

Resources:

- Operational Manual, OP 4.09 - Pest Management, World Bank, December 1998. https://ppfdocuments.azureedge.net/1637.pdf
- Environmental health in emergencies and disasters, Chapter 10 - Vector and pest control, WHO, 2002. https://www.who.int/water_sanitation_health/hygiene/emergencies/em2002chap10.pdf
- The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, WHO, 2019. https://www.who.int/publications/i/item/9789240005662
- Landfill Operation Guidelines: 3rd Edition, ISWA, 2019 iswa_-_landfill_operational_guidelines_3rd_edition.pdf (wehrle-werk.de)
- Solid Waste Disposal Facility Criteria: Technical Manual, EPA, 1993

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Annex J Code of Conduct Minimum Requirements for Contractor

CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL FORM
-Minimum Content-

We are the Contractor, [*enter name of Contractor*]. We have signed a contract with [*enter name of Employer*] for [*enter description of the Works*]. These Works will be carried out at [*enter the Site and other locations where the Works will be carried out*]. Our contract requires us to implement measures to address environmental and social risks related to the Works, including the risks of sexual exploitation, sexual abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, labourers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "**Contractor's Personnel"** and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor's Personnel. Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
    a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
    b. wearing required personal protective equipment;
    c. using appropriate measures relating to chemical, physical and biological substances and agents; and
    d. following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;

6. not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
7. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;
8. not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
9. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
10. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
11. report violations of this Code of Conduct; and
12. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:
1. Contact [*enter name of the Contractor's Social Expert with relevant experience in handling sexual exploitation, sexual abuse and sexual harassment cases, or if such person is not required under the Contract, another individual designated by the Contractor to handle these matters*] in writing at this address [ ] or by telephone at [ ] or in person at [ ]; or
2. Call [ ] to reach the Contractor's hotline *(if any)* and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [*enter name of Contractor's contact person(s) with relevant experience)*] requesting an explanation.

Name of Contractor's Personnel: [insert name]
Signature: _____
Date: (day month year): _____
Countersignature of authorized representative of the Contractor:
Signature: _____
Date: (day month year): _____

ATTACHMENT TO THE CODE OF CONDUCT FORM

BEHAVIORS CONSTITUTING SEXUAL EXPLOITATION AND ABUSE (SEA) AND BEHAVIORS CONSTITUTING SEXUAL HARASSMENT (SH)

The following non-exhaustive list is intended to illustrate types of prohibited behaviors

(1) **Examples of sexual exploitation and abuse** include, but are not limited to:
• A Contractor's Personnel tells a member of the community that he/she can get them jobs related to the work site (e.g. cooking and cleaning) in exchange for sex.
• A Contractor's Personnel that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.
• A Contractor's Personnel rapes, or otherwise sexually assaults a member of the community.
• A Contractor's Personnel denies a person access to the Site unless he/she performs a sexual favor.
• A Contractor's Personnel tells a person applying for employment under the Contract that he/she will only hire him/her if he/she has sex with him/her.

(2) **Examples of sexual harassment in a work context**
• Contractor's Personnel comment on the appearance of another Contractor's Personnel (either positive or negative) and sexual desirability.
• When a Contractor's Personnel complains about comments made by another Contractor's Personnel on his/her appearance, the other Contractor's Personnel comment that he/she is "asking for it" because of how he/she dresses.
• Unwelcome touching of a Contractor's or Employer's Personnel by another Contractor's Personnel.
A Contractor's Personnel tells another Contractor's Personnel that he/she will get him/her a salary raise, or promotion if he/she sends him/her naked photographs of himself/herself

Annex K Air Monitoring Plan Guideline for Contractor

Air Monitoring Plan Guideline for Contractor

For
Pond Island Municipal Solid Waste Disposal Site
and Irma Debris Site

INTRODUCTION

In May 2019, the National Recovery Program Bureau (NRPB) retained EE&G Disaster Response, LLC (EE&G) to perform the ESIA in support of the Fire Suppression Activity to be performed at the Municipal Solid Waste disposal site (MSW) and Irma Debris Site (IDS), both located on the northern portion of Pond Island in Sint. Maarten. EE&G had previously prepared an Air Monitoring Plan (AMP) and provided recommendations for air monitoring to be conducted during the performance of a fire suppression project.

As time progressed VROMI managed to prevent/control surface fires and significantly minimized subsurface fires. In January 2020, it was therefore decided that Fire Suppression as a standalone activity was no longer necessary and that the prevention and suppression of fires would be integrated as a subset activity to other normal and non emergency Landfill Operations to be implemented through EDMP.

The change in approach to interventions on Sint Maarten's waste and debris disposal sites resulted in the requirement to change the content of related safeguards instruments. As such, the NRPB was reviewed the AMP and redrafted the document to better reflect the current situation at the landfills related to fire supression and air quality risks.

The intent of this AMP is to provide guidance to contractors, government and community stakeholders for testing means and methods to monitor the potential airborne hazards emitted during a potential fire, daily landfills operation and restructuring works.

CONSTITUENTS OF CONCERN (COCs)

Determination of the COCs to be screened for during the testing was based upon a general knowledge of which byproducts of incineration were likely to be found in a landfill setting, common components that make up landfill gasses and the input of other studies performed.

Below are the COCs to be included in this AMP:

- ✓ Methane
- ✓ Carbon Dioxide
- ✓ Carbon Monoxide
- ✓ Total Particulates (dust)
- ✓ Volatile Organic Compounds including Benzene
- ✓ Hydrogen Sulfide
- ✓ Polycyclic aromatic hydrocarbons (PAHs), including Benzo(a)pyrene and acenaphthylene (PAHs)
- ✓ Ozone
- ✓ Dioxins and Furans
- ✓ Metals

- ✓ Based on similar projects, hydrogen cyanide has been added to the list of primary COCs addresses by this AMP and that shall be monitored during the Project.

Carbon monoxide, VOCs, hydrogen sulfide, total particulates, ozone and hydrogen cyanide may be tested for using analytical samples and instantaneous read monitors.
PAHs, dioxins and furans, and heavy metals may be tested for using analytical samples.

MONITORING & DATA INTERPRETATION

Monitoring will be performed using instantaneous devices that provide results immediately, and analytical sampling which requires laboratory analysis. The interpretation of sample data obtained during this project will be used to assess the potential health risk of inhalation hazards to both workers on site as well as the surrounding community. Data interpretation will be performed according to occupational exposure limits (OELs) of European Union when possible.
In Europe, there are two types of occupational exposure limits for chemical agents: EU community exposure limits and national exposure limits. The community limits are set by the European Agency for Safety and Health at Work. The EU Member States are required to establish national occupational exposure limit values for listed chemical agents, taking into account the community values. National exposure limit values may be different from the community values. National (Dutch) occupational exposure limit values should be used when EU community limits are not available.
Community exposure and ambient air quality standards (OELs) are typically based on consistent lifetime or long-term ("chronic") exposures, which would be inconsistent with the period of potential exposure anticipated for project workers. Workers are subject to short-term ("acute") exposure, consequently the acute exposure levels established by the United States Environmental Protection Agency (EPA), American Industrial Hygiene Association (AIHA) and United States Department of Energy (DOE) will be used as the criteria for comparison.
The recommended thresholds applicable to the interpretation of both occupational and community sampling results are presented in the table below.

Compound:	Units of Measure:	Occupational Exposure Limit:	Community Exposure Limit:
Landfill and Combustion Gases			
Methane	parts per million (ppm)	1,000 ppm (ACGIH TLV-TWA)	N/A
Carbon Dioxide	ppm	5,000 ppm (ACGIH TLV-TWA)	N/A
Carbon Monoxide	ppm	25 ppm (ACGIH TLV-TWA). 75 ppm (ACGIH 30-minute excursion limit). Personnel CO monitors outside Exclusion Zone with alarms set to go off when concentrations reach 1 ppm	27 ppm (8-hour AEGL-2)
Hydrogen Sulfide	ppm	1 ppm (ACGIH TLV-TWA), 5 ppm (TLV-STEL) and NIOSH IDLH concentration of 100 ppm	0.33 ppm (8-hour AEGL-1)
Ozone	ppm	0.05 ppm (ACGIH TLV-TWA for a heavy workload), Ceiling Limit of 0.1 ppm and IDLH concentration of 5 ppm (NIOSH)	0.05 ppm (WHO 8-hour mean)

Compound:	Units of Measure:	Occupational Exposure Limit:	Community Exposure Limit:
Hydrogen Cyanide	ppm	10 ppm (OSHA PEL), 4.7 ppm (ACGIH TLV-Ceiling)	1.0 ppm (8-hour AEGL-1)
Particulates			
Total particulate	milligrams per cubic meter (mg/m3)	10 mg/m_3 (ACGIH TLV-TWA)	0.05 mg/m_3 (WHO respirable particulate PM_{10} 24-hour mean)
Volatile Organic Compounds			
Benzene	ppm	NIOSH REL of 0.1 ppm, STEL of 1 ppm and IDLH concentration of 500 ppm	9.0 ppm (8-hour AEGL-1)
Propylene	ppm	240 mg/m_3 (100 ppm) – OSHA PEL	N/A
Chloromethane	ppm	104 mg/m_3 (50 ppm) – ACGIH TLV	0.5 ppm (ATSDR acute MRL)
n-Butane	ppm	1,900 mg/m_3 (800 ppm) – NIOSH REL	5,500 ppm (8-hour AEGL-1)
1,3-Butadiene	ppm	2.2 mg/m_3 (1 ppm) – OSHA PEL	670 ppm (8-hour AEGL-1)
Chloroethane	ppm	264 mg/m_3 (100 ppm) – ACGIH TLV	N/A
Ethanol	ppm	260 mg/m_3 (500 ppm) – EU OEL	1,800 ppm (AIHA ERPG-1)
Isopropyl alcohol	ppm	490 mg/m_3 (200 ppm) – ACGIH TLV	N/A
Acetone	ppm	590 mg/m_3 (250 ppm) – NIOSH REL	200 ppm (8-hour AEGL-1)
Acetonitrile	ppm	34 mg/m_3 (20 ppm) – EU OEL, NIOSH REL and ACGIH TLV	13 ppm (4-hour AEGL-1)
Acrylonitrile	ppm	2.2 mg/m_3 (1 ppm) – NIOSH REL	1.5 (30 minute AEGL-1)
n-Hexane	ppm	72 mg/m_3 (20 ppm) – EU OEL	2,900 ppm (8-hour AEGL-2)
2-Butanone	ppm	590 mg/m_3 (200 ppm) – OSHA PEL, NIOSH REL AND ACGIH TLV	N/A
Ethyl acetate	ppm	1,400 mg/m_3 (400 ppm) – OSHA PEL, NIOSH REL AND ACGIH TLV	N/A
Tetrahydrofuran	ppm	150 mg/m_3 (50 ppm) – ACGIH TLV	100 ppm (AIHA ERPG-1)
Cyclohexane	ppm	350 mg/m_3 (100 ppm) – ACGIH TLV	N/A
n-Heptane	ppm	350 mg/m_3 (85 ppm) – NIOSH REL	N/A
Methyl Methacrylate	ppm	205 mg/m_3 (50 ppm) – EU OEL and ACGIH TLV	17 ppm (8-hour AEGL-1)
1,4-Dioxane	ppm	3.6 mg/m_3 (1 ppm) – NIOSH REL	17 ppm (8-hour AEGL-1)
4-Methyl-2-pentanone	ppm	104 mg/m_3 (25 ppm) – EU OEL	N/A
Toluene	ppm	150 mg/m3 (40 ppm) – EU OEL	67 ppm (8-hour AEGL-1)
2-Hexanone	ppm	4.1 mg/m_3 (1 ppm) – NIOSH REL	N/A
Chlorobenzene	ppm	23 mg/m_3 (5 ppm) – EU OEL	10 ppm (8-hour AEGL-1)
Ethylbenzene	ppm	215 mg/m_3 (50 ppm) – EU OEL	33 ppm (8-hour AEGL-1)
Xylene (p,m)	ppm	210 mg/m_3 (50 ppm) – EU OEL	130 ppm (8-hour AEGL-1)
Xylene (Ortho)	ppm	210 mg/m_3 (50 ppm) – EU OEL	130 ppm (8-hour AEGL-1)

Compound:	Units of Measure:	Occupational Exposure Limit:	Community Exposure Limit:
Styrene	ppm	86 mg/m3 (20 ppm) – ACGIH TLV	20 ppm (8-hour AEGL-1)
Isopropylbenzene (cumene)	ppm	100 mg/m3 (25 ppm) – EU OEL	50 ppm (8-hour AEGL-1)
4-Ethyltoluene	ppm	N/A	N/A
1,3,5-Trimethylbenzene	ppm	100 mg/m3 (21 ppm) – EU OEL	45 ppm (8-hour AEGL-1)
1,2,4-Trimethylbenzene	ppm	100 mg/m3 (21 ppm) – EU OEL	45 ppm (8-hour AEGL-1)
Naphthalene	ppm	50 mg/m3 (10 ppm) – EU OEL, OSHA PEL, NIOSH REL and ACGIH TLV	0.0007 ppm (ATSDR chronic MRL)
PAHs ***** NIOSH recommends an IDLH concentration of 80 mg/m3 for the benzene-soluble fraction of coal tar pitch volatiles			
Naphthalene	mg/m3	50 mg/m3 – EU OEL (NL), OSHA PEL, NIOSH REL and ACGIH TLV	3.67 ug/m3 (ATSDR MRL)
Acenaphthylene	mg/m3	0.1 mg/m3 – NIOSH REL	N/A
Acenaphthene	mg/m3	0.1 mg/m3 – NIOSH REL	3.6 mg/m3 (DOE TEEL-1)
Fluorene	mg/m3	0.1 mg/m3 NIOSH REL	6.6 mg/m3 (DOE TEEL-1)
Phenanthrene	mg/m3	0.1 mg/m3 – NIOSH REL and ACGIH TLV	5.4 mg/m3 (DOE TEEL-1)
Anthracene	mg/m3	0.1 mg/m3 – NIOSH REL	48 mg/m3 (DOE TEEL-1)
Fluoranthene	mg/m3	0.1 mg/m3 – NIOSH REL	8.2 mg/m3 (DOE TEEL-1)
Pyrene	mg/m3	0.1 mg/m3 – NIOSH REL	0.15 mg/m3 (DOE TEEL-1)
Chrysene	mg/m3	0.1 mg/m3 – NIOSH REL	0.6 mg/m3 (DOE TEEL-1)
Benzo(e)pyrene	mg/m3	0.1 mg/m3 – NIOSH REL	N/A
Benzo(b)fluoranthene	mg/m3	0.1 mg/m3 – NIOSH REL	0.12 mg/m3 (DOE TEEL-1)
Benzo(k)fluoranthene	mg/m3	0.1 mg/m3 – NIOSH REL	N/A
Benzo(a)pyrene	mg/m3	0.00055 mg/m3 – EU OEL (NL)	0.6 mg/m3 (DOE TEEL-1)
Dioxins and Furans			
Dioxins/furans	pg/m3	10 pg/m3 (Germany), or lowest feasible concentration (LFC) (OSHA and NIOSH)	130,000 pg/m3 (TCDD) (DOE TEEL-1)
Heavy Metals			
Arsenic	mg/m3	0.01 mg/m3 (ACGIH TLV-TWAs)	N/A
Barium	mg/m3	0.5 mg/m3 (ACGIH TLV-TWAs)	N/A
Cadmium	mg/m3	0.01 mg/m3 (total) and 0.002 mg/m3 (respirable) (ACGIH TLV-TWAs)	0.041 mg/m3 (8-hour AEGL-1)
Chromium	mg/m3	0.5 mg/m3 (ACGIH TLV-TWAs)	0.0003 mg/m3 (MRL, intermediate exposure)
Lead	mg/m3	0.05 mg/m3 (ACGIH TLV-TWAs)	0.0005 mg/m3 (WHO)
Selenium	mg/m3	0.2 mg/m3 (ACGIH TLV-TWAs)	N/A
Silver	mg/m3	0.1 mg/m3 (ACGIH TLV-TWAs)	N/A

Compound:	Units of Measure:	Occupational Exposure Limit:	Community Exposure Limit:
Mercury	mg/m3	0.025 mg/m3 (ACGIH TLV-TWAs)	0.33 mg/m3 (8-hour AEGL-2)

Monitoring Strategy

Air monitoring strategy is based on a zone approach. There are three monitoring zones, i.e. the active landfill site, landfill perimeter and community area. Occupational air quality monitoring for workers on active landfill sites or sites where re-sloping works take place, is achieved with portable multi-gas analyzers attached on the cabs of heavy equipment operating onsite. Gas detection alarms will be installed on personnel buildings at landfill entrance to prevent asphyxiation risk. Monitoring well will be drilled on MSWS & IDS perimeter and portable gas meters will be used for accessing the landfill gas (LFG) migration potential. A stationary station will be installed on nearby downwind community for monitoring air quality. Soil samples from landfills perimeter and community will be also analyzed for accessing the chronic exposure of air pollutants sedimentation/precipitation.

- Landfill active areas monitoring

Instantaneous portable multi-gas monitoring stations will be installed on the cabs of heavy equipment working on the landfills (MSWS & IDS), whose operators are subject to increased risk of air emission exposure, due to nature and duration of works. Such equipment shall include the waste compactor, excavator and bulldozer at a minimum. These monitoring devices will link to a monitoring system in the command center. Aerosol monitoring shall also be included. Alarms (audible, visual and vibrating) should be set to ceiling or maximum peak concentrations.

- Landfill perimeter monitoring

Concentrations of COCs in this zone would be anticipated to be below the exposure thresholds. Major risk for landfill perimeter and nearby community is the potential of landfill gas migration. Landfill gas is a natural byproduct of the anaerobic degradation process of the organic matter buried inside the landfill. Specific gases (e.g. CO2) that are heavier than air may migrate horizontally and cause asphyxiation on residents or personnel.

Alarms will be installed inside ground floor personnel or storage buildings, to notify workers and prevent the asphyxiation risk.
Subsurface probes will be installed on MSWS & IDS perimeter within property limits, spaced at 300m apart. Portable methane analyzers will be utilized for periodic monitoring those wells. Methane buildup increases the risk of explosion. Monthly monitoring frequency is anticipated.
Soil quality on landfills perimeter and adjacent community will be also monitored, as an indirect indicator of chronic air emissions. One sample will be collected every 100m inside the MSWS & IDS perimeter and RAI area, at bi-annual frequency. Soil quality analysis parameters will include: Al, Cu, Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, Dioxins/Furans, PAHs, PCBs and VOC. Samples shall be send to an accredited laboratory for analysis.

❖ Community Monitoring

One stationary monitoring multi-gas monitoring station will be installed at the community downwind the prevailing wind direction. Aerosol monitoring shall also be included. This station should be secured to the ground to prevent tipping over and weatherproof covers or enclosures should be utilized to protect pumps, devices, and sampling media. This monitoring device will link to a monitoring system in the command center.

This station will mainly provide data about air quality of the urban environment. Collected data would be made available for sharing with Ministry of VSA if requested, for accessing public health impact and facilitate long-term mitigation planning. Spikes in collected air quality data shall be compared against possible fire suppression incidents to help assess project specific related impacts.

Analytical dust sampling from selected community locations will be also included for the purpose of accessing public health exposure from various pollutants, directly or indirectly related to fire and other landfill air emissions. Soil analysis parameters shall be the same as mentioned above. Three (3) analytical samples will be tested per year. Samples shall be send to an accredited laboratory for analysis.

Table below summarizes the air monitoring plan.

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods
Construction and Operation	Subsurface Fires	Temperature	MSWS Contractor	Weekly or as deemed necessary by VROMI	MSWS & IDS sites	Aerial (drone) thermal infrared survey with high resolution FLIR thermal sensor visual camera. The exact location of hot spots

Project Activity (Phase)	Impact	Monitoring indicators	Responsibility	Frequency/ Duration	Location	Methods
						and vents shall be verified via infrared thermography from ground level.
Construction and Operation	Landfill gas migration control	Methane	MSWS Contractor	Monthly	Subsurface probes on MSWS & IDS perimeter within property limits @ 300m apart	Portable methane analyzer
Construction and Operation	Explosion risk in buildings from landfill gas accumulation	Methane	MSWS Contractor	Continuous	Inside the scale-house/security building	Combustible gas continuous monitoring system
Construction and Operation	Personnel Health & Safety. Risk of explosion, asphyxiation or harmful gases	Gases:CH4, H2S, CO2, CO	MSWS Contractor	Continuous	On cabs of all heavy equipment operating at MSWS & IDS active site. Details will be finalized with Contractor.	Remote transmitting multi-gas analyzer
Construction and Operation	Community health risk from air emissions	Gases:CH4, VOC, H2S, HCN, CO and Particular Matter (PM10) Dust Samples: VOC, aldehydes, PAHs, dioxins/furans, PCBs	MSWS Contractor	Continuous & Yearly	One monitoring station Downwind from the MSWS & 3 analytical samples per year	Remote transmitting multi-gas analyzer with weather sensor & Dust Samples analyzed by an accredited laboratory
Construction and operation	Soil pollution	Pond Island Soil quality. Analysis parameters: Al, Cu, Co, Fe, Cr(VI), Hg, Ni, Pb, Cd, Zn, As, Dioxins/Furans, PAHs, PCBs, VOC	MSWS Contractor	One sample every 100m inside the MSWS & IDS perimeter and RAI. Bi-annually.	Pond Island	Analyzed by an accredited laboratory

Air monitoring during the Project is intended to assess for potential overexposures to personnel at the work site and in the surrounding community. The data collected from the real time monitoring and sampling will be collected and reviewed in the Command Center by the Air

Monitoring Program Supervisor. The following general protocol may be employed when potential overexposures are identified:

- ✓ Notification – alerting management personnel for the Project of overexposures or downwind hazardous conditions. Some hazardous conditions may necessitate temporary cessation of the Project work.
- ✓ Evaluation – assessment of the severity or extent of the overexposures and potential causes.
- ✓ Corrective Actions – implementation of greater engineering or hazard controls, or modification of work methods and materials being used.
- ✓ Follow-up – preparation to startup work activities again, verification that the hazardous conditions (onsite or downwind) have passed.
- ✓ Notification of these incidents will be sent via telephone to the primary point of contact for local government agencies and emails to a previously agreed upon list of recipients, or by other means stablished for the Project.

Personnel, Technical Arrangements and Records

The following personnel positions (or similar) may be included in the air monitoring program:

- ✓ Air Monitoring Program Supervisor – manages the air monitoring teams, data collection, interpretation, retrieval, and reporting, and communications with local government officials and the contractors performing the Project.
- ✓ Field Air Monitoring Technician – performs calibration and maintenance of monitoring and analytical sampling equipment, and the collection and shipping of samples.

The data collected from the real time monitoring and sampling will be collected and reviewed in the Command Center by the Air Monitoring Program Supervisor.

Each sample submitted to a laboratory for analysis will have an accompanying chain-of-custody (CHN). Each chain should be on a form provided by the laboratory. All CHNs must be complete and clearly legible. A copy of each CHN is to be kept on site at all times. Each sample will have a unique sample number.

A log of calibration of air monitoring devices will be maintained on site at all times. The log will document the name of the person performing the test, date, calibration device, and the results of the calibration.

Calculated TWAs and lab analysis data may be entered into an Excel spreadsheet, or similar data management system. The spreadsheet should separate data collected from the various testing locations and methods. The data management system should record the following:

● Sample ID, ● Sample collection date, ● Name of sampled person, or other means of identifying the sampled person, ● Location, ● Job function, ● Regulatory limits: EU, OSHA, NIOSH, ACGIH , ● Wind direction, ● Wind speed, ●Temperature, ● Rain conditions

The spreadsheets should be used to develop data summaries for the various agencies or contractors involved in the Project.

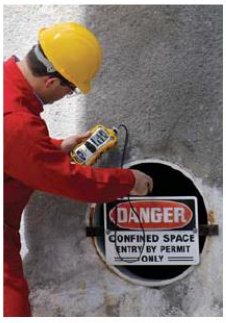
Honeywell
RAE SYSTEMS

MultiRAE Lite

Wireless Portable Multi-Gas Monitor

The MultiRAE Lite is the optimal one-to-six[1]-gas monitor for personal protection and leak detection applications. The MultiRAE Lite is available in pumped and diffusion versions and features the broadest selection of sensor options in its class. The MultiRAE Lite can be configured to exactly meet the detection needs and compliance requirements of various countries, industries, and applications.

The MultiRAE Lite's optional wireless capability improves safety by providing commanders and safety officers real-time access to instrument readings and alarm status from any location for better situational awareness and faster incident response.



Confined space testing with the MultiRAE Lite

APPLICATIONS

- Personal protection and multi-gas leak detection in industries such as:
  - Chemical
  - Food and beverage
  - Oil and gas (downstream)
  - Pharmaceutical
  - Telecommunications
  - Wastewater treatment
- Fire overhaul

- *Available in pumped and diffusion versions*
- *Highly versatile and customizable*
- *Man Down Alarm with real-time remote wireless notification*
- *Easy maintenance with replaceable sensors, pump, and plug-and-play battery*
- *Fully automatic bump testing and calibration with AutoRAE 2*

FEATURES & BENEFITS

- Wireless access to real-time instrument readings and alarm status from any location
- Unmistakable five-way local and remote wireless notification of alarm conditions including Man Down Alarm[2]
- Over 25 interchangeable sensor options, including PID[4] for VOCs, NDIR5 and catalytic for combustibles, and NDIR for CO_2
- Intelligent sensors store calibration data, so they can be swapped in the field[6]
- Large graphical display with easy-to-use, icon-driven user interface
- Continuous datalogging (6 months for 5 sensors, 24x7)
- Device Management with Honeywell SafetySuite

MultiRAE Lite Specifications

INSTRUMENT SPECIFICATIONS[7]	
SIZE	- Pumped model: 7.6" H x 3.8" W x 2.6" D (193 x 96.5 x 66 mm) - Diffusion model: 6.9" x 3.8" x 2.2" (175 x 96.5 x 56 mm)
WEIGHT	- Pumped model: 31 oz (880 g) - Diffusion model: 26.8 oz (760g)
SENSORS	Over 25 intelligent interchangeable field-replaceable sensors including PID for VOCs, electrochemical sensors for toxic gases and oxygen, combustible LEL and NDIR sensors, and CO_2 NDIR sensor
BATTERY OPTIONS, RUNTIME[8] AND RECHARGE TIME	- Rechargeable Li-ion ~12-hr. (pumped)/18-hr. (diffusion) runtime, < 6-hr. recharge time - Extended duration Li-ion ~18-hr. (pumped)/28-hr. (diffusion) runtime, < 9-hr. recharge time - Alkaline adapter with 4 x AA batteries ~6-hr. (pumped)/8-hr. (diffusion) runtime
DISPLAY	Monochrome graphical LCD display (128 x 160) with backlighting. Automatic screen "flip" feature
DISPLAY READOUT	- Real-time reading of gas concentrations; PID measurement gas and correction factor; Man Down Alarm on/off; visual compliance indicator; battery status; datalogging on/off; wireless on/off and reception quality. - STEL, TWA, peak, and minimum values
KEYPAD BUTTONS	Automatic with AutoRAE 2 Test and Calibration System3 or manual
SAMPLING	Built-in pump or diffusion
CALIBRATION	Automatic with AutoRAE 2 Test and Calibration System or manual
ALARMS	Wireless remote alarm notification; audible (95 dB @ 30 cm), vibration, visible (flashing bright red LEDs), and on-screen indication of alarm conditions - Man Down Alarm with pre-alarm and real-time remote wireless notification[2]
DATALOGGING	Continuous datalogging (6 months for 5 sensors at 1-minute intervals, 24/7) - User-configurable datalogging intervals (from 1 to 3,600 seconds)
COMMUNICATION AND DATA DOWNLOAD	- Data download and instrument set-up and upgrades on PC via desktop charging and PC comm. cradle, travel charger, or AutoRAE 2 Automatic Test and Calibration System[3] - Wireless data and alarm status transmission via built-in RF modem (optional)
WIRELESS NETWORK	ProRAE Guardian Real-Time Wireless Safety System or EchoView Host-based Closed-Loop System
WIRELESS RANGE (TYPICAL)	MultiRAE Lite to RAELink3 (Z1) Mesh modem ~330 feet (100 meters) MultiRAE Lite to EchoView Host, RAEMesh Reader or RAEPoint ~660 feet (200 meters) MultiRAE Lite to Wi-Fi Access Point - 330 feet (100 meters)
OPERATING TEMPERATURE	-4° to 122°F (-20° to 50°C)
HUMIDITY	0% to 95% relative humidity (non-condensing)
DUST AND WATER RESISTANCE	IP-65 (pumped); IP-67 (diffusion) ingress protection rating
SAFETY CERTIFICATIONS	CSA: Class I, Division 1, Groups A, B, C and D, T4 Class II, Division 1, Groups E, F, G T85°C ATEX: 0575 II 1G Ex ia IIC T4 Ga 2G Ex ia d IIC T4 Gb with IR Sensor installed I M1 Ex ia I Ma IECEx: Ex ia IIC T4 Ga Ex ia d IIC T4 Gb with IR Sensor installed I M1 Ex ia I Ma IECEx/ANZEx: Ex ia IIC T4 Ga Ex ia d IIC T4 Gb with IR Sensor installed Ex ia I Ma
EMC/RFI[8]	EMC directive: 2004/108/EC
PERFORMANCE TESTS	LEL CSA C22.2 No. 152; ISA-12.13.01
LANGUAGES	Arabic, Chinese, Czech, Danish, Dutch, English, French, German, Indonesian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, and Turkish
WARRANTY	- Four years on Liq O_2 sensors - Three years on CO and H_2S sensors - Two years on non-consumable components and catalytic LEL sensors - One year on all other sensors, pump, battery, and other consumable parts
WIRELESS FREQUENCY	ISM license free band. IEEE 802.15.4 Sub 1GHz - Wi-Fi 802.11 b/g
WIRELESS APPROVALS	FCC Part 15, CE R&TTE, Others[10]
RADIO MODULE	Supports RM900A

SENSOR SPECIFICATIONS[7]	RANGE	RESOLUTION
PID SENSORS[4]		
VOC 10.6 EV	0 to 1,000 ppm	1 ppm
COMBUSTIBLE SENSORS		
CATALYTIC LEL	0 to 100% LEL	1% LEL
NDIR (0-100% LEL METHANE)	0 to 100% LEL	1% LEL
NDIR (0-100% VOL. METHANE)[5]	0 to 100% Vol.	0.1% Vol.
CARBON DIOXIDE SENSOR		
CARBON DIOXIDE (CO_2) NDIR	0 to 50,000 ppm	100 ppm
ELECTROCHEMICAL SENSORS		
AMMONIA (NH_3)	0 to 100 ppm	1 ppm
CARBON MONOXIDE (CO)	0 to 500 ppm	1 ppm
CARBON MONOXIDE (CO), EXT. RANGE	0 to 2,000 ppm	10 ppm
CARBON MONOXIDE (CO), H_2-COMP.	0 to 2,000 ppm	10 ppm
CARBON MONOXIDE (CO) +	0 to 500 ppm	1 ppm
HYDROGEN SULFIDE (H_2S) COMBO	0 to 200 ppm	0.1 ppm
CHLORINE (CL_2)	0 to 50 ppm	0.1 ppm
CHLORINE DIOXIDE (CLO_2)	0 to 1 ppm	0.03 ppm
ETHYLENE OXIDE (ETO-A)	0 to 100 ppm	0.5 ppm
ETHYLENE OXIDE (ETO-B)	0 to 10 ppm	0.1 ppm
ETHYLENE OXIDE (ETO-C), EXT. RANGE[9]	0 to 500 ppm	10ppm
FORMALDEHYDE (HCHO)	0 to 10 ppm	0.05 ppm
HYDROGEN (H_2)[9]	0 to 1,000 ppm	10ppm
HYDROGEN CYANIDE (HCN)	0 to 50 ppm	0.5 ppm
HYDROGEN SULFIDE (H_2S)	0 to 100 ppm	0.1 ppm
HYDROGEN SULFIDE (H_2S), EXT. RANGE[9]	0 to 1,000 ppm	1 ppm
METHYL MERCAPTAN (CH_3-SH)	0 to 10 ppm	0.1 ppm
NITRIC OXIDE (NO)	0 to 250 ppm	0.5 ppm
NITROGEN DIOXIDE (NO_2)	0 to 20 ppm	0.1 ppm
OXYGEN (O_2)	0 to 30% Vol.	0.1% Vol.
OXYGEN (LIQ O_2)	0 to 30% Vol.	0.1% Vol.
PHOSPHINE (PH_3)	0 to 20 ppm	0.1 ppm
PHOSPHINE H (PH_3 H)	0 to 20 ppm	0.1 ppm
SULFUR DIOXIDE (SO_2)	0 to 20 ppm	0.1 ppm

[1] *A two-gas combination sensor is required for a 6-gas configuration.*
[2] *Additional equipment and/or software licenses may be required to enable remote wireless monitoring and alarm transmission.*
[3] *AutoRAE 2 supports the MultiRAE Lite pumped version only.*
[4] *PID sensor requires a pumped configuration.*
[5] *NDIR combustible sensors require a pumped configuration in CSA countries.*
[6] *RAE Systems recommends calibrating sensors on installation.*
[7] *Specifications are subject to change.*
[8] *Specification for non-wireless monitors.*
[9] *Supported in MultiRAE Lite Diffusion only.*
[10] *Please contact RAE Systems for specific wireless approvals*

ORDERING INFORMATION (MODELS: PGM-6208 and PGM-6208D)

- Wireless[2] and non-wireless configurations are available
- Refer to the Portables Pricing Guide for part numbers for monitors, accessories, sampling and calibration kits, gas, sensors, and replacement parts

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Device Management with **Honeywell SafetySuite**

honeywellanalytics.com/SafetySuite

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RAE SYSTEMS

AreaRAE Pro

Easy to use transportable area monitor for multiple threat detection.

AreaRAE Pro

Remote visibility on more threats than ever for a new level of real-time situational awareness

AreaRAE Pro is a wireless, transportable area monitor that can simultaneously detect toxic and combustible gases, volatile organic compounds, radiation and meteorological factors. Whether you're carrying it into a hazmat response, setting up perimeter at a fire or protecting a public venue, the AreaRAE Pro works with Honeywell's remote monitoring software to give you a real-time view of threat readings so you can make real time decisions to ensure the safety of your teams and the general public.

AreaRAE Pro delivers maximum flexibility and versatility in one device:

- **Up to six 4R+ sensors for toxic and combustible gas.**
AreaRAE Pro offers more than 20 interchangeable sensors that can be swapped at a moments notice to meet the changing needs of first responders.

- **7R+ photoionization detector.**
Monitor VOCs in parts per billion, with built-in compensation for temperature and humidity.

- **Meteorological station for tracking toxic plumes.**
Honeywell's compact RAEMet sensor sits at the top of the AreaRAE Pro and measures wind speed, wind direction, temperature and humidity. This information is then modeled in Honeywell's real time monitoring software which integrates the ALOHA hazard monitoring program.

- **Optional gamma sensor for radiation detection.**
Detect and measure gamma radiation with increased sensitivity and faster response without using an additional sensor slot.

Applications
- First responders
- Hazmat
- Civil Defense & Military
- Public Venue Protection

Ease and Fexibility
- Available in Rapid Deployment Kit for quick threat assessment
- User-friendly interface; turn it on and go
- Supports long-distance remote monitoring
- Built-in mesh modem for short-range monitoring — no external router required
- Flexible power options for short- and long-term deployments
- Easy to hear and see, with 108-decibel alarm
- Easy USB connection to configuration software
- Device Management with Honeywell Sotera™

Remote Visibility on Threats
- Delivers real-time readings to Honeywell's remote monitoring software, so you can instantly determine the location and severity of a threat
- Map-based display is accessible from any computer with an internet connection — or from our laptop as a turnkey host
- Enables coordination and data sharing in joint operations

Specifications

DIMENSIONS	314 x 306 x 166 mm (with rubber boot) 12.36" x 12.04" x 6.53" (with rubber boot)
WEIGHT	6.3 kg (13.88 lb) full option configuration 6.5 kg (14.33 lb) full option configuration (+RAEMet)
GAS SENSORS SLOTS	up to 7; see Sensor list
ADDITIONAL SENSORS	Gamma; RAEMet (Wind Speed, Wind Direction, Temperature & Humidity)
GPS	Standard equipment in every unit
BATTERY	Rechargeable 7.2 V / 10 Ah Li-ion battery pack with built-in charger Alkaline Battery Adapter
OPERATING HOURS	~20 hours with wireless connectivity on Li-ion battery pack ~12 hours with wireless connectivity on Alkaline battery adapter
	Specification at room temperature (20°C)
DISPLAY	Large 240 x 320 pixel LCD backlit display
	64 x 85 mm / 2.5" x 3.33"
KEYPADS	3 operation and programming keys
ALARMS	Multi-tone 108 dB buzzer @ 3.3 ft / 1 m, Bright LED 360 degree view and on-screen indication of alarm conditions
	Additional diagnostic alarm and display message for low battery
	Wireless connectivity alarm
DATA LOGGING	Continuous data logging (90 days for 7 gas sensors, 1 Gamma sensor, 1 RAEMet (wind speed & direction, temp and RH), and GPS at 1 min intervals, 24/7)
DATA STORAGE	24M bytes (memory full action: stop when full or Wrap around)
DATA INTERVAL	User-configurable from 1 to 3,600 sec
WIRELESS[1]	Bluetooth Low Energy module (BT4.0) and GPS
	Primary radio module: - Long range ISM License Free 900 MHz or 2.4 GHz radio - IEEE 802.11 b/g Wi-Fi
	Secondary radio module: Short Range IEEE 802.15.4 900 MHz or 868 MHz Mesh Radio
	Wireless range[3]: Up to 2 miles (3 km) for ISM 900 MHz; Up to 1.2 miles (2 km) for ISM 2.4 GHz; Up to 330 ft (100m) for Wi-Fi; Up to 660 ft (200m) for Mesh secondary radio; Up to 15 ft (5m) for BLE.
	Wireless Approval: FCC Part 15, CE R&TTE, Others[4]
COMMUNICATION	Communicates to ProRAE Studio II via USB cable to PC;
	Wireless data and alarm status transmission via Wi-Fi or ISM modem;
	Act as gateway to connect up to 8 remote instruments (using secondary radio module)
SAFETY CERTIFICATION	US / Canada: Class 1, Division 2 Groups A, B, C, D
SAMPLING PUMP	Built-in pump, typical flow rate 450 cc/min
TEMPERATURE	-20 °C to +50 °C / (-4 °F to +122 °F)
HUMIDITY	0% to 95% relative humidity (non-condensing)
INGRESS PROTECTION (IP)	IP 65
PERFORMANCE TESTS	MIL-STD-810G and 461F
	LEL CSA C22.2 No. 152, ISA-12.13.01
WARRANTY[2]	Four years for O_2 Liquid Oxygen sensors Three years for CO, and H_2S sensors Two years for non-consumable components, catalytic LEL sensor and 10.6eV 7R+ PID lamp One year on all other sensors, battery, and other consumable parts Six months for 9.8eV lamp PID sensor

RAEMet SPECIFICATIONS	
WIND SPEED	Range: 0 to 20 m/s (0 to 44 mph) Start Speed: 0.1 m/s (0.22 mph)
WIND DIRECTION	Range: 360° (No dead band)
TEMPERATURE	- 20 °C to 60 °C (-4 °F to 140 °F) Resolution 0.1 °C (1.8 °F)
HUMIDITY	10 to 95% RH Resolution 1% RH
COMPASS	Resolution 1°
POWER	Power supplied by the AreaRAE Pro

[1]Additional equipment and/or software licenses may be required to enable remote wireless monitoring and alarm transmission
[2]Against factory defects
[3]Receiving > 80%
[4]Contact RAE Systems for country specific wireless approvals and certificates
Specifications are subject to change

Supported Sensors

SENSOR	RANGE	RESOLUTION
PID SENSORS		
4R+; 10.6eV ppb	0 to 2,000 ppm	10 ppb
7R+; 10.6 eV ppb	0 to 2,000 ppm	10 ppb
4R+; 9.8 eV*	0 to 2,000 ppm	0.1 ppm
COMBUSTIBLE SENSOR		
CATALYTIC BEAD SENSOR	0 to 100% LEL	1% LEL
NDIR SENSOR		
CARBONE DIOXIDE (CO_2)	0 to 50,000 ppm	100 ppm
ELECTROCHEMICAL SENSORS		
AMMONIA (NH_3)	0 to 100 ppm	1 ppm
CARBON MONOXIDE (CO)	0 to 500 ppm	1 ppm
CARBON MONOXIDE EXT. (CO HR)	0 to 2,000 ppm	10 ppm
CARBON MONOXIDE H_2 Comp (CO H_2 Comp)	0 to 2,000 ppm	10 ppm
CHLORINE (Cl_2)	0 to 50 ppm	0.1 ppm
CHLORINE DIOXIDE (ClO_2)	0 to 1 ppm	0.03 ppm
ETHYLENE OXIDE (ETO-A)	0 to 100 ppm	0.5 ppm
ETHYLENE OXIDE (ETO-B)	0 to 10 ppm	0.1 ppm
ETHYLENE OXIDE (ETO-C)	0 to 500 ppm	10 ppm
HYDROGEN (H_2)	0 to 2,000 ppm	10 ppm
HYDROGEN CHLORIDE (HCl)	0 to 15 ppm	1 ppm
HYDROGEN CYANIDE (HCN)	0 to 50 ppm	0.5 ppm
HYDROGEN FLUORIDE (HF)	0.5 to 10 ppm	0.1 ppm
HYDROGEN SULFIDE (H_2S)	0 to 100 ppm	0.1 ppm
HYDROGEN SULFIDE EXT. (H_2S HR)	0 to 1,000 ppm	1 ppm
OXYGEN (O_2)	0 to 30 %	0.10 %
SULFUR DIOXIDE (SO_2)	0 to 20 ppm	0.1 ppm
NITRIC OXIDE (NO)	0 to 250 ppm	0.5 ppm
NITROGEN DIOXIDE (NO_2)	0 to 20 ppm	0.1 ppm
PHOSPHINE (PH_3)	0 to 20 ppm	0.1 ppm
GAMMA RADIATION SENSOR		
GAMMA I-SENSOR	0.01 µSv/h to 0.2 mSv/h (1 µrem/h to 0.02 rem/h)	50 keV to 3 MeV

Honeywell Gas Detection

Honeywell is able to provide gas detection solutions to meet the requirements of all applications and industries.
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Device Management with
Honeywell Sotera™

honeywellanalytics.com/products/Honeywell-Sotera

Honeywell

HEALTH AND SAFETY

Exposure Monitoring

DustTrak™ II Aerosol Monitor

Models 8530, 8531, and 8532

Desktop or Handheld Units for Any Environment, Any Application

The new DustTrak II Aerosol Monitors are battery-operated, data-logging, light-scattering laser photometers that give you real-time aerosol mass readings. They use a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. Suitable for clean office settings as well as harsh industrial workplaces, construction and environmental sites and other outdoor applications. DustTrak II monitors measure aerosol contaminants such as dust, smoke, fumes and mists.

Features and Benefits

- Easy to program, easy to operate
- New graphical user interface with color touch-screen
- Perform in-line gravimetric analysis for custom reference calibrations
- Automatic zeroing (with optional zero module) minimizes the effect of zero drift
- Measure aerosol concentrations corresponding to PM_1, $PM_{2.5}$, PM_{10}, or Respirable size fractions

Applications

- Industrial/occupational hygiene surveys
- Indoor air quality investigations
- Outdoor environmental monitoring
- Baseline trending and screening
- Point source monitoring
- Engineering control evaluations
- Engineering studies
- Remote monitoring
- Process monitoring
- Emissions monitoring
- Aerosol research studies

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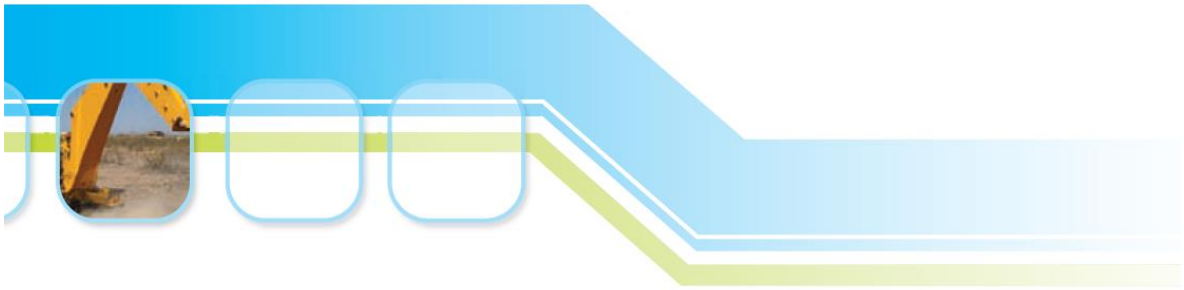

Easy to Program and Operate

The new graphical user interface with color touch-screen puts everything at your fingertips. The easy-to-read display shows real-time mass concentration and graphical data as well as other statistical information along with instrument pump, laser and flow status, and much more. Perform quick walk-through surveys or program the instrument's advanced logging modes for long-term sampling investigations. Program start times, total sampling times, logging intervals, alarm setpoints and many other parameters. You can even set up the instrument for continuous unattended operation.

Desktop Models: Ideal for Long-Term Surveys and Remote Monitoring Applications

Manual and programmable data logging functions also make DustTrak II desktop monitors ideal for unattended applications. They come with USB (device and host), Ethernet, and analog and alarm outputs allowing remote access to data. User adjustable alarm setpoints for instantaneous or 15-minute short-term excursion limit (STEL) are available on desktop models. The alarm output with user-defined setpoint alerts you when upset or changing conditions occur.

All DustTrak II desktop monitors have three unique features:

- Gravimetric sampling capability using a 37-mm filter cassette which can be inserted in-line with the aerosol stream allowing you to perform an integral gravimetric analysis for custom reference calibrations.
- They can be zeroed automatically using the external zeroing module. This optional accessory is used when sampling over extended periods of time. By zeroing the monitor during sampling, the effect of zero drift is minimized.
- STEL alarm feature for tracking 15-minute average mass concentrations when alarm setpoint has been reached for applications like monitoring fugitive emissions at hazardous waste sites.

Handheld Models: Perfect for Walk-Through Surveys and Single-Point Data Collection Applications

DustTrak II handheld models are lightweight and portable. They're perfect for industrial hygiene surveys, point source location monitoring, indoor air quality investigations, engineering control evaluations/validation, and for baseline trending and screening. Like desktop models, they have manual and programmable data logging functions. In addition, they have single-point data logging capability. Single-point data collection is used for walk-through industrial hygiene surveys and indoor air quality investigations.

New Software Makes Monitoring Easier than Ever

TrakPro™ Data Analysis Software allows you to set up and program directly from a PC. A new feature is the ability for remote programming and data acquisition from your PC via wireless (922 MHz or 2.4 GHz) communications or over an Ethernet network. As always, you can print graphs, raw data tables, and statistical and comprehensive reports for recordkeeping purposes.

DustTrak II Aerosol Monitor Features

All Models

- Li-Ion rechargeable batteries
- Internal and external battery charging capabilities
- Outlet port for isokinetic sampling applications
- User serviceable sheath flow and pump filters
- Logged test pause and restart feature
- Logged test programming
  - – Color touch screen—either manual mode or program mode
  - – TrakPro™ Data Analysis Software via a PC
- User adjustable custom calibration settings
- Instantaneous alarm settings with visual and audible warnings
- Real-time graph display
- View statistical information during and after sampling
- On-screen instrument status indicators: FLOW, LASER and FILTER
- Filter service indicator for user preventative maintenance

All Desktop Models

- Hot swappable batteries
- Gravimetric reference sample capability
- Long life 10,000-hour internal pump
- TrakPro Data Analysis Software
- Auto zeroing module (optional accessory)
- STEL alarm setpoint

All Handheld Models

- Long life 2,500-hour internal pump
- Single-point data collection for walk through surveys
- TrakPro Data Analysis Software

Battery Performance

Models 8530/8531 (typical) 6600 mAH Li-Ion Battery Pack (P/N 801680)	1 Battery	2 Batteries
Battery Runtime (hours)	up to 6	up to 12
Charge Time * (hours) in DustTrak	4	8
Charge Time* (hours) in external battery charger (P/N 801685)	4	8

Model 8532 (typical) 3600 mAH Li-Ion Battery Pack (P/N 801681)	Battery
Battery Runtime (hours)	up to 6
Charge Time * (hours) in DustTrak	4
Charge Time* (hours) in external battery charger (P/N 801686)	4

*of a fully depleted battery

Exposure Monitoring

Specifications

Models 8530, 8531, and 8532
DustTrak™ II Aerosol Monitor

Sensor Type
90° light scattering

Particle Size Range
0.1 to 10 µm

Aerosol Concentration Range

8530 Desktop	0.001 to 150 mg/m³
8531 Desktop High Conc.	0.001 to 400 mg/m³
8532 Handheld	0.001 to 150 mg/m³

Resolution
±0.1% of reading or 0.001 mg/m³, whichever is greater

Zero Stability
±0.002 mg/m³ per 24 hours at 10 sec time constant

Flow Rate
3.0 L/min set at factory, 1.40 to 3.0 L/min, user adjustable

Flow Accuracy
±5% of factory set point, internal flow controlled

Temperature Coefficient
+0.001 mg/m³ per °C

Operational Temp
32 to 120°F (0 to 50°C)

Storage Temp
-4 to 140°F (-20 to 60°C)

Operational Humidity
0 to 95% RH, non-condensing

Time Constant
User adjustable, 1 to 60 seconds

Data Logging
5 MB of on-board memory (>60,000 data points)
45 days at 1 minute logging interval

Log Interval
User adjustable, 1 second to 1 hour

Physical Size (HWD)

Handheld	4.9 x 4.8 x 12.5 in. (12.5 x 12.1 x 31.6 cm)
Desktop	5.3 x 8.5 x 8.8 in. (13.5 x 21.6 x 22.4 cm)

Weight

Handheld	2.9 lb (1.3 kg), 3.3 lb (1.5 kg) with battery
Desktop	3.5 lb (1.6 kg), 4.5 lb (2.0 kg)–1 battery, 5.5 lb (2.5 kg)–2 batteries

Communications

8530/31	USB (host and device) and Ethernet. Stored data accessible using flash memory drive
8532	USB (Hose and device). Stored data accessible using flash memory drive

Power–AC
Switching AC power adapter with universal line cord included, 115–240 VAC

Analog Out

8530/31	User selectable output, 0 to 5 V or 4 to 20 mA User selectable scaling range

Alarm Out

8530/31	Relay or audible buzzer Relay Non-latching MOSFET switch User selectable set point –5% deadband Connector 4-pin, Mini-DIN connectors
8532	Audible buzzer

Screen

8530/31	5.7 in. VGA color touchscreen
8532	3.5 in. VGA color touchscreen

Gravimetric Sampling

8530/31	Removable 37 mm cartridge (user supplied)

CE Rating

Immunity	EN61236-1:2006
Emissions	EN61236-1:2006

Specifications are subject to change without notice. TSI, the TSI logo, DustTrak, and TrakPro are trademarks of TSI Incorporated. Microsoft and Windows are trademarks of Microsoft Corporation.

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Addendum 1

Use of shredded tires as an Alternative Daily Cover material for the Municipal Solid Waste Disposal Site of Sint Maarten

Introduction

Approximately 5700 tons of waste tires are stockpiled in a location at the Municipal Solid Waste Disposal Site (MSWDS) in Pond Island, Philipsburg, St. Maarten, as shown in white outline in Figure below. Waste tires include whole, unprocessed, or semi-processed tires (i.e., tires that have not been shredded, or tires that have the rubber separated from the rim, or tires with the rubber and the rim attached). Waste tires include commercial, passenger vehicle tires, truck and off-road vehicle and motorcycle tires.

This pile of tires poses a serious fire hazard because tires can easily be ignited from external sources or self-ignite, releasing hazardous substances into the environment and affecting the health and safety of the population in the immediate and extended area. Tire fires are difficult to extinguish and may burn for significant periods. As such, storage of tires in an uncontrolled manner and without the appropriate firefighting measures in place must be avoided.

A tire shredding and disposal activity is planned for implementation under the EDMP project. This activity is primarily designed to mitigate fire risks and to provide an environmentally sound and feasible solution to the accumulated waste material. It is the intention that whole tires will be shredded and then used as an alternative daily cover for the landfill, after mixing with a prescribed proportion of soil.

Figure. Location of Tire Stockpile

Technical Evaluation

According to the U.S. Environmental Protection Agency[1], the three largest scrap tire markets are: a) Tire-derived fuel, b) Civil engineering applications and c) Ground rubber applications/rubberized asphalt. Out of those three, civil engineering application is the option that has been further explored because there could be a local end-use application and cost savings can be realized due to less transportation and disposal fees.

Regarding the civil engineering applications[2], the most important are a) Subgrade Fill and Embankments, b) Backfill for Wall and Bridge Abutments, c) Subgrade Insulation for Roads, d) Landfills, e) Septic System Drain Fields. Specifically for landfills, scrap tire shreds can replace other construction materials that would have to be purchased. Scrap tires may be used as a lightweight backfill in gas venting systems, in leachate collection systems, and in operational liners. They may also be used in landfill capping and closures, and as a material for daily cover.

The landfill daily cover application seems to be the most appropriate for the Sint Maarten case, because Sint Maarten MSWDS relies on soil imports for the necessary daily landfill covering operations and uses alternative materials when there is a shortage of soil. This application could readily absorb the accumulated scrap tires, while for other uses there is not a current demand or technical readiness. As such, for the tendering of the Tire Shredding activity, specifications conducive to the use of tire shreds as ADC are described.

Using the shredded tires as an Alternative Cover Material (ADC) has many advantages, most notably: 1) The whole tire stockpile can be processed and disposed in a determined and short period of time, 2) Shredded tires will substitute the equivalent amount of imported soil, 3) Tire processing and shredded tire final disposal will take place within the landfill, in close proximity to the final disposal location, saving on transportation costs and reducing CO_2 emissions to the environment.

A Guidance Manual[3] prepared for the California Integrated Waste Management Board (CIWMB), provides the necessary technical specification for the use of shredded tires as ADC. Those are:

- ✓ Shredded tires used as daily cover alone or mixed with soil shall be shredded such that 50% by volume is smaller than 6 inches in length and no individual pieces are greater than 12 inches in length and no “U-shaped” pieces shall be allowed.
- ✓ Tire shreds, due to their chemical composition, are combustible and thus will not minimize potential fire hazard. The tire shreds can be mixed with soil prior to placement over the working face to mitigate the potential for fire hazard or reduce potential for rainfall infiltration. If ADC consisting only of tire shreds is used, as a precaution against the spread of a fire through the waste at a landfill, earthen material (without tire shreds) should be used as daily cover at least once a week.
- ✓ The undesirable characteristics of combustibility and high permeability are applicable only to tire shreds used alone (i.e., not mixed with soil). The combustibility of a 50% - 50% mixture (by weight) of tire shreds and soil is expected to be low. Moreover, laboratory tests show that mixtures with more than 30% to 50% soil (by weight) have a hydraulic conductivity that is like that of the soil. Although tire shreds alone would allow oxygen to

[1] Basic Information | Scrap Tires | US EPA
[2] Civil Engineering Applications | Scrap Tires | US EPA
[3] Guidance Manual: Shredded Tires as Alternative Daily Cover at Municipal Solid Waste Landfills (p2infohouse.org)

move into the waste, mixtures of tire shreds and soil would be expected to have performance like soil.

- ✓ Because of the hazards associated with shredded tires and exposed steel belts and beads, it is suggested that track-mounted equipment, if feasible, be used on and around the tire shreds. Tire shreds may be placed over the working face using landfill equipment such as dozers or steel-wheeled compactors with blades.
- ✓ Due to combustibility of tire shreds, it is recommended that only the shredded tires intended for use on the respective day as ADC material shall be transported and stockpiled next to the working face of the landfill.

Environmental & Social Considerations

The existing pile of scrap tires poses a serious fire hazard that shall be eliminated as soon as practicably possible. The selected process, of tire shredding and use as alternative daily cover for the landfill, is in line with acceptable environmental practices used in other countries (see previous references to U.S. EPA) and will also reduce the dependence on natural resources (soil) for the landfill covering. The following table summarizes the risks and impacts of the proposed application and the mitigation measures to manage the potential negative results.

Risks & Impacts	**Mitigation measures**
Landfill Operation	
Fire Risks related to the combustibility of tire shreds compared to soil in landfill application	Tire shreds should be mixed with soil at a ratio of 1:1 by volume before application. This ratio has the same fire suppression characteristics as bare soil and is higher compared to the one proposed by CIWMB. Tire chips size shall not exceed 50mmx50mm, further improving fire suppression of the mix. The ADC application thickness should be uniform and at a minimum 15cm deep. The ADC layer should be tested periodically (every month) to ensure it meets the requirements.
Increased Leachate production due to higher hydraulic conductivity of tire shreds compared to soil in landfill application	Tire shreds should be mixed with soil at a ratio of 1:1 by volume before application. This ratio has the same hydraulic characteristics as bare soil and is higher compared to the one proposed by CIWMB. Tire chips size shall not exceed 50mmx50mm, further reducing hydraulic conductivity of the mix. The ADC application thickness should be uniform and at a minimum 15cm deep. Also, tire shreds do not leach volatile organic compounds (VOCs) or, when leaching does occur, these compounds are found at very low concentrations. Similar results are reported for iron leaching from tires, which is not favored in the landfill environment.

Fire Risk of shredded tires stored close to the active landfill face.	Only tires/soil blend used during the same day as ADC should be piled in the landfill workface. Tire shreds for mixing should be stored at a distance from active workface (min. 50m, next to current soil stockpile) and the accumulated volume shall be limited.
Vehicle Safety Risk due to flat tires caused by metal pieces for tire shreds	Although the risk of tires puncture associated with shredded tires and exposed steel belts and beads is low due to the small size of shreds , it is suggested that track-mounted equipment, if feasible, be used on and around the tire shreds. Tire shreds may be placed over the working face using landfill equipment such as dozers or steel-wheeled compactors with blades.
Operational risks due to the introduction of a new procedure	NRPB, in coordination with VROMI, will develop a Standard Operating Procedure (SOP) for the storage, mixing and application of tire shreds as ADC, before the commencement of the tire processing contract. The location of tire shreds storage and mixing will be defined in more detail, along with appropriate fire safety measures as needed (max storage footprint and height, safety buffer zones among piles, etc). Consideration shall be given to the daily produce of shred tires; daily needs of ADC at the landfill based on waste influx and waste/soil cover ratio; new scrap tires brought to the landfill and Occupational Health & Safety risks from tire shreds handling. NRPB, in coordination with VROMI, will reach out to landfill operators currently utilizing tire shreds as ADC, for knowledge sharing in developing the SOP. At least two VROMI personnel must be trained and warned of the hazards posed by the steel belts and beads of shredded tires.
Tire Processing Operation	
Fire Risk of tire shredding operation	Contractor shall prepare a Fire Safety Plan with appropriate measures related to tire shreds piles (max volume, min distance, fencing, etc.) and firefighting equipment onsite. Contractor shall also minimize the onsite storage of fuel.
Vector Spread due to the disturbance of the existing tire pile.	Contractor shall assess the site for vectors and pests and eradicate the presence of such before starting the operation. Contractor will continue to monitor the presence of vectors during operation and take additional measures if needed.
Slope Stability risks due to the tire pile removal and “No Work” zone.	Contractor shall be conducting soil stability inspection on the slopes of the tire pile as

	works progresses, at regular intervals not exceeding 1 week.
Occupational Health & Safety (OHS) risks of the tire processing personnel	All personnel shall wear the necessary PPEs and be trained for the tasks they perform. Workers should be warned of the hazards posed by the steel belts and beads. Appropriate personal protective equipment, including protective work clothing and stiff-soled shoes with a steel insert and steel toes, should be utilized by personnel during shredding and placement activities. Moving equipment shall have audible reverse alarms. Contractor shall assess the risks related to the operation and propose an OHS plan. Sanitation facilities and drinking water shall be provided on the site.
Dust emittance from the tire shredding operation.	The tire shredder shall be equipped with a water sprinkler for minimizing fugitive dust emissions.
Noise emittance from the tire shredding operation.	Contractor will be responsible for complying with the noise limits as set In the WB EHS General Guidelines for industrial sites.
Traffic Safety due to heavy equipment movement in proximity with the tire processing facility	Contractor shall prepare a traffic management plan and ensure the safe continuation of the operation of the MSWDS and accessibility to the storage and crushing sites.
Soil Pollution due to waste management on the processing site.	Contractor will be responsible for developing a waste management plan for the proper management of various waste streams. Metal waste from tire rims and wires shall be stored separately and recycled. Tire shreds should be directly loaded into skips/bids and transported to the storage site daily.