Rehabilitation and Closure of Municipal Solid Waste Disposal Site

Sint Maarten Emergency Debris Management Project (P-167347)

Environmental and Social Management Plan (ESMP)

April 10, 2026

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List of abbreviations and acronyms

Table 0.1 List of abbreviations and acronyms

Abbreviation	Meaning
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
EDMP	Emergency Debris Management Project
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
C-ESMP	Contractor Environmental and Social Management Plan
GRM	Grievance Redress Mechanism
GSP	Great Salt Pond
HDPE	High-Density Polyethylene
IDS	Irma Disposal Site
ISWMF	Integrated Solid Waste Management Facility
LEL	Lower Explosion Limit
LFG	Landfill Gas
LLDPE	Linear Low-Density Polyethylene
LRP	Livelihood Restoration Plan
MAC	Maximum Allowable Concentrations
MSWDS	Municipal Solid Waste Disposal Sites (SWDS and IDS together)
NRPB	National Recovery Program Bureau
OHS	Occupational Health and Safety
PAHs	Polycyclic Aromatic Hydrocarbons
PAP	Project Affected Persons
PIU	Project Implementation Unit
PM	Particulate Matter
RAP	Resettlement Action Plan
SWDS	Solid Waste Disposal Site
TSS	Total Suspended Solids
VROMI	Ministry of Public Housing, Spatial Planning, Environment and Infrastructure

0 Executive Summary

Sint Maarten is currently facing significant challenges with its municipal solid waste management system, primarily attributed to the longstanding operational inefficiencies of the Solid Waste Disposal Site (SWDS) and the Irma Disposal Site (IDS). Despite recent improvements initiated by the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI), the absence of a comprehensive legal framework has perpetuated inadequate waste management practices. After Hurricane Irma (2017), the government, backed by a Dutch-financed and World Bank administered Trust Fund under the “Building Back Better” programme, launched the Emergency Debris Management Project (EDMP) to clear debris and rehabilitate waste facilities.

0.1 Project Activities

The Environmental and Social Management Plan (ESMP), developed by Witteveen+Bos and TAUW as part of the Emergency Debris Management Project (EDMP) describes the framework for implementing the mitigation measures identified in the project Environment and Social Impact Assessment (ESIA). As described in the ESIA, the project activities to be undertaken include:

- Reprofile the waste bodies to plateaued 1: 3 slopes, reaching 36 m (SWDS) and 24 m (IDS), then cease filling; IDS will be finished in about 60 weeks, SWDS 52 weeks after dumping stops
- Construct a 4 m-wide ring dike for access, erosion control and added stability; reinforce landfill slopes with HDPE geocells and reuse existing rock armour plus recycled C&D aggregate
- Install a 1.8 m security fence and a storm-water system: 5 % surface fall to Great Salt Pond and precast-gutter drainage on the landward side
- Place an engineered final cover comprising support sand, 2 mm LLDPE liner, drainage mat, geocell layer, and 0.5 m vegetated top-soil; the cap both cuts infiltration (leachate collection is not required)
- Collect landfill gas through a network of horizontal gas drains linked to compost biofilters
- Procure mobile shredding and crushing equipment so VROMI can process incoming waste and produce recycled aggregate for ring-dike and road works
- Landscape the dike with juvenile red-mangrove plantings to offset habitat loss. Establishing auxiliary facilities in the existing VROMI yard (contractor compound, recycled-aggregate stockpiles) and relocating two onsite businesses prior to works
- Small scale extension of SWDS and relocation of access road and weighbridge to Resettlement Area
- Relocation of Economic Operators to VROMI Yard

Activities will be completed in general accordance with Sint Maarten provisions and provisions derived from the United States Occupational Safety and Health Administration (OSHA), Dutch legislation or comparable EU legislation as well as IFC EHSGs standards. The proposed mitigation measures in this ESMP will avoid, prevent, minimize, or compensate for adverse impacts associated with carrying out the activities that were identified in the ESIA.

Preparation of the ESMP includes a consultation process about the Project's environmental and social aspects. Feedback received during this consultation process has been incorporated in the final version of this ESMP. During Project implementation, the NRPB will monitor on compliance with the measures agreed with World Bank including implementation of the ESMP, Abbreviated Resettlement Action Plan (A-RAP), including a Livelihood Restoration Plan (LRP), grievance mechanism, etc., ensuring that the design, construction and operation measures are appropriately delivered.

0.2 Environmental and Social Impacts

The key impact findings during construction phase are:

- Social Impacts: two commercial entities need to be relocated, and one association needs to be compensated for their plot for the reconstruction of the IDS and SWDS. Abbreviated Resettlement Action Plan (ARAP), including a Livelihood Restoration Plan (LRP) will be prepared and implemented to describe how this will be undertaken in compliance with World Bank operational policy requirements
- Residents, businesses and educational centres, leisure facilities and government activities on Pond Island and the area between Pond Island and the port facilities will be impacted during construction phase by increased traffic, dust and noise
- Air Quality: Activities will lead to a temporary decrease of air quality due to exhaust emissions, increase risk of fires and other emissions from the landfill
- Odor: Re-opening of landfill sections can lead to temporary increased odor nuisance, especially in areas where anaerobic layers are reworked
- Dust: Reprofiling and soil works will lead to an increase in dust formation, chiefly within site border
- Roads and Traffic: Increase heavy traffic is expected between the port facilities and the MSWDS and between the SWDS and IDS sides of the MSWDS
- Noise: The metal-scrap yard and rock crusher could emit up to 90 dB (~80 dB average), exceeding the 55 dB night time limit[1]within 60 m. Extra noise will also come from haul-trucks and any relocated crushers or shredders
- Hydrology and water quality: Reprofiling may temporarily raise leachate generation and sediment-laden runoff; once capped, infiltration – and thus leachate – should fall by >80 %. Storm-water channels and vegetation will further cut sediment loads
- Ecology: Building the ring dike will clear existing mangroves, but compensatory planting can successfully reestablish mangroves on a like for like basis. Reduced leachate discharge should improve pond ecology over time. Importing large soil volumes carries a risk of invasive (soil) biota
- Worker health & safety: Main hazards are contact with sharp or contaminated waste, dust, occasional fires, steep working slopes, heavy machinery and drowning near water. Traffic between port and site adds accident risk
- Public health & safety: Residents may experience more dust, odour and traffic hazards during construction; vermin patterns could shift. Fire outbreaks remain a short-term concern until capping is complete

[1] Limit values Eindrapport Milieunormen Nederlandse Antillen Close to main roads, in urban areas with some commercial activities

- Aesthetic effects and Archaeological, Historic and Cultural Heritage impacts: Final grassed slopes will enhance the landscape relative to the current situation. The ring dike encroaches slightly on historic salt-pond area and may lead to the loss of small sections of the walls designated as national monuments
- Natural disasters: Closed slopes remain vulnerable to major earthquakes much like surrounding structures. The ring dike and changes in surface run-off are expected to result in a maximum 2.6 cm rise in peak flood levels during high intensity rainfall events

The two commercial entities will be resettled in VROMI yard, as an integral part of the Government of Sint Maarten's waste management strategy. The key impacts predicted during the operational phase are:

- Dust: Activities of two commercial entities will continue in VROMI yard, potentially resulting in an increase in dust emissions
- Noise: The metal-scrap yard and rock crusher could emit up to 90 dB (~80 dB average), exceeding the 60 dB residential limit (night time) within 60 m. Extra noise will also come from haul-trucks and any relocated crushers or shredders
- Soil and groundwater: Activities of two commercial entities can impact to soil and groundwater quality due to spills in operating processes
- Increased traffic near VROMI yard: Heavy vehicles operated by the two commercial entities will access VROMI yard, which will affect residents and businesses in proximity to VROMI yard

0.3 Key Mitigation Measures

Essential mitigation measures are suggested to tackle the environmental and social impacts of the project.

Social Impacts

The project involves the resettlement of three entities: Steel Crushers B.V., Windward Roads B.V., and the Soccer Association. An A-RAP, including LRP, is being developed. The mitigation measures for Steel Crushers B.V. include providing an alternative long leasehold nearby (in VROMI Yard), compensation for temporary income loss (during move to the new site and restoration of income afterwards), as applicable, and support for dismantling and relocation. For Windward Roads B.V., compensation includes a new rental agreement, compensation for temporary income loss (during move to VROMI yard and restoration of income afterwards), as applicable, and support for dismantling and rebuilding at VROMI Yard. The Sint Maarten Soccer Association will be provided with an alternative land in long lease. Resettlement of economic actors should be completed (all compensations paid) prior to granting the contractor access to the areas they are currently using.

Air Quality, Odour and Dust

Key actions include maintaining construction equipment, scheduling work during main work hours (07-19), and implementing a Construction Communications Plan. Dust suppression techniques such as watering unpaved areas and using water vapor cannons will be employed, along with

providing appropriate personal protective equipment (PPE) for workers. Fire risk management will include the establishment of a fire suppression strategy, daily covers for excavated areas, and direct communication with the Fire Department. Measures to manage odors and landfill gases will also be implemented to minimize health risks.

Roads and Traffic
Specific measures include traffic control on Soualiga Road, speed restrictions, and providing wheel cleaning facilities to minimize debris on public roads. Covering soil and waste loads during transport and avoiding rush hours will also be crucial to reducing traffic-related impacts. Regular inspections of Soualiga Road will ensure any damage from increased use is promptly addressed.

Noise
Mitigation strategies include adhering to noise level standards, constructing noise barriers between noisy operations and nearby residential areas, and implementing speed restrictions for project trucks on public roads.

Geology and Soils
Mitigation measures for soil impact focus on ensuring that any imported soil is of equal or better quality than existing soil, and that activities do not adversely affect soil quality. Soil protection measures will be implemented in potentially contaminated areas, especially where vehicle dismantling occurs.

Hydrogeology, Hydrology, and Surface Water Quality
The project aims to enhance surface and groundwater quality by reducing leachate production. Mitigation measures include temporary erosion controls, stormwater management systems to prevent runoff into the Great Salt Pond, and establishing a surface water quality monitoring system during construction.

Ecology
Vegetation removal during construction will be mitigated by reinstating flora post-project completion. Ongoing biological surveys will monitor the ecological impacts, with specific measures for protected species to minimize disturbances.

Worker Health and Safety
To address health risks associated with heavy machinery, working on steep slopes and near water, adherence to local, international and World Bank guidelines on labor conditions is critical. A Grievance Redress Mechanism (GRM) will be established by the contractor to allow workers to voice concerns, enhancing workplace safety.

Public Health and Safety
Public health impacts from construction activities will be monitored, with strategies to facilitate open communication with the community regarding air quality, traffic, and project timelines. Regular public forums will allow stakeholders to express concerns.

Aesthetic effect and Archaeological, Historic, and Cultural Heritage
Mitigation measures will enhance the visual appeal of non-operational areas through greening initiatives, using local materials for construction to better integrate with the surroundings.
The project will safeguard the aesthetic value of the Great Salt Pond by ensuring that site embankments mimic the original Salt Pan banks, utilizing locally sourced natural rocks. Where construction on top of Salt Pan features cannot be avoided, the features will be left in-situ. A Monuments Permits will be applied for.

Natural Disasters
Mitigation efforts will focus on maintaining slope stability and ensuring rapid response procedures are in place for emergencies. Flood risk management includes preserving the buffering capacity of the Great Salt Pond, primarily covered by pumping capacity of the new pumps at the Rolandus Channel outlet. In case the pumps are not available on-time or their capacity differs from the current working hypothesis, a bypass at the Fresh Pond can be made to reduce flooding. The Fresh Water Bypass more than halves the potential water level increase in the GSP during heavy rainfall events effectively eliminating the risk of flooding.

VROMI yard
There are residents and businesses in south of VROMI yard. The operations by Steel Crushers and Windward Roads in VROMI yard will have impacts, such as noise, dust, soil, and increased traffic on access road. Mitigation measures will include noise barriers, speed and operating hour restrictions, soil protective measures, such as oil collection slope, stockpile height restrictions, etc. The mitigation measures will be further refined by the VROMI yard site plan to be developed by VROMI/NRPB.

0.4 Implementation Arrangements

The National Recovery Program Bureau (NRPB) serves as the Project Implementation Unit (PIU) for activities funded by the SMTF and is responsible for delivering the required mitigation in the design, construction and operation phases of the project. To achieve this and adherence to national policy, legislation and regulation, the NRPB will collaborate closely with relevant government ministries and departments.

To support this role, the NRPB has appointed two Environmental Specialists and a Social Specialist who are responsible for ensuring the measures in the ESMP are up-to-date, appropriate and implemented, and managing the grievance redress mechanism (GRM). Additionally, the NRPB Community Engagement Specialist will facilitate outreach to the community, while E&S personnel will provide capacity-building initiatives for local government ministries and as needed contractors.

Under NRPB's oversight, a 'concept design' for the closure works has been developed to demonstrate a tailored design solution that meets the required performance specifications.

This concept design has been subject to the environmental and social assessment as part of this process, and the concept design therefore incorporates relevant mitigation measures. The concept design has also been used to acquire a permits required for the works under the national law, including Monument permits.

A Design and Build (D&B) contractor will be procured. The D&B will be required to prepare a design for the closure of the MSWDS in combination with the building works for the closure of the IDS and ensuring geotechnical stability at the SWDS as preparation for its closure after termination of the landfill operations. Contractor shall ensure that its design shall not result in any new significant impacts or any worsening of the impacts described in the ESIA.
The D&B contractor would be required to update the ESIA and this ESMP, as well as reapply for permits as needed for any alternative design solution.

An Independent Supervising Engineer will be appointed by NRPB to administer the D&B contract and ensure that the closure of the landfill site is achieved based on the Concept Design and using methods that comply with contract requirements. The Engineer's team will include an Environmental, Social, Health, and Safety (ESHS) Specialist who will be responsible for supervising the ESHS aspects of the works, providing technical and specialist support to the Engineer to ensure the works are undertaken in accordance with the D&B contract. The D&B contract will set out clearly the E&S performance specifications to be achieved in the design and during the works, drawing on the information provided in the ESIA and this ESMP.
The D&B contractor will be required to provide ESHS staff that are suitably qualified to ensure that any design work undertaken does not result in any worsening of the predicted impacts (or the introduction of any new significant effects), and ESHS staff that are suitably qualified to advise the contractor on the processes and methods for undertaking the construction activities in compliance with requirements.

0.5 Environmental, Social, Health, Safety, Monitoring Plan

Monitoring and reporting on environmental and social mitigation measures are essential for effective management throughout the project, particularly during the construction phase, where identifying performance enhancement opportunities is advantageous. The Contractor is tasked with keeping the NRPB and the Independent Supervising Engineer informed of project performance related to environmental, health and safety, and social issues.

VROMI and NRPB will engage with stakeholders to keep relevant groups informed about project activities and environmental monitoring outcomes. An environmental, health, and safety monitoring plan outlines the minimum requirements for monitoring point placement, frequency, and parameters to be analyzed, while contractors may suggest alternative monitoring methods if they prove more effective. The following monitoring will be implemented as a minimum during the construction phase of the project.

Environmental, Health and Safety Monitoring Plan

Impact	Monitoring
Air Quality	Baseline and construction monitoring at 6 monitoring stations for PM10, heavy metals, PAH
Roads and Traffic	Visual inspection of roads between MSWDS and Port facilities Monitoring of adherence to traffic regulations by contractor vehicles
Noise	Baseline noise measurements and measurements in case of complaints during construction phase
Geology and Soils	Establishment of baseline soil and sediment quality in areas of future activities that can impact soil quality Quality control of imported soil through check on set quantities according to protocols
Hydrogeology, hydrology and surface water quality	Baseline surface water quality control Quarterly sampling of water quality at 6 sampling points Daily measurements of oxygen levels in water during installation of ring dike at 3 points
Ecology	Baseline ecological inspection, individual actions based on pre-established instructions in case protected species are identified
Archaeological, Historic, and Cultural Heritage	Baseline inventory of remaining Salt Pan structures
Natural Disaster Risks	Visual monitoring for presence of cracks and damages, review of buffer capacity in relation to pumps at Rolandus Channel

0.6 Stakeholder Engagement and Grievance Redress Mechanism

During the preparation phase of the ESIA and ESMP, a public consultation was held on Wednesday, September 3, 2025 at the Belair Community Centre with nearly 200 people in attendance. The high participation showed great connection to the issues and overall questions involved waste management in general, with some technical questions on the closure and design. These questions have been answered in the ESIA document and did not warrant any additional monitoring or mitigation measures.

Stakeholder engagement and communication will be monitored to ensure that consultation and disclosure efforts are effective, in particular that stakeholders have been meaningfully consulted throughout the process. Monitoring will cover the following, which will be reported to the Bank biannually:

- Consultation activities conducted with government authorities and non-governmental stakeholders
- Numbers and types of grievances and the nature and timing of their resolution

NRPB has a GRM at the organization level and accepts grievances for all its projects, including EDMP. GRM is accessible by all stakeholders and free of charge to all.

1 Introduction

Sint Maarten struggles with a weak municipal solid waste management system.
Despite considerable improvements in operational management over the past five years by the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI), the Municipal Solid Waste Disposal Sites (MSWDS) on the Island do not operate in line with International Best Practice. Since the start of its operation in the seventies, the Solid Waste Disposal Site (SWDS), and later the Irma Disposal Site (IDS), both situated at Pond Island in Philipsburg and collectively referred as the Municipal Solid Waste Disposal Sites (MSWDS), operate without a legal and regulatory framework and serves as an open dumpsite for the whole country with limited supervision, operational workflows, waste measures and controls.

In response to the Irma hurricane destruction in 2017, the Government of Sint Maarten initiated the National Recovery and Reconstruction Program, known as "Building Back Better".
This program aims to facilitate the island's large-scale recovery and reconstruction efforts. A significant portion of the funding is provided through a Trust Fund established by the Netherlands administered by the World Bank. The projects funded by this Trust Fund are managed by the National Recovery Program Bureau (NRPB), which serves as the Project Implementation Unit (PIU) for Trust Fund projects.

One of the projects supported by the Trust Fund is the Emergency Debris Management Project (EDMP). This project aims to effectively manage debris resulting from the hurricane and reconstruction activities, as well as improve the organization, rehabilitation, and upgrading of debris storage and municipal disposal sites.

As part of the EDMP a project was developed by the NRPB for conducting a Feasibility Study and Development of Procurement Document for the Rehabilitation and Closure of Municipal Solid Waste Disposal Site (MSWDS) in Philipsburg, Sint Maarten. The aim of this project assigned to the consortium of Witteveen+Bos and TAUW is to develop a sustainable solution, including a Concept Design and associated Procurement Documents for implementation, for the SWDS and IDS in compliance with Environmental, Social, Health and Safety requirements and to establish sufficient landfill disposal capacity during the country's transition period to a non-disposal Integrated Solid Waste Management System.

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

- SWDS Slope recontouring and closure including slope stability improvement
- Irma debris disposal site recontouring and closure
- Installation of auxiliary buildings

This Environmental and Social Management Plan (ESMP) outlines a series of mitigation, monitoring, and institutional measures to be implemented during mentioned activities. The goal is to eliminate, offset, or reduce any adverse environmental and social impacts to acceptable levels.

Additionally, this ESMP includes the necessary actions for implementing these measures along with an estimated budget. This document is an update to the original ESMP Sint Maarten Emergency Debris Management Project. P-167347. NRPB, December, 2023.

1.1 Environmental and Social Assessment of the Project

The ESMP summarises the predicted impacts and details how the required mitigation measures identified in the Environmental and Social Impact Assessment (ESIA) Report[2], which has been released separately, will be implemented. It therefore helps to ensure that the requirements of the ESIA will be implemented, including by clarifying responsibilities for actions and ensuring that the relevant contracts include the relevant requirements to deliver the mitigation.

1.2 Mitigation of Environmental and Social Impacts

The ESMP outlines practical and cost-effective strategies designed to minimize potentially significant adverse environmental and social impacts to acceptable levels. In cases where mitigation measures are not feasible, cost-effective, or adequate, the plan includes compensatory measures.

- Specifically, the ESMP identifies and summarizes all anticipated significant adverse environmental and social impacts as outlined in the Environmental and Social Impact Assessment (ESIA) report
- It details each mitigation measure, including the type of impact it addresses and the conditions under which it is required (e.g., on a continuous basis or in response to specific contingencies), along with relevant designs, equipment specifications, and operational procedures as needed
- The plan estimates any potential environmental and social impacts associated with these measures and establishes connections with other necessary mitigation plans related to the project
- Lastly, the ESMP delineates contractor responsibilities, reporting obligations, and the engagement of safeguards personnel

1.3 Monitoring

The Environmental and Social Management Plan (ESMP) outlines the necessary monitoring of key environmental and social impacts during project implementation, as well as the effectiveness of the mitigation measures. This monitoring will enable VROMI, the NRPB, and the World Bank to assess the success of these mitigation measures in delivering the project as predicted in the ESIA.

The ESMP defines specific monitoring objectives and details the type of monitoring needed, linking it to the impacts evaluated in the Environmental and Social Impact Assessment (ESIA) and the mitigation measures outlined in the ESMP. In particular, the monitoring section of the ESMP includes:

[2] Environmental Social Impact Assessment (ESIA) for Upgrading, Extension, Reconditioning / Rehabilitation and Closure of Municipal Solid Waste Disposal Sites in Philipsburg, Sint Maarten, TAUW + Witteveen+Bos, report R005-1293149GMC-V02-nnc

- A detailed description of monitoring measures, considering costs and technical specifics, including the parameters to be measured, methodologies employed, sampling locations, measurement frequency, and detection limits (where relevant)
- Monitoring and reporting procedures designed to (i) ensure early identification of conditions that require specific mitigation measures, and (ii) provide information regarding the progress and outcomes of the mitigation efforts

1.4 Contents of the Report

Chapter 2 offers a general background of the site, while Chapter 3 presents an overview of the legal and regulatory framework. Chapter 4 details the Environmental and Social baseline, followed by Chapter 5, which discusses Environmental and Social Risks, Impacts, and their Management. The implementation arrangements for the Environmental and Social Management Plan (ESMP) are outlined in Chapter 6, with the monitoring plan detailed in Chapter 7. Chapter 8 covers Stakeholder Engagement and Information Disclosure, and Chapter 9 addresses the associated Grievance Redress mechanism. The document concludes with references in Chapter 10 and the annexes

2 Project Description

To support Sint Maarten's recovery through management of debris from the hurricane and reconstruction activities and to facilitate recovery and reduce risks, the project will focus on the following activities:

- Slope recontouring and closure including slope stability improvement
- Irma debris disposal site recontouring and closure
- Installation and operation of auxiliary buildings

The following sections provide the details on concept design and the mentioned activities. The current landfill lay-out with the associated activities and operations is presented in the following figure.

Figure 2.1 Current landfill lay-out with in red the approximate project boundaries (excluding Soualiga road)

2.1.1 SWDS re-contouring and closure

The existing waste mass will be reprofiled for stable slopes and levelled to a height of 36m for the SWDS and 24m above Sint Maarten Peil (average sea level) for the IDS. Associated activities, including the weighbridge will be moved within the set-back zone of the SWDS, the resettlement area and VROMI yard. The landfill entrance road will be moved slightly South of the existing road, within the current RAI area. To ensure slope stability and limit volume loss due to oblique corners of the current landfill, a small section of the RAI area will be included in the new SWDS disposal area (maximum 10% of RAI surface area). It is expected that the IDS side is closed permanently after a construction period of ~60 weeks. The SWDS is expected to be closed permanently ~52 weeks after landfilling operations cease.

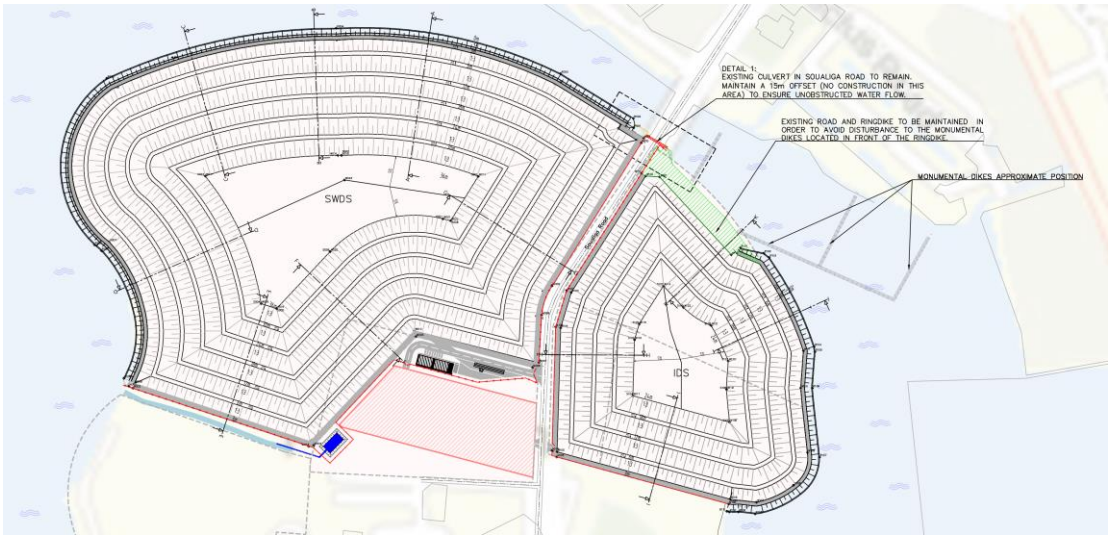

Figure 2.2 Landfill design

Based on the calculations a stepped elevation profile consisting of slopes with a height of 6m and a slope ratio of 1:3, in combination with flat benches with a width of 4m and a slope ratio of 1:20 in combination with a ring dike at the toe of the MSWDS bordering the GSP with a width of 4m (at surface level) and a slope ratio at surface level of 1:20 and geotechnical reinforcement of the entire slope from crest to toe at all sides of the MSWDS is sufficient to ensure geotechnical stability. The SWDS will expand slightly into the former Resettlement Area. This section is required for slope restructuring and is not intended to serve for primary waste disposal.

A 1.8 m high mesh wired (max mesh 0.1m), including supporting poles and a manually operated sliding access gate at the entrance road, is foreseen at the landside of the SWDS to prevent uncontrolled and/or unauthorised access during its operational phase.

Storm water management consists of a separate collection of stormwater runoff from the MSWDS through the construction of open gutters consisting of (pre-fab) concrete U profiles along the toe of the MSWDS boundary at the land side. Stormwater collected in this open gutter will be transported under gravity to a stormwater storage basin with a discharge overflow into the GSP. Stormwater run-off at the MSWDS boundary with the GSP will not be separately collected and be allowed to flow across the ring-dike into the GSP. A profile of 5% towards the GSP is applied at the surface of the ring dike to prevent stagnation of the run-off and associated infiltration in the ring dike.

After closure, the stormwater infiltrated through the soil of the cover layer will accumulate above the permeability barrier layer. This infiltrated stormwater will be collected by means of so-called “drainage mats” (drainage core connected to nonwoven filters) installed on top of the permeability barrier layer. The infiltrated stormwater collected by the drainage mats will be transported to the toe of the slope. At the landside the drainage mats will be extended underneath the open gutter for stormwater run-off and the service area in order to discharge into an open ditch. At the area of the MSWDS bordering the GSP, the drainage mats will be extended to the slope of the ring-dike.

Until final closure of the landfill, landfill operations will continue within the current site boundaries and processing operations within the VROMI yard and RAI areas. These operations will require an upgrade to current operational practises and continued Environmental and Social Monitoring.
In the ESMP the actions for the future landfill and auxiliary operations are included.

While current waste collection contracts make allowance for segregated waste collection, no specific actions have been taken to pre-sort the wastes coming to the landfill as the facilities for processing are lacking. NRPB has launched a Request for Bid in the selection of a suitable Supplier to procure, deliver and commission a mobile crusher and shredder with the associated application hardware and software, and provision of operator training, for the purpose of processing the incoming waste to the landfill required by the landfill operator (VROMI).

Interim and final cap
The feasibility design assumes a uniform engineering solution to be applied for the cover layer at the slopes upon closure of the SWDS and IDS. Based on the base-case where a synthetic permeability barrier is foreseen, the cover layer consists of the following elements (top down):

- Topsoil with grass vegetation (0.5)
- Geotechnical Reinforcement Structure (0.3m) filled with sand/gravel (0-40mm)
- Drainage Mat
- Synthetic Permeability Barrier (2mm LLDPE)
- Protective Geotextile (800g/m^2)
- Support Layer (0.3m sand/gravel, 0-40mm), with high-dense vertical gas extraction incorporated at flat areas of slopes at SWDS)
- Profiled Waste Material

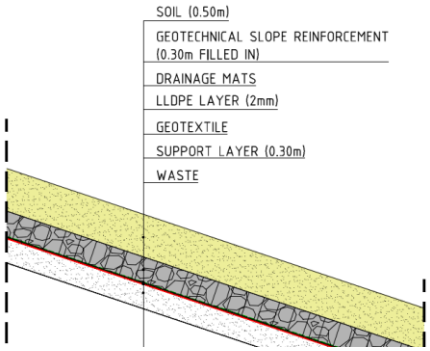

Figure 2.3 Total Overview Engineering Concept for Slope Cover Layer

The feasibility design of the cover layer to be constructed upon closure for the base-case with a synthetic permeability barrier. This results in a cover layer consisting of the following elements (top down):

- Topsoil with grass vegetation (0.5)
- Sand/Gravel (0-40mm)
- Drainage Mat
- Synthetic Permeability Barrier (2mm LLDPE)

- Protective Geotextile (800g/m^2)
- Support Layer (0.3m sand/gravel, 0-40mm), with gas drainage incorporated (horizontal passive extraction system at IDS, vertical active high-dense extraction system at SWDS)
- Profiled Waste Material

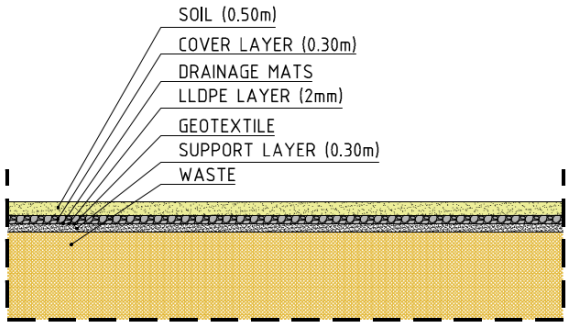

Figure 2.4 Total Overview Engineering Concept for Crest Base Case Cover Layer - IDS and SWDS

The design includes the recycling or re-use of waste, including their origin and availability to minimize environmental impact. In practice, this would consist of the excavation of parts of the landfill, the sieving of the materials to separate soil, and the crushing of construction waste for re-use on-site.

The topcover shall be vegetated, which as a minimum consists of grass covering the full surface of the soil cover layer. The composition of the soil cover layer and the climate conditions shall be considered for the selection of the type and seed density of the grass to be applied and the necessary preparation of the soil cover layer to ensure a swift rooting and growth; deep rooting (>0.3m) vegetation shall not be applied and preparation of the soil cover layer shall not be performed at a depth exceeding 0.2m from the top of the soil cover layer. The species to be seeded should be appropriate to the flora of Sint Maarten (i.e. be considered native and not introduce new or invasive species). The full surface covering vegetation shall be established with a matured growth within 13 weeks after the installation of the soil cover.

Landfill Gas Management

The feasibility engineering solution consists of a horizontal gas drainage incorporated in the support layer underneath the synthetic permeability barrier. A network of perforated HDPE gas drains (160mm) will be trenched into the support layer for gas relief to prevent accumulation. The network of perforated HDPE drains will be connected to a limited number of locations (3 at SWDS and 2 at IDS) that will pass through the entire build-up of the cover layer on the crest of the IDS.

The relieved gas collected through the passive horizontal drainage will be passed through a biofilter filled with compost material. Compost materials in general provide a high oxidation capacity for methane oxidation, thereby reducing the GHG emission. The biofilter should be designed for a volume of 900 m^3/d and 600 m3/d at respectively the SWDS and IDS with an oxidation rate of > 60 %.

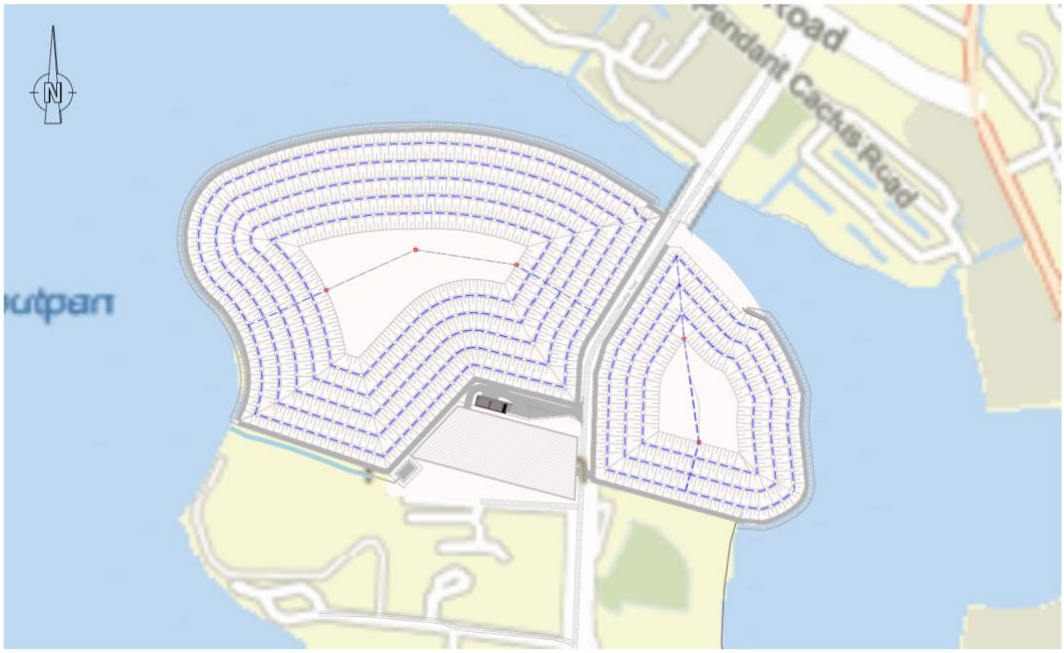

Figure 2.5 LFG network at SWDS and IDS

Figure 2.6 Visualization of biofilters

Leachate Management

With respect to the (uncontrolled) discharge of leachate from the MSWDS into the GSP, the feasibility design measures are based on the reduction of leachate generation. No leachate treatment for the existing SWDS and IDS is envisaged as the leachate disperses from the base of the waste body, and collection would not be technically and economically feasible.

Reduction of leachate generation is achieved through the installation of a permeability barrier in the cover layer upon closure of the landfill.

The engineering solution for the reduction of leachate generation is to be achieved by a synthetic permeability barrier to be incorporated in the cover layer upon closure of the MSWDS.

Figure 2.7 Permeability Barrier for Landfill Closure (Synthetic vs Mineral Barriers)

An engineering solution for the synthetic permeability barrier consists of a LLDPE liner (2 mm) as a synthetic permeability barrier. The selection of a LLDPE liner is based on its higher flexibility and lower puncture risk in comparison to a HDPE liner.

In order to install the LLDPE liner. the waste mass is to be covered by a support sand layer (0.3m). A geotextile is to be installed between the support layer and the LLDPE liner to reduce the risk of damage of the liner. In order to collect and discharge infiltrated storm water accumulated by the permeability barrier, a drainage system is to be installed above the LLDPE liner which is integrated with the stormwater management system (i.e. drainage mats).

The strokes of LLDPE liner need to be welded together using special equipment by qualified personnel and tested for strength after installation to ensure the functionality of the synthetic permeability barrier.

Anchoring of the LLDPE liner by means of a soil cover at the toe of the MSWDS is anticipated underneath the service road and integrated within the ring-dike structure surrounding the full boundary of the MSWDS.

Ring dike

Accessibility is achieved through the 4m wide ring-dike to be constructed along the boundary with the GSP as part of the engineering solution for the geological stability, in combination with a 4m wide service area is foreseen at the landside of the MSWDS. Both the ring-dike and the service area will have a gravel pavement (0.3m top layer). The slopes of the ring-dikes will be covered with the existing rock-armour and (cultivated) juvenile mangroves suitable for the salt conditions of the GSP.

The ring dike will be constructed from recycled aggregate from C&D waste or in case of insufficient volume of recycled coarse aggregate crushed stones. The ring dike will boast a gravel pavement consisting of Recycled Aggregate to increase material re-use.

In order to avoid erosion as a result of the stormwater run-off towards the GSP, a soil layer of 0.5m is to be constructed on top of the Base Construction at the slopes of the Ring Dike in order to allow for a natural development of general vegetation.
The slopes of the ring-dikes furthermore require erosion protection against waves and currents in the GSP to avoid excessive damage. A slope protection is applied in the Concept Engineering Design, which consists of the re-use of rock armour from the existing Ring Dike in combination with mangrove vegetation. The rock armour removed from the Ring Dike will be evenly distributed to form part of the slope protection. The mangrove vegetation to be installed is not solely intended for slope protection against waves and currents but is also intended as compensation for the loss of mangrove vegetation at the existing Ring Dike. A Mangrove Restoration is therefore anticipated consisting of planting juvenile (red) Mangrove with a density of 1 per 0.8 m^2 along the Ring Dike.

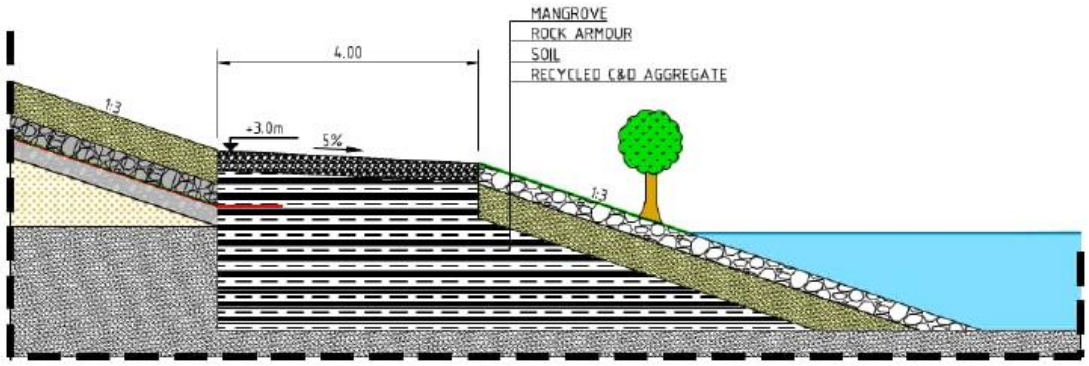

Figure 2.8 Ring dike cross-section with Stormwater gutter and maintenance road

Along the northern side of the SWDS and IDS, the ring dike will be moved slightly inland to limited blockage of existing culverts and encroachment of the Salt Pan structures. Figure 2.8 indicates these areas.

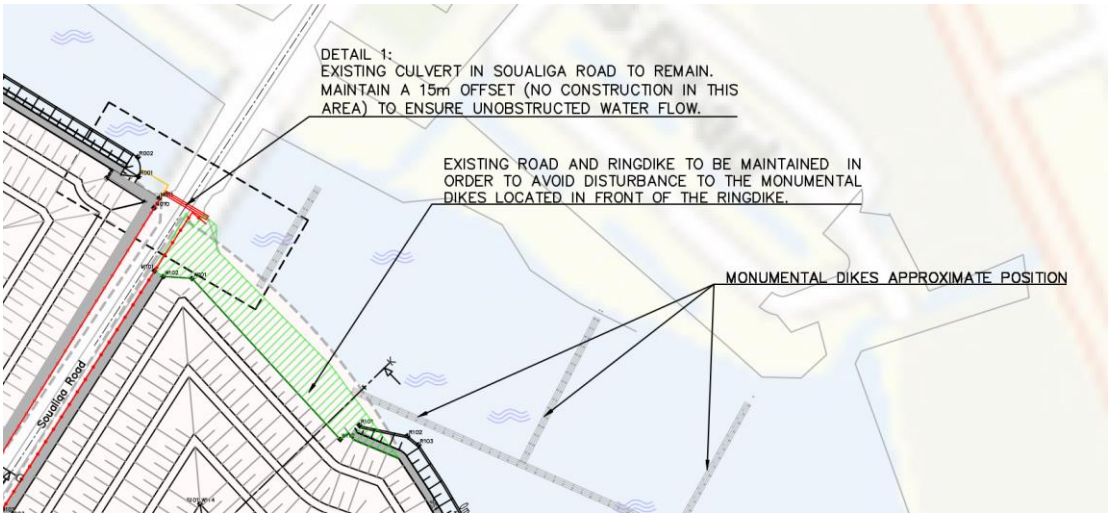

Figure 2.9 Details where existing ring dike shall be maintained

Irma debris disposal site recontouring and closure

No further waste disposal at the IDS is foreseen. The area currently used by Steel Crushers B.V. is needed to achieve the objectives of the project and hence, relocation of its activities to another suitable location (most probably the VROMI yard) is required. The existing waste mass will be reprofiled for stable slopes and levelled to a height of 24m. Based on August 2024 estimates and continued landfilling since, it is expected that no positive net-balance remains at the time of reprofiling. If a positive balance remains, the volume will be filled with construction and demolition wastes from the SWDS.

Slope regrading, Stormwater management, leachate management, landfill gas collection and treatment, ring dike and final capping for the IDS are identical to the SWDS.

Figure 2.10 Visualization of IDS Site Lay-out

2.1.2 Installation and operation of auxiliary operations

The current VROMI yard and set-back area will be made available for auxiliary operations closely associated with the landfill operations. This includes the operations of two commercial entities to be resettled in VROMI yard. Steel Crushers operates an End Of Life Vehicle and Scrap metal services, while Wind Ward Roads NV operates a crusher facility in the landfill and a temporary construction yard including separation and processing of construction wastes.

Steel crushers operates using a hydraulic crane with claw crusher for lifting heavy objects. A compactor then further reduces the volume of the metal wastes. The future facility of Steel Crushers should be equipped with collection area for waste oils that is installed inside a collection basin as well as soil protection facilities underneath the entire site. The mitigation measures described in the Hindrance Permit issued for this facility are applicable.

A high-performance, universal waste shredder is required for on-site shredding of diverse waste streams. The shredder shall be capable of handling a broad range of waste types including plastics, paper, glass, metals, wood, textiles, organic and yard waste, tires, bulky waste and light construction debris. Also required is a robust, high-capacity mobile jaw crusher engineered for demanding applications such as hard rock processing, and heavy-duty recycling. Its design emphases must be in robust construction and durability, in mobility, and ease of operation.
The shredder and jaw crusher will be operated by the landfill operator (VROMI). Both equipment is mobile and as such will be located at different points in the area, during the construction phase. It is expected, if still beneficial, this equipment will be relocated to the auxiliary operations area.

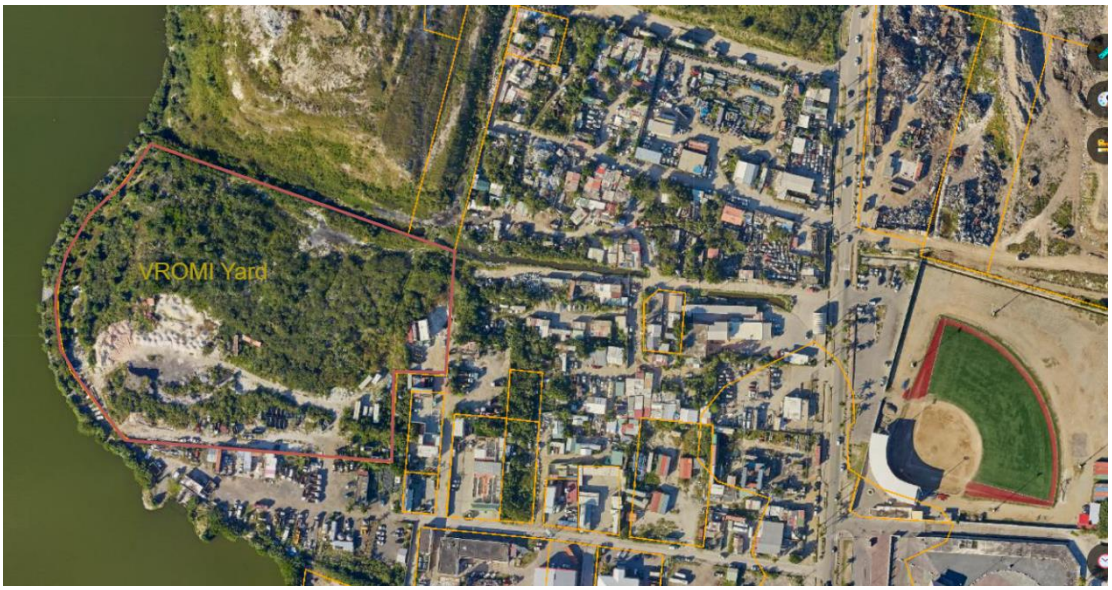

Figure 2.11 VROMI Yard

In order to further improve the operational performance, control and management of the landfill, a number of operational amenities and buildings are foreseen in the developed EHS Engineering Concept. These amenities and buildings are elaborated hereafter.

The access road will consist of an asphalt pavement, whereas all other internal transport routes and open areas within the set-back area will consist of 0.3m gravel.

2.1.3 Service Road

The accessibility along the entire boundary of the IDS and SWDS for future maintenance and fire fighting is ensured through the installation of a Service Road along the landside boundary of both the IDS and SWDS. The Service Road will be constructed bordering the toe of the IDS and SWDS with a minimum width of 4m and a 0.3m unbounded pavement filled in at prior excavated level below surface level, consisting of Recycled Aggregate. A pre-cast U-shaped concrete stormwater gutter will ensure collection and discharge of surface water run-off.

2.1.4 Fencing and gate

In order to avoid uncontrolled and/or unauthorized access to the MSWDS or project area, permanent fencing along the full land side perimeter of the waste management areas on both sides of Soualiga Road, i.e. SWDS, IDS (including the area currently occupied by Steel Crushers), RAI, and VROMI yard will be fenced., with a fence height of 1.8m. In order to ensure maintaining a controlled access to the MSWDS, an access gate shall be installed at the entrances of both the IDS and SWDS with a total gate width of 8 m.

2.1.5 Temporary Contractor Yard

To facilitate Contractor with the execution of the scope and for the location of a temporary Employer's Office Facility, Employer will allow Contractor to use an area of land immediately south of the entrance of the SWDS with a size of approximately 16,000 m2. Contractor can use the temporary Contractor Yard for the temporary location of its office facilities, storage of equipment and material, production and stockpiling of recycled aggregates from C&D Waste, etc.

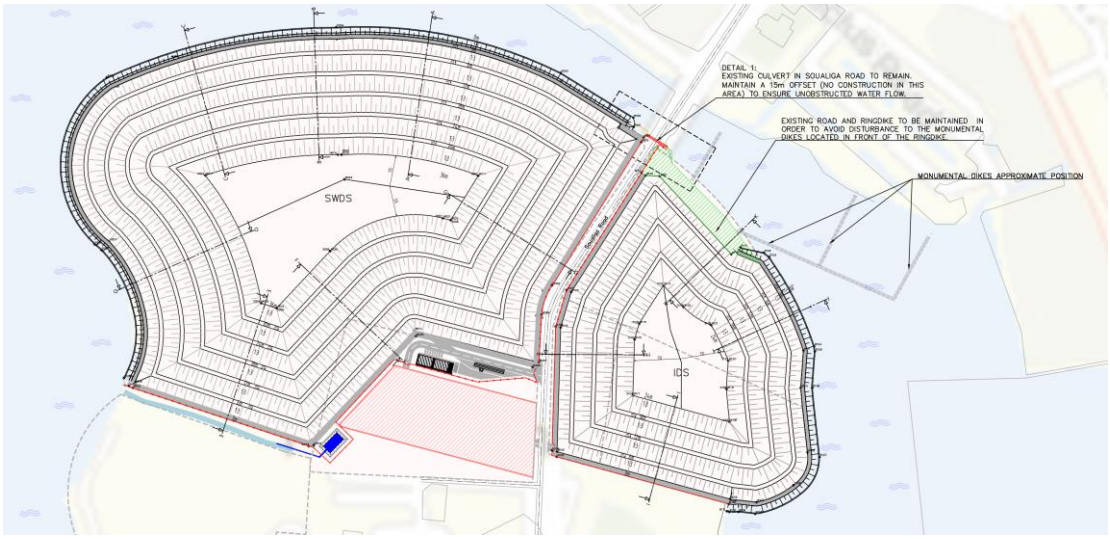

Figure 2.12 Location of Temporary Contractor Construction Yard (indicated in red)

2.1.6 Production of recycled aggregates

Recycled Aggregates are to be recovered or produced from excavated C&D Waste (e.g. sand, soil, bounded ceramic material) deposited at the MSWDS. The C&D Waste shall be sieved and crushed in order to meet the required particle sizing for the different types of construction applications; contamination of bounded non-ceramic materials shall be removed prior to the crushing. This will be done using (mobile) machinery positioned with the current MSWDS boundaries and-/or contractor yard based on future location and needs. Apart from the C&D aggregates for construction purposes under the DB Contract, an additional volume of 3,700 m^3 of shredded aggregates from waste tires deposited at the SWDS shall be produced for their application in the LFG drain trenches

2.1.7 Estimated labour requirements

The estimated labour requirements for the construction phase are approximately 10,000 work days over a period of around 7 years. Main labour would be in the following activities:

- Operators of compactors, cranes, bulldozers – 8,000 work days
- Supervisors, Environment, Social, Health and Safety (ESHS) management – 2,000 work days

Most labour will likely be sourced locally, partially through the current landfill contractor subcontractors. Some international staff is expected to come to the island for the project.

3 Government Regulations and World Bank Group's Operational Guidelines

The island of Sint Maarten, an autonomous country within the Kingdom of the Netherlands, is located in the Caribbean Sea. Sint Maarten achieved country status and self-governing power through reforms in 2010. Sint Maarten is *not* an independent State, instead, the Kingdom of the Netherlands is considered the "State", and it is therefore not a Member State of the European Union (EU). Instead, Sint Maarten only enjoys an associated status to the European Union (EU) as an Overseas Country and Territory (OCT) under the Lisbon Treaty and is not directly subject to EU law. The ESIA document contains a detailed overview of the relevant government regulations.

Main points of attention are:

- Air quality is regulated based on standards set by the Working Group on Environmental Standards Netherlands Antilles (WMNA)
- Surface water, wastewater standards are prescribed in in the **Eindrapport Milieunormen Nederlandse Antillen**
- Maximum noise levels are established based on area type and time of day, as outlined in the **Eindrapport Milieunormen Nederlandse Antillen**, with specific limits for urban and rural settings
- The Great Salt Pond is designed as a National Monument

3.1 Additional Operational Guidance

Activities will be completed in general accordance with Sint Maarten provisions and provisions derived from the United States Occupational Safety and Health Administration (OSHA), Dutch legislation or comparable EU legislation:

- Health Safety and Environment: https://www.crow.nl/Onderwerpen/Arbo-en-Veiligheid/ or 1926 | Occupational Safety and Health Administration
- Debris reduction, recycling and disposal: https://www.osha.gov/etools/hurricane#index
- Scrap metal recycling: Basic Steel Products - Standards | Occupational Safety and Health Administration
- OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Activities: https://www.osha.gov/emergency-preparedness/hazardous-waste-operations
- Planning for natural disaster risks: US EPA Guidance about planning for Natural Disaster Debris
- IFC, Environmental, Health and Safety Guidelines: Environmental, Health, and Safety Guidelines

3.2 World Bank Safeguards Policies and World Bank Group Environmental Health and Safety and Sectoral Guidelines

This project has been classified as a Category A project, as documented in the ISDS. Based on early scoping of the project by World Bank environmental and social specialists, the following World Bank safeguards policies are triggered:

The World Bank Operational Policies triggered by this project are:

- Environmental Assessment (OP/BP 4.01)
- Natural Habitats (OP/BP 4.04)
- Pest Management (OP/BP 4.09)
- Physical Cultural Resources (OP/BP 4.11)
- Involuntary Resettlement (OP/BP 4.12)

Projects on International Waterways (OP/BP 7.50) is not seen as relevant as this specific part of the project does not involve any offshore components.

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 about the Project's activities, its environmental and social potential impacts and mitigation measures. Feedback received during the public consultation on September 3rd, 2025 and questions received following this consultation have been incorporated in the final version of this ESMP. Annex 1 of the ESIA, contains the full overview of the presentation and questions and answers, questions and answers can also be found on the NRPB website through this link.

During Project implementation, the NRPB will report on compliance with the measures agreed with World Bank including implementation of the ESMP, ARAP, including LRP, grievance mechanism, etc.

3.2.1 The World Bank Group's Environmental, Health and Safety Guidelines (EHSGs)

The World Bank Group Environmental, Health, and Safety (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 EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Specific reference is made to the EHS guideline for Waste Management Facilities:

3.2.2 Sectoral Guidelines Applicable to the Project: Waste Management Facilities

The EHS Guidelines for Waste Management encompass facilities or projects focused on the management of municipal solid waste and industrial waste. This includes aspects such as waste collection and transport, waste receipt, unloading, processing, and storage, landfill disposal, physico-chemical and biological treatment, as well as incineration projects. Additionally, industry-specific waste management activities, such as those pertaining to medical waste, municipal sewage, cement kilns, and others, are included in the relevant industry-sector EHS Guidelines. These guidelines also address the minimization and reuse of waste at the source. This industry sector EHS guideline is intended to be used in conjunction with the General EHS Guidelines document, which offers guidance on common EHS issues that may apply across all industry sectors. Link to guideline.

4 Baseline Environmental and Social Conditions

4.1 Regional setting

Sint Maarten is a constituent country of the Kingdom of the Netherlands situated in the Northeastern Caribbean. It is geographically divided into two parts, with the southern half known as the Dutch part of the island, and the northern half known as the French Collectivity of Saint Martin. With a population of over 40,000, Sint Maarten is the most densely populated country in the Caribbean. The island is a popular tourist destination and play a regional role as a well - frequented stop for cruise ships and air transportation hub through Princess Juliana International Airport. The tourism industry plays a pivotal role in the island's economy, providing employment for the majority of the workforce.
The capital of Sint Maarten is Philipsburg, located on a narrow strip of land between Great Bay and the Great Salt Pond (GSP). Inside the GSP is a man-made Island; Pond Island which is connected with two bridges to the mainland. Pond Island is approximately 48 hectares in size and houses, in addition to the Municipal Solid Waste Landfill Site and Irma Disposal Site, commercial buildings, government offices, a baseball stadium, festival centre and the University of St Martin. Based on the fire and structural assessment of SWDS/IDS Sites, the informal residential area immediately south-east of the MSWDS slope was identified as the resettlement area of impact (RAI) and has been relocated due to safety concerns. Directly South of the RAI, just outside of the project area, additional housing is present, both permanent and in containers.

Figure 4.1 Map depicting the layout of the project area and the regional setting

4.2 Geohydrology

Groundwater table on Pond island varies in relation to the elevation of the landfill and the water level in the GSP. The GSP receives sewage and stormwater runoff from surrounding neighbourhoods and roadways as well as drainage and storm water from the Fresh Pond which drains into the GSP.

There are no liner system, leachate system, or stormwater controls in place at Pond Island resulting in stormwater runoff and discharge from Pond Island into the Great Salt Pond as well. Water from the GSP is periodically discharged into the Great Bay via the Rolandus Canal, which is located to the east of the GSP that drains into the Great Bay to the south of Philipsburg. Great Bay has an active beach/recreational use area.

4.3 Climatology

The island of Sint Maarten exhibits a marine climate, classified as "Am" according to the Köppen classification scheme. This climate is characterized by distinct dry and rainy seasons, with the dry season occurring from January to April and the rainy season from August to December. The prevailing winds in the region are from the east to northeast, with moderate to fresh intensity.

Showers can be a common occurrence during the late afternoon, particularly during the summer months when they are limited and of light intensity. However, as autumn approaches, showers become more frequent and can be moderate to heavy, often accompanied by thunderstorms.

The average temperature on the island remains tropical, hovering around 27 °C throughout the year, with August being the warmest month.

The seawater surrounding the island maintains an average temperature of approximately 27.2 °C. Skies are generally clear to partly cloudy, providing ample sunshine. Wind speeds at an elevation of 10 m above ground level consistently average around 9 m/s, with a prevailing direction from the east to northeast.

According to climatic records, the hurricane season on Sint Maarten spans from June 1st to November 30th, with the peak season occurring from August through October. Being situated within the Atlantic hurricane region, the island has experienced the passage of 64 hurricanes within 120 nautical miles on either side of its location, based on data spanning from 1851 to 2009.

For the project climate data from Princess Juliana International Airport was requested for the period January 2019 – December 2023. During this period no major hurricanes were registered in the climate data.

Table 4.1 Climate data based on weather station at Prinses Juliana Airport for January 2019 till December 2023

	Average precipitation (mm/month)	Daily maximum precipitation (mm)	Average Max T (Celsius)	Average Min T (Celsius)
January	65.30	21.30	29.23	23.61
February	51.86	16.70	29.10	23.42
March	36.12	16.90	29.38	23.85
April	26.72	11.00	30.08	24.56
May	39.78	30.30	30.97	25.81
June	48.48	24.00	31.63	26.55
July	90.36	71.80	31.90	26.78
August	112.34	84.20	32.30	27.04
September	93.96	44.50	32.50	27.08
October	178.16	105.80	31.83	26.32
November	100.62	76.60	30.88	25.48
December	68.52	30.10	30.15	24.49
Total	**912.22**	**105.80**	**30.83**	**25.41**

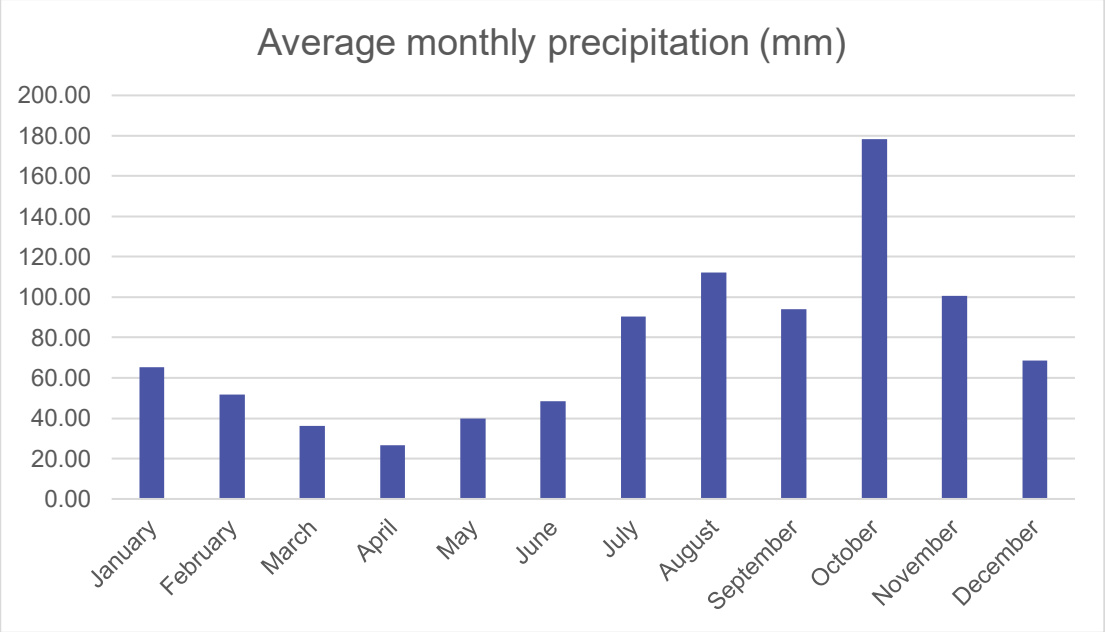

Figure 4.2 Average monthly precipitation (Data from January 2019 – December 2023 – Princess Juliana Airport Sint Maarten)

4.4 Ambient Air Quality

4.4.1 Dust, Air Quality and Landfill gas

Site reconnaissance of the SWDS and IDS Site, and surrounding neighbourhoods, conducted by EE&G in 2017, 2018, and 2019, revealed that dust control practices were minimal. Dust was most visible at work/landfilling locations and on vehicular roadways. Excavation of burnt wastes particularly generated dust (Environmental Field survey Report, R002-1293149ABR-V03-mvg-NL, Witteveen+Bos and TAUW, November 28th, 2024).

EE&G performed a preliminary air quality screening of smoke and fumes from subsurface fires at the SWDS/IDS Sites in January 2020. In addition, the Environmental Incident Service (MOD) of the Dutch National Institute for Public Health and the Environment (RIVM) measured the air quality around the SWDS/IDS Sites at Philipsburg, Sint Maarten for two weeks in 2019. No specific information on landfill gas generation was available.

The EE&G study found that Contaminants of Concern (COC) were found to exceed occupational exposure levels (OELs) within smoke fumes emanating from fissures on the MSWDS at a height of 1,5 meters above the fissure, and particulate levels, exceeding Occupational Exposure Levels (OELs), were found in the cabs of equipment and upwind of smoke fumes. As this study was focussed on landfill fires, the results are not representative of a steady state situation where regular landfill activities are taking place.

Although the report of the Environmental Incident Service (MOD) of the Dutch National Institute for Public Health and the Environment (RIVM) did measure heightened concentrations of aluminium,

Chromium and PAH in the air, they indicated that this is most likely associated with heavy traffic rather than due to the presence of the landfill. The MOD measured during a period when no landfill fires were present.

4.4.2 Underground Fires

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 SWDS. The hot spots observed on the northwest of the SWDS were located approximately 180 m northwest of southwest boundary by the stormwater drainage channel; the hot spots located on the southeast were approximately 60 m west of boundary next to the then present adjacent residential area. This was 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.

4.4.3 Landfill Gas Estimates

The methane generation at the MSWDS at Philipsburg Sint Maarten was calculated by using the IPCC model (first-order decay). Based on the calculations the current (2024) yearly methane generated in the landfill is around 1,453 tonnes of CH_4 and the peak of CH_4 generation will be reached in 2027 with 1,593 tonnes of CH_4. For more information, please refer to Methane gas model calculations for the MSWDS, Philipsburg, Sint Maarten, TAUW note N002-1293149ABR-V01-rlk-NL, d.d. January 15th, 2025.

4.5 Ambient and Receiving Water Quality

On July 22, 23, and 24, 2012, the Sint Maarten Nature Foundation conducted water quality assessments at eight locations across the island. The purpose of these tests was to evaluate the water quality for recreational bathing at swimming beaches and to assess the overall water quality in various bodies of water throughout the island.

The analysis revealed that Simpson Bay Lagoon, Simpson Bay Beach, Mullet Pond, and Great Bay exhibited medium levels of both phosphates and nitrates in the collected samples.
The elevated concentrations of nitrates and phosphates indicate the potential presence of various pollutants and sewage, which may lead to algal blooms and mortality events.

Additionally, it was observed that Simpson Bay Lagoon, Simpson Bay Beach, Mullet Pond, and Great Bay had low levels of nitrogen. The highest concentration recorded during this study was in the Great Salt Pond, measuring 6 parts per million (ppm).

4.5.1 Ground Water Table Condition of the Study Area

Groundwater and leachate measurements were conducted on August 16, 2024, and the results are presented in the Environmental Field survey Report (R002-1293149ABR-V02-mvg-NL, nov. 2024).

In the study, various monitoring wells were tested, and it was observed that the groundwater levels varied, with some wells showing no presence of leachate or groundwater. pH levels mostly ranged between 5.86 and 7.54, generally staying within the normal range (6.5-8.5), except for some deviations.

EC values were elevated across all samples, with values reaching up to 20,000 µS/cm. This is significantly higher than the normal threshold of 2,500 µS/cm. Turbidity levels were also elevated, exceeding the normal limit of 10 NTU, likely due to floating particles in the groundwater.
Most groundwater samples showed temperatures above the normal threshold of 30°C, with some reaching as high as 43.1°C of wells inside the landfill body. These elevated temperatures suggest a significant influence of leachate from the landfill and biological activity inside the waste body.

The elevated EC is attributed to the groundwater's connection with the GSP, which contains brackish water. Interestingly, when leachate presence was higher, EC values are lower as this shows presence of freshwater inflow. Unlike other parameters, pH did not conclusively indicate the presence of leachate, as it remained relatively consistent across samples.

The study reveals significant contamination of groundwater by leachate from the landfill, as indicated by elevated electrical conductivity, turbidity, and temperature readings as well as laboratory analysis. Samples tested against the target values for wastewater treatment plants BOD and COD, Total Coliform and E. Coli are elevated in all of the monitoring wells. Nitrogen and Phosphorus are elevated in a limited number of monitoring wells. Where leachate was present, concentrations of heavy metals was above target levels.

Leachate generation and interchange with surrounding GSP
Due to the presence of highly permeable beach sands below the landfill, it is expected that there is a strong interchange between the leachate/groundwater and the GSP. Thick clay layers at greater depth will limit vertical migration of the contaminated leachate. As such leachate outflow is expected to occur around the entire landfill. Preferential pathways can be present but have not been specifically detected.

The actual volume of leachate is estimated between 91.000 – 133.000 m^3/year. The leachate ranges between 50 and 74% of the total incoming precipitation.

4.5.2 Great Salt Pond Surface Water Quality

A bathymetric assessment of the Great Salt Pond was completed by the University of South Florida Water Institute in October 2019, which is summarized below:

- Perimeter – 8,555 meters
- Area – 282.9 Acres (114.5 hectares – excluding Pond Island)
- Mean depth – 0.77 meters
- Volume – 712.8 Acre-ft (232,267,344 gallons)
- Deepest point – 1.48 meters

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. In addition to leachate coming from the landfill, there is evidence of discharge of sewerage from the surrounding areas.

Surface water sampling of the Great Salt Pond was performed in October 2019 (Gallagher Basset Technical Services (GBTS), January 13th, 2020). The purpose of the surface water assessment was to establish baseline conditions in the Great Salt Pond prior to the initiation of activities aimed at suppressing the sub-surface fires at the MSW and Irma Debris Site.

To establish baseline water quality conditions within the Great Salt Pond prior to the initiation of fire suppression activities, a total of 18 samples were collected from 8 discrete locations (13 samples from the surface and 5 'deeper' samples collected from the bottom 0.45 meters of the pond's water column). At each sampling location, measurements of field parameters and representative water samples were collected from both the surface and the bottom of the water column. See the figure below for a map depicting the sampling locations.

Figure 4.3 Surface water sampling locations

None of the analysed samples were found to contain elevated values in excess of the compounds listed in the EU's Maximum Allowable Concentrations (MACs) established in the Directive 2008/10/EC Annex 1, except for PAH compounds anthracene, fluoranthene and benzo(a)pyrene.

A review of the field readings showed that there are typically low dissolved oxygen levels at just 1 m below surface. Given the levels of COD noted in the analytical results and the high turbidity at depths, the general water quality appears to be poor and likely the main influence in the fish kills observed during the site reconnaissance.

4.6 Ambient Noise

No ambient noise studies were available. The noise on Pond Island is affected by a wide variety of activities. The existing facilities on the MSWDS will generate noise. As part of other NRPB procurement, rock crushers have been requested. Maximum noise levels were up to 90 dB(A) at 10 m distance with other equipment at lower noise levels of 71 and 70 dB(A) at 10 m distance A metal recycling facility or scrap yard can result in a maximum noise pressure up to 90 dB, with an average noise level in the order of 80 dB.

4.7 Biological Environmental of Sint Maarten

A significant portion of Sint Maarten is characterized by secondary vegetation, which arises from seasonal formations or dry evergreen formations. Original semi-evergreen seasonal forests are predominantly found atop the hills, though these formations have become exceedingly rare in the region. Due to their limited area, these forest formations are particularly vulnerable.
In the elevated areas of the two central ridges and the eastern ridge, dense secondary woodland vegetation thrives, effectively preventing erosion and providing substantial scenic value. Coastal areas are home to remnants of mangrove forests and various types of coastal vegetation, which hold considerable ecological, aesthetic, and recreational significance.

The fauna of Sint Maarten is relatively limited in species diversity, a consequence of the island's small size, habitat destruction, hunting practices, the introduction of non-native predators, and the impact of hurricanes.

4.7.1 Great Salt Pond Site and Pond Island Biological Environment

The Great Salt Pond is a 1.65 square kilometre saltwater pond historically used for salt production. Pond Island is a man-made island on the southeast side of the Great Salt Pond, prior to the current configuration the areas consisted of salt pans.

Pond island was reportedly created through the infilling of the salt pans with dredged materials from the port and/or soil and rock from a nearby hillside and quarry. This infilling started in the mid 1960's/early-1970s. Based on the soil profiles available, a significant part of the infilling of Pond Island in the landfill area was done with coarse beach sand. The current configuration of Pond Island was established in approximately 2011 when the west-central portion of the island was filled in.
The terrestrial species diversity around the SWDS/IDS Sites and the Great Salt Pond is relatively low, with only a limited number of species contributing to the canopy structure.

Four mangroves species are found around the Great Salt Pond: Rhizophora mangle (Red Mangrove), Avicennia germinans (Black Mangrove), Laguncularia racemosa (White Mangrove), and Conocarpus erectus (Buttonwood). The total shoreline length of the Great Salt Pond, most of which is covered with Mangroves is approximately 8,5 km.

Figure 4.4 mangrove vegetation along Pond Island

One hundred and seventy species of birds can be found in or around the GSP, of which 47 are resident and nesting birds, and 123 are migrants and non-nesting visitors[3]. There are no endemic bird species on Sint Maarten since birds can move easily between the islands, and there is a lack of habitat on Sint Maarten, particularly undisturbed forest. The Great Salt Pond is recognized as an Important Bird Area (IBA). This IBA is significant for its population of Laughing Gull Larus atricilla. Up to 5,800 gulls congregate at the IBA prior to the breeding season. About 50 pairs of Black-necked Stilt Himantopus mexicanus breed—the only species confirmed to do so within the IBA. This bird nests during the spring on mudflats and on the remaining stone walls that separate the salt pans on the Great Salt Pond.

Knowledge regarding the composition, distribution, and density of aquatic fauna and flora in the Great Salt Pond wetland is limited. The invasive tilapia or Nile perch (O. niloticus) appears to be the dominant fish species in the wetland, followed by Mullet and Tarpon. Algal presence in the wetland has also been noted, although detailed information remains scarce.

[3] Brown, A. C. & Collier, N. (2006). New bird records from Anguilla and St. Martin. Caribbean Journal of Ornithology

4.8 Description of the Environment and Social Context

4.8.1 Economy of Sint Maarten

Sint Maarten is recognized as a high-income constituent country within the Kingdom of the Netherlands, located in the Caribbean with an estimated per capita Gross Domestic Product (GDP) of USD 25,381. The tourism sector and related industries serve as the principal source of employment for the populace. Approximately 10% of the land is deemed suitable for domestic agricultural production, leading to a reliance on imports for over 90% of food products. Nearly 30% of the male working population and 45% of female workers earn less than ANG 2,000 (USD 1,200) per month. The literacy rate among individuals aged 14 and older stands at 95.8%.

Hurricane Irma inflicted severe damage on the nation's economy. Following the hurricane, Sint Maarten's low unemployment rate of 6.2% and youth unemployment rate of 23.8% in 2017 experienced a significant increase due to the closure of tourism-related businesses. The tourism sector faced extensive damage to the airport, accommodations, and tour operator equipment, leading to a dramatic decline in tourist arrivals. Furthermore, micro, small, and medium-sized enterprises suffered substantial losses in capital as a result of the hurricane's impacts.

4.8.2 Demographics of the Project Affected Area

In 2024 RAI was completely vacated as such there is no residential area remaining in this part of Pond Island. For further reference see the Resettlement Action Plan (RAP) (August 2022) and the corresponding section in the document Environmental and Social Impact Assessment – ESIA (Jan 2023 - https://nrpbsxm.org/wp-content/uploads/2023/02/ESIA-Landfill_-Jan23-compressed.pdf). Directly south of the project area, a small housing area remains. This consist of containerized houses as well as regular houses (see Figure 4.1). The houses in this area do not have ownership or long lease of the land, which is owned by the government of Sint Maarten.

4.8.3 Existing Traffic Patterns

Soualiga Road serves as the only access road for the SWDS/IDS Sites. It runs in a north south direction across Pond Island separating the SWDS and IDS. Entrances to the SWDS Site from Soualiga Road are through a small narrow dirt road (Brine Drive) and an unnamed dirt road, respectively. There are no alternative roads that could be used during an emergency should Soualiga Road become unusable. Typically, the traffic laws/controls focus on adherence to the Traffic Ordinance. The traffic law restricts truck delivery of supplies from 6:30 AM to 8:30 AM and from 12:00 PM to 2:30 PM. The restriction applies for Soualiga Road every day except Sunday. This restriction is not enforced as the traffic counts indicate a presence of (waste) trucks during these hours, with the highest numbers of trucks between 07:00 and 10:00.

A traffic assessment was executed on Soualiga road at the Southern end of the exit of Brine Drive. The Traffic assessment was done over a period of 2 days;

- 7.00 AM till 12:00 PM on Thursday August 15th, 2024
- 12:00 PM till 5 PM on Friday August 16th, 2024

In total 2895 vehicles passed the control point in the direction of Philipsburg, and 2164 vehicles passed the control point travelling from Philipsburg. Main traffic was in the morning and late afternoon hours, likely associated with commuter work to the government offices on Pond Island.

Table 4.2 Cummulative Traffic assessment on Soualiga road

From	To	Cars, pick-up trucks, motorbikes	Regular trucks	Waste trucks	Other vehicles
07:00	08:00	570	5	22	1
08:00	09:00	545	15	15	0
09:00	10:00	443	4	25	1
10:00	11:00	399	10	13	0
11:00	12:00	356	3	17	0
12:00	13:00	449	3	8	3
13:00	14:00	561	7	3	1
14:00	15:00	485	7	3	0
15:00	16:00	472	2	6	0
16:00	17:00	595	5	5	0
	Subtotal	4875	61	117	6

4.8.4 Social Baseline – Affected Entities

The following external parties will be affected by the landfill works:

- Steel Crushers B.V. – operating a facility for collection and scrapping of metals (mainly cars). Operating under a Long Lease of plot 192/2017
- Windward Roads (WWR) B.v. having a facility within the main SWDS. This facility is not formalized (no official land lease is present)
- Sint Maarten Soccer Association, holding a long lease of plot 190/2016 on the IDS side. This plot has been used for landfilling since Hurricane Irma

Steel Crushers Bv holds a lease till 17-12-2028. Windward Roads B.V. has a verbal agreement with the Government, which is well-recognized by both parties. The location of the mentioned facilities is indicated in Figure 2.1. The two businesses will be relocated to the VROMI yard. Considering their business profile, with generation of noise and dust, the VROMI yard has a strong preference above relocation to the former RAI area as this is much closer to the remaining residential area. The Sint Maarten Soccer Association will be provided with replacement land by the Government.

Waste pickers at the landfill were compensated by RAP implementation and provided transition measures, including skills training, internship, job placement support, and immigration support, under the livelihood restoration plan (LRP).. Despite these measures, there are still waste pickers active at the landfill despite upgrade of access restrictions.

Based on the anticipated updated activities, especially concerning the slope recontouring and re-profiling activities where large volumes of soil need to be moved, an updated red and yellow zone has been established. These are presented in Figure 4.5 and Figure 4.6.

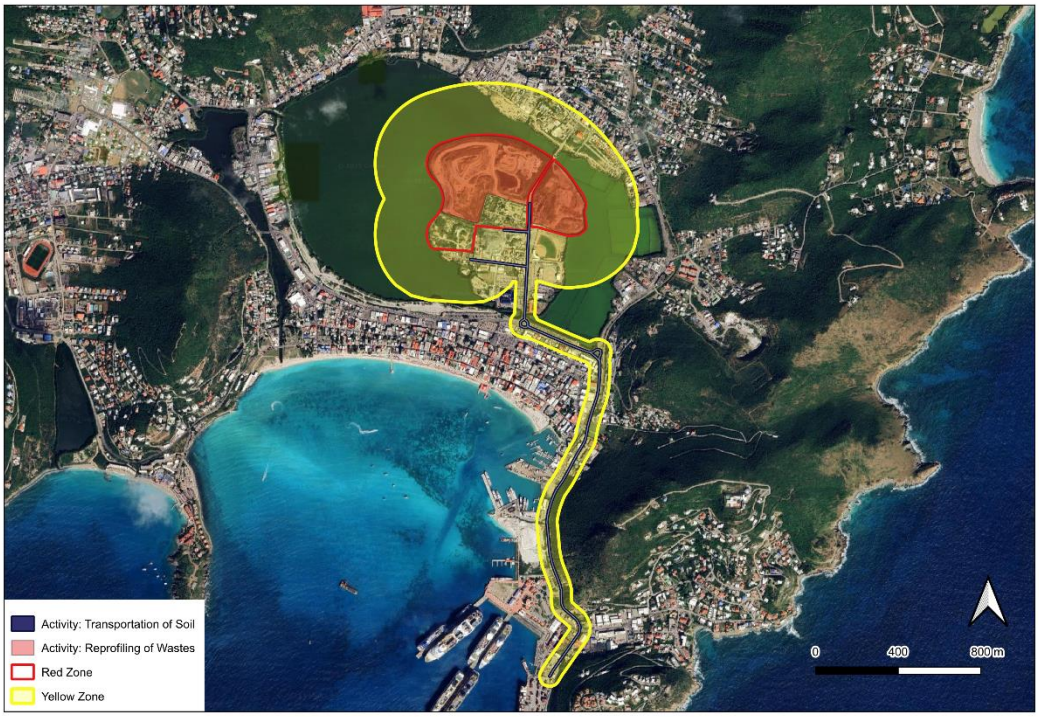

Figure 4.5 Updated red and yellow zones based on activities

Figure 4.6 Red and yellow zone on Pond Island

4.8.4.1 Community Social Baseline of the New Yellow Zone/ Impact Zone by the Landfill Work

The southern half of Pond Island is comprised of mixed commercial/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, Post office, numerous bars/restaurants, a brothel, vehicle inspection building, scrap yards, a pump house facility, GEBE electricity substation, Sint Maarten Festival Village Turning Point, Safe Haven, parking lots and residences.

Figure 4.7 Map with the Extent of the Different Alternatives and Receptors

Significant quantities of soil are needed for the final cover of the IDS and SWDS. The limited sources available on-island will require import from external sources. Imported soil will be shipped to Sint Maarten and transported with lorries from the Port of Sint Maarten to MSWDS. An increase in traffic, including heavy lorries is expected along Juancho Yrausquin Blvd, Walter A. Nisbeth Road between Juancho Yrausquin Blvd and the roundabout with Soualiga Road and the western side roads of Soualiga Road (unnamed) on Pond Island. The route passes mostly over the main road, past mixed commercial and residential areas. The following specific sensitive receptors are present along the roads:

- Sundial middle school at the corner of Juancho Yrausquin Blvd and Walter A. Nisbeth Road
- University of Sint Martin along Soualiga Road

In addition to the mentioned educational facilities, various government and sports facilities as well as the vehicle inspection office are present along the route. The route is also used extensively by tourist arriving by Cruise ship to Sint Maarten.

5 Environmental and Social Risks, Impacts and their Management

This chapter addresses the identification of environmental and social (E&S) related risks and outlines actions to mitigate potential negative impacts. The most significant impacts identified include:

- Physical and Economic displacement
- Air Quality
- Roads and Traffic
- Noise
- Geology and Soils
- Hydrogeology, hydrology and surface water quality
- Ecology
- Worker Health and Safety
- Public Health and Safety
- Aesthetic
- Archaeological, Historic, and Cultural Heritage
- Natural Disaster Risk
- Operation phase impact – VROMI yard

The environmental and social impacts of project activities, along with the mitigation measures aimed at avoiding, reducing, or minimizing these impacts and risks, as well as associated responsibilities, are presented in greater detail in the subsequent tables, chapters, and annexes.

5.1 Summary of Key Mitigation Measures

This section summarizes the essential mitigation measures suggested to tackle the environmental and social impacts of the project. Further details can be found in the following chapters and in Appendix 2. Appendix 2 also contains the mitigation and monitoring actions for the operational and closure phases, noting that these are likely not part of the DB contractor scope but will possibly interact with the mitigation measures implemented during the construction.

5.1.1 Social Impacts

The following potential specific social impacts as a result of the SWDS and IDS Landfill management project have been identified;

- Relocation of two entities (Steel Crushers Bv and Wind Wards Roads B.V.)

Two companies active in the area will need to be physically re-located as the future design of the area cannot include their facilities. The facilities include Steel Crushers B.V. – operating a facility for collection and scrapping of metals (mainly cars) and Windward Roads B.v. having a construction waste processing facility within the main SWDS. The activities of both facilities are closely connected to waste management and recycling.

For Steel Crushers Bv, the Irma debris disposal site recontouring and closure will require relocation of their business. The facility of Windward Road B.V. on the SWDS is currently not

formal and will need to relocate due to the planned SWDS Slope recontouring and closure including slope stability improvement.

The Sint Maarten Soccer Association has a long lease of a part of the IDS. This area has been used for landfilling since 2017 and the anticipated Irma debris disposal site recontouring and closure will lead to an end situation of the area where use for sport activities is no longer feasible.

Pending final agreement, mitigation measures for Steel Crushers B.V. include;
- Provision of alternative long lease hold in the direct vicinity of the MSWDS (VROMI-yard)
- Compensation for temporary loss of income during period of moving
- Allowance for dismantling, transportation and rebuilding of structures and assets
- Compensation for loss of income following relocation as part of livelihoods restoration

Pending final agreement, mitigation measures for Wind Ward Road B.V. include;
- Provision of a rental or similar agreement in the direct vicinity of the MSWDS (VROMI-yard)
- Compensation for temporary loss of income due to the move
- Allowance for dismantling, transportation and rebuilding of structures and assets at VROMI Yard
- Compensation for loss of income following relocation as part of livelihoods restoration

The impacts for these economic operators are being assessed by an independent firm through a social and economic assessment.
Pending final agreement, Mitigation measures for Sint Maarten Soccer Association B.V. include;
- Provision of long lease for an alternative facility

VROMI is in discussion with the two businesses and the Sint Maarten Soccer Association. Depending on the outcome of discussions and based on the information collected by the socioeconomic survey by an independent firm. NRPB will prepare and implement an abbreviated Resettlement Action Plan (A-RAP), including a Livelihood Restoration Plan (LRP).

Despite the transition measures were offered to wastepickers, they are operating in the landfill and can face safety risk if adequate measures are not in place. The contractor in coordination with VROMI will implement measures to prevent wastepickers from being present on site due to safety risks related to active works.

5.1.2 Air quality, odour and dust

Reprofiling the landfill, recycling of aggregates and transporting soil and rock to the landfill mass will be significant sources of dust and various air pollutants, chiefly consisting of particulate matter (PM) and lower concentrations of volatile organic compounds (VOCs), and greenhouse gases.

In addition, during construction phase of the re-profiling and re-contouring there is an increased risk of fires as oxygen levels in various waste layers will increase when exposed to outside air.

This might increase potential inhalation and skin contact hazards to the contractor, government and landfill contractor employees working at the SWDS and IDS Site.
The re-profiling and re-contouring methods chosen, as well as the associated fire suppression activities will impact the magnitude of the potential air emissions exposure scenarios.

Air quality mitigation measures include a number of general actions and actions for specific environmental impact. Mitigation measures to minimize the impact of air emission during construction activities would include the following:

- Maintain all construction equipment in accordance with manufacturer's specifications
- Schedule construction and rehabilitation work during main working hours (07 – 19) and to minimize activity during weekends, holidays, etc
- Develop and implement a Construction Communications Plan to inform businesses and residents of construction activities
- Limit idling of equipment and machinery when not in use
- Implementation of the Environmental, H&S Monitoring Plan to monitor air, water, soil emissions during construction works (see chapter 7)

Specifically for dust (including visible dust, PM10) the following additional measures are required:

- Suppress dust as needed in unpaved areas, by watering, putting gravel or other means.
- Suppress dust during excavation, recycling of aggregates and recontouring by limiting excavation and recontouring area
- Suppress dust during excavation recycling of aggregates and recontouring by use of water vapor cannons
- Cover truckloads with soil with tarpaulins or other means when transporting materials off-site
- Cover depots/stockpiles during periods of inactivity and/or high winds where feasible
- Providing wheel wash facilities or other suitable alternatives to clean before vehicles leaving the site
- Provide all landfill site workers and operators with the appropriate PPE such as FFP3 dust masks, safety goggles

Figure 5.1 Dust suppression cannon (left) picture source: https://www.tecpro.com.au/product/v22-dust-controller/ and wheel wash facility (right) – picture source (https://www.agg-net.com/resources/articles/loading-hauling/wheel-washers)

For smoke and fires the following additional mitigating measures are foreseen:

- Implementation of a fire suppression strategy during construction works including on-site manual and/or automatic fire protection installations
- Cease work if fire breaks out, or if significant smoke formation occurs in the operational area
- Cease work if wind direction and speed are detrimental to safe management of emissions risks during fire suppression activities
- Draft and Strict adherence to the Site-Specific OHS manual (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
- Maintain direct communications with the Fire Department to ensure quick actions in case of fire outbreak
- For operations within 20 meters of the tire pile, fire prevention and fighting measures should be in place at the operational area

For odour the following additional mitigating measures are foreseen:

- Daily air monitoring for odours/stench
- Covering of operational surface areas with strong odour/stench outside operating hours

For landfill gasses, the uncontrolled emission of landfill gasses should be minimized with an oxidation rate of minimum 60% and a capacity of minimum 900 m3/day on the SWDS side and 600 m3/day on the IDS side. The additional mitigating measures are focussed on health and safety aspects (use of LEL meter during installation of system) and control of leaks of the system during and directly after the installation.

5.1.3 Roads and Traffic

Although by maximizing the recycling of aggregates from the current MSWDS, the need for import of materials is minimized, during the construction phase, especially for the SWDS Slope

recontouring and closure including slope stability improvement and the Irma debris disposal site recontouring and closure, significant additional traffic will move between the port facilities and the landfill. In addition, significant movement of trucks, equipment and machinery between the IDS and SWDS sides of the MSWDS is expected, requiring the crossing of a public road. The following mitigating measures are anticipated:

- Implementation of the Traffic Control Measures by the Contractors as part of the C-ESMP with proper and adequate staffing and equipment for the activity and construction of infrastructures which should cover most actions. Specific actions are included below:
  - Inform the public via social media, newspaper, radio and other means of the traffic management measures to be implemented and possibilities for complaints and suggestions
  - The new entrance to the SWDS side is planned directly across from the IDS entrance, reducing need for use of Soualiga road by construction equipment
  - Implement traffic controls measures on Soualiga Road between IDS and SWDS entrance sections – including signs
  - Implement traffic control in route from Port till MSWDS consisting of speed restrictions and spotters at sensitive passages
  - Align traffic movement with peak cruise ship traffic, avoiding transport during peak loading and unloading times of cruise ships
  - Providing wheel wash facilities or other suitable alternatives
  - Providing cover materials for soil and waste loads when travelling on public roads
  - Avoiding rush hours and respect the heavy vehicles traffic restrictions of the legislation (traffic ban between 06:30 – 08:30 and 12:00 – 14:00). Exception to this point is crossing of Soualiga Rd between the SWDS and IDS facilities as this is needed for operations and traffic measures will be implemented in this area to mitigate impacts
  - Inspection of the Soualiga road, prior to the start of operations and at monthly intervals between entrance road to VROMI yard and Northern bridge over GSP and immediate repair of damages related to intensified use of the road

5.1.4 Noise

Re-location of facilities within the (vicinity of) the MSWDS, more specifically the rock crushing and steel crushing facilities, will lead to a different noise distribution in the area. Additional noise is further expected from the traffic to and from the port for the delivery of the cover materials needed for SWDS Slope recontouring and closure including slope stability improvement and the Irma debris disposal site recontouring and closure. The following mitigation measures are anticipated:

- Limiting construction noise levels to applicable standards such as EHS Guidelines and Labour standards for workers
- Placement of aggregate recycling installation within MSWDS with noise buffers not exceeding landfill contour
- Implementation of speed restriction of project trucks on public roads

5.1.5 Geology and Soils

The SWDS and IDS slope recontouring and closure activities will require significant quantities of soil for future cover layers. In addition, the installation of new facilities outside the current MSWDS boundaries can impact the soil quality. The mitigating measures are focussed on stand-still principle; the activities should not impact the soil and any new soil applied should have the same or better quality than the underlying soils. Test results of incoming materials and baseline soil investigation of the areas potentially impacted should confirm their status. Placement and recontouring of materials within the SWDS and IDS should be done taking into account the geotechnical stability of the site.

The importation of non-native species with the incoming soil should be prevented, the re-use of processed materials has preference above import of soil to further limit this risk.

5.1.6 Hydrogeology, hydrology and surface water quality

The project development will lead to an improvement of the surface and groundwater quality in the area through prevention of post-closure leachate generation. Mitigating measures for the hydrogeology, hydrology and surface water quality are as such focussed on the prevention of additional contamination to the GSP during the construction phase such as:

- Installation of impermeable topcover, to prevent infiltration of rainwater through the landfill
- Use of temporary erosion control in areas of work
- Install temporary storm water controls in areas where storm water runoff from operational areas is discharging directly into the Great Salt Pond
- Establish control of sediments in area of new ring dike
- Establish quality of soil to be used for ring dike construction to be of equal or better quality than sediment quality of area where soil is to be deposited
- Set-up surface water quality monitoring system during construction activities (see chapter 7)

5.1.7 Ecology

During project construction phase, existing vegetation on and around the MSWDS, including the existing mangroves, will be removed. The vegetation will be re-instated after the finalization of the project. Disturbance of the shoreline for the installation of the new ring dike and/or compensation for loss of buffering capacity will lead to disturbance of aquatic life in the Great Salt Pond. Primary affected species are birds and possibly reptiles.

Mitigation measures for ecology are focussed on the continuation of the biological surveys to monitor the flora and fauna species located along the perimeter of the SWDS and IDS, for protected species, specific actions such as restriction for disturbance of mangrove vegetation with nesting birds. Monitoring of oxygen levels in the surface water of the Great Salt Pond to ensure actions for the installation of the ring dike do not contribute to further reduction of oxygen levels. Contractor will receive instructions on species level for mitigation measures the ecological guideline in Appendix 7 provides the basis for the measures to be taken and will be further updated after the baseline assessment.

After installation the mangrove vegetation will be re-instated along the entire ring dike, effectively increasing the size and number of mangrove species in the area.

5.1.8 Worker Health and Safety

Site operations involve a number of full-time workers both local and international, operating within the MSWDS project site, using or being in the presence of heavy machinery increasing risks for accidents. Increased fire risks and dust can impact further the health of those present.

Mitigation measures would include the adherence to local legislation, international standards and World Bank guidelines regarding labour conditions which should be detailed in writing in the C-ESMP. Minimum age for working in the project is 18 years of age due to the potentially hazardous working environment, preventing children between the ages of 16 and 18 to participate.

The contractor is responsible for establishing a grievance mechanism for workers to raise workplace concerns, including a referral procedure to NRPB in case the complaint contains elements of GBV. The NRPB's institutional grievance mechanism will also be available to contractors' workers to submit workplace complaints.

The Contractor shall submit comprehensive yet concise Environmental and Social Management Strategies and Implementation Plans (see paragraph 5.2) which shall describe in detail the actions, materials, equipment, management processes etc., that will be implemented by the Contractor, and its subcontractors.

5.1.9 Public Health and Safety

Site operations will lead to temporary deterioration of air quality (including odour) within the project boundaries, effects outside the project boundaries should be monitored and corrective actions taken. Additional traffic due to the construction is expected in the area between the port and the MSWDS increasing risks for accidents.

Public Health and Safety mitigation measures are focussed on the establishment and facilitation of 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. The contractor should install information signs along public areas of the site, with direct contact details of the responsible ESHS management staff and information on the Grievance mechanism available to public stakeholders. In addition, after finalization of main project phase (i.e. closure of IDS, finalization of ring dike) contractor should invite the public to showcase progress and allow the public to express their concerns during a public gathering.

In addition, the C-ESMP and Traffic Control Measures should decrease the potential of vehicular accidents both at the SWDS, IDS sites and the surrounding roadways. Measures to reduce odour and vermin through vector control practises should limit associate nuisance.

An environmental, health, and safety monitoring plan is detailed in section 7, aimed at evaluating the impact of the SWDS/IDS management on the surrounding natural environment, workers, and communities.

5.1.10 Aesthetic Archaeological, Historic, and Cultural Heritage

Aesthetic mitigation actions focus on facilitating greening of non-operational areas through seeding and irrigation to limit exposed barren areas within the MSWDS. The use of local, natural materials for rock amour or other protection measures where possible will better align the area with the surroundings.

Mitigation measures for archaeological, historic or cultural heritage impacts of the project focusses on ensuring the aesthetic value of the remaining Salt Pans in the Great Salt Pond is not further impacted by the project. This is done by moving the ring dike structure inland at the most visible structures on the IDS side of the MSWDS.
For the ring dike structures on the SWDS, the ring dike will be constructed over the structures, keeping them in their original location underneath the new ring dike. To improve on the visual appearance of the remaining Salt Pan structures, the embankments of the ring dike will be covered with locally available natural rocks in a similar structure / view as the original Salt Pan.
A Monument Permit application is in process for these actions at the Minister of Education, Culture, Youth and Sport.

5.1.11 Natural Disaster Risk

Natural Disaster Risk mitigation measures focus on maintaining SWDS/IDS landfill slope stability and profiling practices under the best practices and standards, rapid response and training for emergency procedures and prevention of environmental impacts from heavy rainfall during storm events. Implementation of set-back distance for all non-landfill associated activities, the latter includes the operations of Steel Crushers and Wind Ward Roads B.V. within the VROMI yard.

Increased flood risks are mitigated by ensuring no change in the buffering capacity of the Great Salt Pond. The anticipated new pumps at the Rolandus Channel are capable of handling the increased water and reduction of buffering capacity. In case the pumps are not available on-time or their capacity differs from the current working hypothesis, a bypass at the Fresh Pond can be made to reduce flooding. The Fresh Water Bypass more than halves the potential water level increase in the GSP during heavy rainfall events

5.1.12 Coordination with Operator

As disposal operations will be continued by Owner at the SWDS, coordination between contractor and operator is required till final closure of disposal operations. Contractor is responsible for the Interface Management between the execution of the works and the simultaneous disposal operations conducted at the project location. In this respect, Contractor is obliged to elaborate a Logistical Plan clarifying the locations where disposal operations can be performed at a certain period in time and how they shall be conducted to ensure the profile and contour as per the engineering design.

5.1.13 Operation Phase Impact – VROMI Yard

The two commercial entities will move to VROMI yard. During operation phase, potential impacts include noise, dust, soil, stockpiling, and increased traffic on access roads. Mitigation measures include the following:

- **Noise.** Construction of noise barrier between area where crusher / shredder are permanently located and off-site commercial / residential areas in case noise exceedance at point of receptor is modelled
- **Dust.** Suppress dust as needed in unpaved areas, by watering, putting gravel or other means. Since prevailing wind is eastern, it is anticipated that most of the dust will travel towards the GSP. Control measures include the implementation of dust control measures for WWR and Steel Crushers to applicable standards, such as hindrance permits. Features, such as water misting, could be requested/proposed for WWR and Streel Crushers.
- **Soil.** For the VROMI yard and set-back area, soil protection measures will be implanted for those parts where (potential) soil contamination activities will take place. These areas are those used for the dismantling and crushing of vehicles. In those zones, any liquids collected should be stored in drums or IBC on drip trays or within leakage prevention basins. For the storage of processed wrecks and underneath the crusher, soil impermeability measures should be implemented, either in the form of a hard cover or in the form of a hydraulic barrier below a 0.5 m thick top cover.
- **Stockpiling.** Hindrance permits to specifically indicate the maximum height and footprint of stockpiles.
- **Traffic.** Steel Crushers is located in IDS and will have to cross a public road (i.e., Soualiga Road) to move their assets (machineries, containers, etc.). WWR, on the other hand, is in SWDS but may have to use a small segment of Soualiga Road when they move their assets (machineries, crushed materials, etc.). The access road to VROMI yard from Soualiga Road will be to extend either Rock Salt Road (unpaved) to north of VROMI yard or Soualiga Drive (unpaved) to south of VROMI yard (see Figure 5.2). The access road will be determined in the VROMI yard site plan to be developed by VROMI/NRPB. The use of public road will follow traffic management plan, which will further be refined by DB contractor once they are on board.

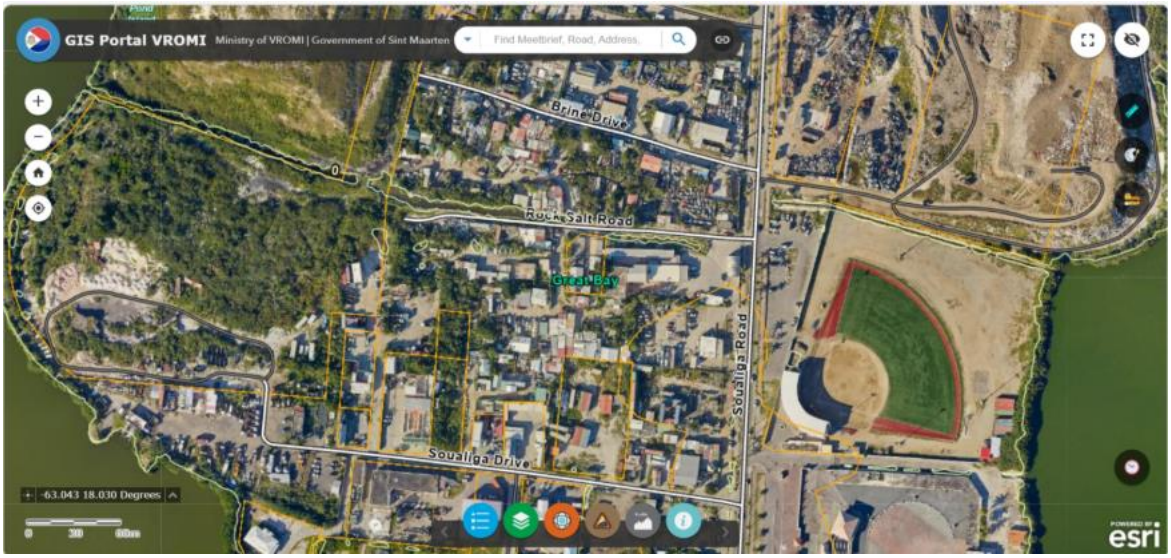

Figure 5.2 Access road options to VROMI yard from Soualiga Road

5.2 Management Strategies and Implementation Plans

The main Management Strategies and Implementation Plans (MSIP) will be detailed in the Contractor Environmental and Social Management Plan (C-ESMP) of the DB contract.
This document is essential for ensuring that the construction project aligns with environmental and social safeguards, particularly those set by the World Bank. The C-ESMP will further detail the information provided in this document and adapt it to the final project design. The C-ESMP should contain as a minimum the following MSIP sub-plans:

MSIP for Mobilization to the Sites

- Site mobilization plan including H&S equipment inventory, temporary yard layout, traffic safety measures, staffing arrangements, training, and required permits

MSIP for Fire Prevention and Fire Fighting

- Fire risks during waste reprofiling and the prevention, monitoring, equipment, and training measures to be implemented

MSIP for OHS during Waste Reprofiling

- OHS risks of handling (hazardous) waste and present the mitigation philosophy, PPE, medical surveillance, asbestos procedure, and training program

MSIP for Working at Excavations and Steep Slopes

- Outline risk assessment, mitigation procedures, required equipment, and training for work near excavations and steep slopes

MSIP for Working at Water Bodies

- Risk assessment, mitigation measures, required PPE, and training for activities near water bodies

MSIP for Pest & Disease Vector Control

- Vector control plan including site inventory, prevention measures, and hierarchy of control methods

MSIP for Relocation of Existing Buildings and Facilities

- Risks and controls for electrical disconnection/connection, crane operations, and exclusion zones

MSIP for Emergency Preparedness and Response

- Emergency response plan, including roles, contacts, resources, training, and hurricane/storm preparedness procedures

MSIP for ESHS Equipment & Materials Availability

- Method for defining required ESHS materials, ensuring availability, and an inventory with procurement arrangements

MSIP for Fuels and Hazardous Substances

- Inventory of fuels/hazardous substances and describe measures to prevent spills, releases, or accidents

MSIP for Stakeholder Engagement and Complaints

- Stakeholder engagement responsibilities, GRM procedures, and communication of works with potential impacts. Includes SEA/SH action plan

MSIP for Ecological (Bird) Preservation

- Roles, bird species overview, nesting assessment, and required ecological protection actions

MSIP for Mangrove Restoration

- Roles, inventory impacted mangroves, and outline planning and implementation of restoration activities

MSIP for Environmental Impact Prevention and Reduction

- Organizational responsibilities, environmental impact risks, budgets and the preventive/mitigation measures to be taken. Includes procedures for updating the document

In the C-ESMP the contractor should clearly indicate for all sections and sub-plan how the communication and interaction with the landfill operator will be covered.

6 Implementation Arrangements for the ESMP

6.1 Institutional arrangements

The National Recovery Program Bureau (NRPB) serves as the Project Implementation Unit (PIU) for activities funded by the SMTF, and is tasked with administering the contract. The NRPB will collaborate closely with VROMI and other government stakeholders to ensure adherence to 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 SWDS Site and the IDS. Departments within VROMI that would be involved include the following: Infrastructure & Management (Public Works). VROMI is also the operator of the MSWDS, although this situation can change in the future
- VSA – The ministry of public health, social development and labor. Main departments would be the Department of Public Health, department of labour affairs and the inspectorate public health, social services and labour
- Ministry of Justice – oversees public safety, law and order and the upholding of justice

6.2 Environmental and Social Management Capacities

The NRPB, is responsible for implementing and monitoring this ESMP. To fulfil this role, the NRPB has appointed two Environmental Specialists and a Social Specialist to the ESMP team. Their responsibilities include (i) monitoring compliance with the ESMP, (ii) updating the ESMP, (iii) preparing/implementing an ARAP, including a LRP, and (iv) acting as the focal point for the NRPB's grievance redress mechanism (GRM), including entering data on complaints and their resolutions into the GRM database (v) engaging with the contractor and Engineer ESHS specialists to ensure E&S compliance, including on GRM implementation, response and reporting as well as incidents and accidents.

Additionally, a Community Engagement Specialist is engaged to reach out to the community south of RAI and to facilitate public consultations/engagements. The PIU's E&S personnel will also facilitate capacity-building initiatives related to safeguards for local government ministries and contractors/Engineer.

6.3 Environmental, Social Health and Safety (ESHS) Specialists

The contractor is responsible for the position of an ESHS Specialist. The ESHS Specialist ensures that the works are implemented according to applicable national laws, regulations, and rules, as well as NRPB's ESHS standards and World Bank Environmental and Social Safeguards Policies and the World Bank Environmental, Health, and Safety Guidelines. This specialist will also ensure that the specified mitigation measures in this ESMP are appropriately reflected in the C-ESMP and implemented by the contractors. It is expected that the contractor will include an Occupational Health and Safety Specialist and Environmental Specialist in his/her team. These specialists should have as a minimum the following requirements:

- Bachelor Degree in Health, Safety or Environmental Topics
- Minimum of 8 years working experience as OHS and Environmental Specialist in Construction
- Experience in working on/with landfill sites

6.4 Roles and Responsibilities

The NRPB will oversee overall management and monitoring. An independent Supervising Engineer will be selected to oversee the overall project as well as ensuring compliance with environmental, social, health, and safety (ESHS) standards. VROMI, will be present in their role as national authority and continue their operations overseeing and monitoring the daily landfill management activities. The role of the independent Supervising Engineer will conclude once the project activities have been finalized after which VROMI will resume full responsibility for the site. The EDMP Project Manager will coordinate with and manage the Independent Supervising Engineer in implementing the ESMP, guided by the advice of the NRPB E&S Specialists. The Independent Supervising Engineer will be responsible for approving or modifying site-specific environmental mitigation measures during pre-construction and construction phases, including the C-ESMP and its updates. Approving or modifying site site-specific environmental mitigation measures for the landfill operations are the responsibility of VROMI. The roles and responsibilities of the relevant Project staff in managing the environmental and social aspects of the Project are outlined in Table 6.1.

Table 6.1 Overview of roles and responsibilities

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 into contract documents • Review of the various documents prepared by the contractor such as C-ESMP, monitoring reports, etc. and coordinate with the Independent Supervising Engineer • Coordinate with the Independent Supervising Engineer 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 reportable incidents and accidents 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 entities affected by displacement (physical and economic) • Undertake independent inspections to ensure E&S compliance. Prepare semi-annual progress reports on the implementation of the ESMP for transmission to the World Bank throughout the Project implementation period, including information on grievances, incidents and accidents
Contractor	• Preparation of the C-ESMP with site-specific management plans • Updating the C-ESMP in case of design alterations, as a minimum every 3 months • Implement all mitigation measures to address potential environmental and social risks and impacts as described in the ESMP and 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 Independent Supervising Engineer any ESHS related incidents and accidents. 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 C-ESMP implementation (see Appendix 4 or minimum metrics to be reported)
Independent Supervising Engineer	• Supervise day to day 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

Staff	Responsibilities
	• Report to NRPB on all incidents related to environmental, social and health aspects and accidents. 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, including signature of code of conduct by all workers.
VROMI	• Preparation of the site-specific ESHS management plans for continued landfilling operations • Monitor landfilling operation ESHS plans and advise NRPB/VROMI on compliance • Supervise day to day landfill management activities outside the scope of the contractor • Consult with Contractor and Independent Supervising Engineer on technical aspects of the works • Liaise with Contractor and Independent Supervising Engineer on ESHS cross-cutting issues

6.5 Incidents & Accidents Reporting

6.5.1 Contractor Responsibilities

Contractor must have a written/documented procedure for the managing of incidents and accidents related to the project. The incident management and reporting process may comprise below steps.

- Step 1 Initial Communication – notify the relevant authorities, Independent Supervising Engineer and NRPB
- Step 2 Classification – identify how serious is the incident
- Step 3 Investigation – conduct root cause analysis (RCA) and identify necessary set of measures as appropriate to address the root causes (aka corrective action plan (CAP)
- Step 5 Response – implement corrective actions
- Step 6 Follow Up – completion of corrective actions and develop necessary preventive actions to prevent similar incidents occurring in the future

Contractor shall report any accidents/incidents to the NRPB in writing within 24 hours after the incident, and immediately after the occurrence via email. Incidents/accidents to be reported include, but are not limited to, the following:

1. Inspection, investigation by, or warning or official order from, government regarding a (possible) violated policy, permit or legislation or permit conditions, as per the ESMP
2. Any work-related fatality
3. Accidents requiring medical treatment, in case of hospital admittance, in case of medical leave days, in case of permanent complete or partial invalidity of an employee, fractured or cracked bones or teeth, punctured eardrums or hearing loss
4. Near miss events, which are legally required to be reported by the Contractor to the Labor Department immediately, no later than three days; following the NATIONAL REGULATIONS containing (general) measures (provisions) for the security of work in enterprises (overheid.nl)

5. A significant environmental incident as a consequence of which major pollution (air, water, noise, or land) or a significant adverse environmental impact (wildlife or local habitat) has occurred, is occurring, or is likely to occur
6. Reported Code of Conduct violations in regard to human rights, discrimination against workers, drugs or other illegal activities, fraud & corruption, and conflict of interest
7. Significant adverse effects or damage to private property (e.g., vehicle accident, damage from flying rock, working beyond the boundary)
8. Discovery and/or damage to cultural heritage, artifacts, monuments, sacred grounds, etc.
9. Significant encroachment on private property
10. Displacement Without Due Process: The permanent or temporary displacement against the will of individuals, families, and/or communities from the homes and/or land which they occupy without the provision of, and access to, appropriate forms of legal and other protection and/or in a manner that does not comply with an approved resettlement action plan
11. Burglary or theft of assets
12. Any confirmed Covid-19 case, or other infectious disease
13. Indication or incidents of child labor, forced labor or undocumented workers
14. Sexual Orientation and Gender Identity (SOGI) related violence or discrimination incidents.
15. Any indication of sexual exploitation or abuse, sexual harassment or sexual misbehavior, rape, sexual assault, child abuse, or defilement, or other violations involving children
16. Acts of Violence/Protest: Any intentional use of physical force, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, deprivation to workers or project beneficiaries, or negatively affects the safe operation of a project worksite

The initial report from Contractor shall address the following questions: What was the incident? What happened? To what or to whom? Where and when did the incident occur? What is the information source? How did you find out about the incident? Are the basic facts of the incident clear and uncontested, or are there conflicting versions? What were the conditions or circumstances under which the incident occurred? Is the incident still ongoing or is it contained? Is the loss of life or severe harm involved? How serious was the incident? How is it being addressed?

For the initial report, depending on the nature of incident/accident, the Contractor shall use the reporting forms attached in Appendix 4.

After the initial written reporting, the Contractor shall undertake an investigation and a root cause analysis and propose appropriate measures to avoid future incidents.

A detailed report shall be submitted in writing, for NRPB's approval, within 3 days. After the Contractor's initial reporting on the root cause analysis (RCA) and corrective action plan (CAP), the Contactor should also report the completion of corrective actions and possible preventive actions. In case of a SEA/SH incident, the Contractor follows the instructions from the NRPB.

A root-cause analysis of an incident reports the sequence of events and factual circumstances. The analysis identifies what failing(s) led to the accident, what safety measures were in place, and the risk information/training provided to workers on site. The level of supervision of unskilled labor

should also be assessed. A root-cause incident investigation report for the accident, including corrective measures is expected to improve OHS conditions at the given site.

For the root cause analysis and Corrective Action Plan, depending on the nature of incident/accident, the Contractor shall use the reporting forms attached in Annex 7.

6.5.2 NRPB Responsibilities

NRPB shall promptly notify the World Bank, within 72 hours after learning of the incident or accident, of any incident or accident related to or having an impact on the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers, in accordance with the instruments referenced therein. The Incident Forms Part B (see Annex 8) template will be used for reporting according to the incident category.

The following are incident types to be reported using the environmental and social incident response process:

i. **Fatality**: Death of a person(s) that occurs within one year of an accident/incident, including from occupational disease/illness (e.g., from exposure to chemicals/toxins)
ii. **Lost Time Injury**:Injury or occupational disease/illness (e.g., from exposure to chemicals/toxins) that results in a worker requiring 3 or more days off work, or an injury or release of substance (e.g., chemicals/toxins) that results in a member of the community needing medical treatment
iii. **Acts of Violence/Protest**: Any intentional use of physical force, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, deprivation to workers or project beneficiaries, or negatively affects the safe operation of a project worksite
iv. **Disease Outbreaks**: The occurrence of a disease in excess of normal expectancy of number of cases. Disease may be communicable or may be the result of unknown aetiology
v. **Displacement Without Due Process:** The permanent or temporary displacement against the will of individuals, families, and/or communities from the homes and/or land which they occupy without the provision of, and access to, appropriate forms of legal and other protection and/or in a manner that does not comply with an approved resettlement action plan
vi. **Child Labor:** An incident of child labor occurs: (i) when a child under the age of 14 (or a higher age for employment specified by national law) is employed or engaged in connection with a project, and/or (ii) when a child over the minimum age specified in (iii) and under the age of 18 is employed or engaged in connection with a project in a manner that is likely to be hazardous or interfere with the child's education or be harmful to the child's health or physical, mental, spiritual, moral or social development
vii. **Forced Labor**: An incident of forced labor occurs when any work or service not voluntarily performed is exacted from an individual under threat of force or penalty in connection with a project, including any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor-contracting arrangements. This also includes incidents when trafficked persons are employed in connection with a project

viii. **Unexpected Impacts on heritage resources**: An impact that occurs to a legally protected and/or internationally recognized area of cultural heritage or archaeological value, including world heritage sites or nationally protected areas not foreseen or predicted as part of project design or the environmental or social assessment

ix. **Unexpected impacts on biodiversity resources**: An impact that occurs to a legally protected and/or internationally recognized area of high biodiversity value, to a Critical Habitat, or to a Critically Endangered or Endangered species (as listed in IUCN Red List of threatened species or equivalent national approaches) that was not foreseen or predicted as part of the project design or the environmental and social assessment. This includes poaching or trafficking of Critically Endangered or Endangered species

x. **Environmental pollution incident**: Exceedances of emission standards to land, water, or air (e.g., from chemicals/toxins) that have persisted for more than 24 hrs or have resulted in harm to the environment

xi. **SEA/SH**: Sexual Exploitation: Any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes. Sexual Abuse: Actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions

xii. **SOGI**: Violence on the basis of SOGI or Discrimination on the basis of SOGI

xiii. **Other**: Any other incident or accident that may have a significant adverse effect on the environment, the affected communities, the public, or the workers, irrespective of whether harm had occurred on that occasion. Any repeated non-compliance or recurrent minor incidents which suggest systematic failures that the task team deems needing the attention of Bank management

A subsequent report after investigation will be submitted to the Bank in a timeframe acceptable to the Bank. The report will include a description of such Significant Event, and the measures, if any, that the Recipient is taking or plans to take to address such Significant Event and to prevent any future similar event. In case the accident resulted in fatality/injury for worker or member of the public, then the accident Form Part C (Annex 8) template will be used for reporting. In case of SEA/SH and SOGI incidents then the corresponding Part C forms shall be used (also in Annex 8).

The description of the Event shall address the following questions (if possible and relevant). What was the incident? What happened? To what or to whom? Where and when did the incident occur? What is the information source? How did you find out about the incident? Are the basic facts of the incident clear and uncontested, or are there conflicting versions? What were the conditions or circumstances under which the incident occurred? Is the incident still ongoing or is it contained? Is the loss of life or severe harm involved? How serious was the incident? How is it being addressed?

The report will contain a Root Cause Analysis (RCA), highlighting the reasons that lead into this incident. The Event description and RCA analysis will be shared with the World Bank preferably within 10 days after the occurrence of the Event. The RCA will be discussed with the Bank and agreements will be made on the corrective actions.

NRPB will prepare a Corrective Action Plan which will describe the set of measures (short, medium, long term), responsibilities and timelines for implementation, as appropriate to address the root causes to help prevent any recurrence of the incident and discuss this plan with the Bank. The Corrective Action Plan should be based around a summary table, with additional supporting text and

information to adequately describe the measures and how they will achieve the corrective actions to address the immediate, underlying, and root causes identified in the investigation report. The Corrective Action Plan template found under Annex 8 should be used.

NRPB will keep the World Bank informed of the on-going implementation of the said measures and plans. Incidents that do not require immediate WB reporting (based on requirement) will be still included in the semi-annual project reports, in agreement with NRPB.

7 Environmental, Health and Safety Monitoring Plan

Monitoring and reporting on the environmental and social mitigation measures are crucial components of an effective environmental and social management procedure. In instances of non-compliance or non-conformance, corrective actions must be implemented. Additionally, during the construction phase, identifying opportunities for performance enhancement is beneficial.

The contractor is responsible for keeping NRPB/Independent Supervising Engineer updated on Project performance regarding environmental, health and safety, and social issues, as well as the implementation of the C-ESMP. This will be achieved through the submission of weekly written status reports to the Independent Supervising Engineer and/or face-to-face meetings. Contractors are also expected to provide monthly Environmental, Health, Safety, and Social (EHSS) performance reports to the Independent Supervising Engineer, based on their specific responsibilities.

An environmental, health, and safety monitoring plan is detailed in appendix 8, aimed at evaluating the impact of the SWDS/IDS management on the surrounding natural environment, workers, and communities. It details the monitoring location and frequency for each phase: (i) baseline; (ii) construction; (iii) operation; and (iv) closure. This plan specifies the minimum requirements for the placement of monitoring points, the frequency of monitoring, and the parameters to be analyzed. Contractors may propose alternative monitoring methods that supersede those suggested in the C-ESMP.

8 Stakeholder Engagement and Information Disclosure

8.1 Project Stakeholders

The Project has a broad range of stakeholders, who directly or indirectly are being affected by project activities. These stakeholders are broadly categorized as follows:

Residents

- Residents living within the yellow zone of impact (see figure Figure 4.5 and Figure 4.6).

Affected businesses and association

- Steel Crushers BV
- Windward Roads BV
- Sint Maarten Soccer Association

Environmental, Social and Nature Organizations

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

Government Entities

- Ministry VROMI
- Ministry of Public Health, Social Development and Labor (VSA)
- Minister of Tourism, Economic Affairs, Transport and Telecommunication (TEATT)
- Ministry of Justice

Commercial Businesses

- Potential commercial business owners and patrons located in the vicinity of the MSWD landfill.
- VROMI contracted Operators / Heavy equipment owners / operators
- Waste haulers
- Recycling Companies
- Waste Management Companies
- Utilities Companies
- Telecommunications Companies

8.2 Public consultation and disclosure

The ESIA/ESMP was presented during public consultation on the 3rd of September 2025. More than 200 people participated in person for the second round of consultations, and about 30 participated online. About 85 participants were women, and 25 were elderly. There also were more than 30 community members who used to live in RAI (PAPs) or who currently live next to RAI. The draft ESIA/ESMP were disclosed on the NRPB website since September 3rd 2025 and open for feedback until 10th of September 2025. The presentations of the stakeholder consultation can be found here, here and here. Questions and answers can be found here.

9 Grievance Redress Mechanism

NRPB has a Grievance Redress Mechanism (GRM) at the organization level and accepts grievances for all its projects, including EDMP. GRM is accessible by all stakeholders. It accepts anonymous grievances. The contact information and the complaint handling procedure is summarized below:

NRPB website: Complaints Procedure (including on-line complaint submission form)
Telephone: +1(721) 542-8886/7
E-mail: complaints@nrpbsxm.org
In-person: National Recovery Program Bureau (NRPB)
#57 Walter A. Nisbeth Road
Philipsburg, Sint Maarten

- **Sorting, processing.** Any complaint received is forwarded to Complaint Officer, logged in the NRPB GRM database upon its receipt. The complaint is categorized according to the following complaint types: civil work (damage, dust, noise, etc.), resettlement, application, communication/consultation, conduct, working conditions, SEA/SH, and other
- **Acknowledgement and follow-up.** Receipt of the grievance is acknowledged to the complainant by the Complaint Officer within five working days
- **Verification, investigation, and action**. Investigation of the complaint is led by the Complaint Officer, in collaboration with the relevant project team (EDMP, in case of landfill activity related complaints) and/or technical units within 10 working days. A proposed resolution is formulated by the Complaint Officer and communicated to the complainant by the Complaint Officer as soon as possible, not to exceed 6 weeks. If the complaint is not redressed within 10 working days, the Complainant Officer sends a follow-up message to provide update
- **Monitoring and Evaluation.** Data on complaints are collected in the NRPB GRM database and reported to the project team and the Bank semi-annually
- **Provision of feedback.** If there is no follow-up message from the complainant, the case is closed in one month after NRPB's response to the complainant
- **Escalation Process.** The complainant can appeal to NRPB senior management. A case specific review panel will be set up for redressal
- **SEA/SH related grievances.** NRPB GRM has an uptake mechanism for SEA/SH related grievances. Survivors are referred to government or NGO service providers

The Contractor will be required to include a GRM in the C-ESMP, subject to NRPB's approval, to address worker complaints and community complaints, thus, the Contractor can receive grievances separate from the NRPB. The Project will use the GRM as a component of the broader stakeholder engagement activities, including monitoring and reporting.

9.1 Monitoring and Reporting

Stakeholder engagement and communication will be monitored to ensure that consultation and disclosure efforts are effective, in particular that stakeholders have been meaningfully consulted throughout the process.

Monitoring will cover the following, which will be reported to the Bank biannually:

- Consultation activities conducted with government authorities and non-governmental stakeholders, including feedback received and how it was integrated into project implementation
- Number and type of grievances and the nature and timing of their resolution, including status of resolution. Grievances related to SEA/SH or any other sensitive grievance will be reported to the Bank as soon as possible after being received

10 References

The basis for the ESMP are the following studies, plans and reports;

- Air Screening Results for Pond Island Municipal Waste Disposal Site and Temporary Debris Site International Advisory Support for Debris Management and Short Term Solid Waste Priorities for the Hurricane Irma Reconstruction, Recovery and Resilience Program Sint Maarten World Bank. Project Number: 2018-4191. EE&G Disaster Response, LLC, December 13th, 2018 (DRAFT)
- Landfill Operational Improvements and Debris Site Closure – Sint Maarten. SCS Engineers, January 2019
- Short Term Plan, Pre-feasibility Studies for MSW Landfill Upgrading & Extension and Integrated Solid Waste Management Facility (ISWMF). AIM Texas Trading, February 17th, 2020
- ESIA Sint Maarten Emergency Debris Management Project. P-167347. NRPB, January 31st, 2023
- Moving to Integrated Solid Waste Management on Sint Maarten (ISWM-SXM). VNG International - October 15th, 2023
- ESMP Sint Maarten Emergency Debris Management Project. P-167347. NRPB, December, 2023
- Environmental Field Survey Report. Reference R002-1293149ABR-V03-mvg-NL, Witteveen+Bos and TAUW, November 28th, 2024
- Geotechnical and Geographical Survey Report. Reference R003-1293149GMC-V01-mvg-NL, Witteveen+Bos and TAUW, January 10th, 2025
- Methane gas model calculations for the MSWDS, Philipsburg, Sint Maarten, TAUW note N002-1293149ABR-V01-rlk-NL, d.d. January 15th, 2025.
- Feasibility Criteria and Boundary Conditions, TAUW report R004-1293149IKR-V01-mvg-NL, February 21, 2025
- Analysis and Selection of Alternatives for MSWDS development. Project Code 144046. Witteveen+Bos and TAUW, March 20th, 2025
- Environmental Social Impact Assessment (ESIA) for Rehabilitation and Closure of Municipal Solid Waste Disposal Sites in Philipsburg, Sint Maarten. NRPB,. TAUW report R005-1293149GMC-V04-tsz-NL, d.d. Februray 2nd , 2026.

Appendix 1 Relevant Administrative Framework

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.

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.

Appendix 2 Project Environmental, Social Impacts, Risks and Concerns with Mitigation Measures, Responsibilities and Means of Verification

Table 10.1 Project Environmental, Social Impacts, Risks and Concerns with Mitigation Measures, Responsibilities and Means of Verification – Construction Phase

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Physical and Economic displacement	1. 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 2. Prepare/implement ARAP, including LRP for relocation of two entities and one association	1. NRPB / VROMI 2. NRPB / VROMI	NRPB /Monitoring, Supervision and inspections
Air quality general	1) Respect recommended maintenance schedule for combustion engines to ensure exhaust emissions are within the acceptable limits of the manufacturer. 2) Avoid idling of equipment and machinery when not in use 3) Schedule construction and rehabilitation work during main work hours (07-19) and to minimize activity during weekends, holidays, etc.	1. Contractor 2. Contractor 3. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections
Air quality - Dust	In addition to general air quality measures; 1) Suppress dust as needed in unpaved areas, by watering during dry days, putting gravel or other means 2) Suppress dust during excavation and recontouring by limiting size of excavation and recontouring area 3) Suppress dust during excavation, mining and recontouring by use of water vapor cannons 4) Providing wheel wash facilities or other suitable alternatives for vehicles leaving the site 5) Implement dust control measures for Shredder and Crusher	1. Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor 6. Contractor 7. Contractor	Realtime dust monitoring network during excavation and recontouring activities by contractor Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	6) Sweeping and cleaning paved areas at the Site as well as the public road used for transfer of materi-als and equipment between the SWDS and IDS. 7) Inform Employer in a timely manner by informing (2 weeks in advance) of planned activities that might cause dust nuisance in community areas, and support in notification and communication with the community.		
Air quality – Smoke and Fire	In addition to general air quality measures; 1) Implementation of a fire prevention and fire-fighting strategy during constructions works 2) Cease work if fire breaks out, or if significant smoke formation occurs in the operational area 3) Cease work if wind direction and speed are detrimental to safe management of emissions risks during fire suppression activities 4) All vehicles and equipment operated at site shall be equipped with fire extinguishers, rated 2A 10BC as a minimum. 5) Prohibit smoking in the entire project area. Signage shall include: “No Smoking or Open Flame”. 6) Disposal of excavated waste material shall be performed in layers of max. 0.5 m height. After reach-ing a layer of max 0.5 m height and at the end of every working day, the layer of disposed excavated material needs to be compacted by a vibratory roller compactor preferably and be covered with inert material.	1. Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor 6. Contractor 7. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	7) Excavation areas need to be compacted by means of a vibratory roller compactor, preferably with padfoot drum, with a weight of min. 20 tonnes, through a minimum of 5 passes at the end of every working day and be covered with 0.1m of inert material. 8) Fire fighting equipment is on location for all activities within 20 m of the tire pile		
Air Quality - Odour	In addition to general air quality measures; 1. Daily air monitoring for odors/stench 2. Covering of operational surface areas with strong odour / stench outside operating hours with inert material	1. Contractor 2. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections
Air Quality – Landfill Gasses	1. Use of methane and LEL meters during installation of landfill gas network 2. Control of landfill gas collection network for leaks after installation using methane and LEL meters 3. Installation of LFG system with minimum 60% oxidation rate and 900 m3/day capacity on SWDS side and 600 m3/day capacity on IDS side	1. Contractor 2. Contractor 3. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections
Roads and Traffic	1) Implementation of Traffic Safety and Management actions as integrated in the C-ESMP including suitable annotated drawing(s) of the proposed traffic management measures in advance of the works and proper and adequate staffing and equipment for the activity and construction of infrastructures 2) Manage onsite parking and the congestion of traffic onsite and offsite 3) Provide security at the access gates/control points 4) Maintain site roads in a clean and safe condition	1. Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor 6. Contractor 7. Contractor 8. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	5) Implement traffic controls measures on Soualiga Road between IDS and SWDS entrance sections 6) Implement traffic control in route from Port till MSWDS 7) Align traffic movement with peak cruise ship traffic, avoiding transport during peak loading and unloading times of cruise ships 8) Planning and managing both vehicle and pedestrian routes 9) Implement speed restrictions for project construction vehicles of 30 km/hr 10) Elimination of blind spots and reversing where possible 11) Ensure routes provide adequate space for vehicles to manoeuvre safely. If needed, vehicles not fitted with reversing aids must be guided when reversing 12) Adequate vision and lines of sight 13) Adequate parking and off-loading/storage areas 14) Providing wheel wash facilities or other suitable alternatives 15) Providing cover materials for soil and waste loads when travelling on public roads 16) Construct a security fence and maintain signs and barriers 17) Communication outreach to the public by newspaper, social media, radio, etc. Manage GRM. 18) Implementation of general preventive maintenance plan for all machinery to reduce operational hazards and improve equipment reliability	9. Contractor 10. Contractor 11. Contractor 12. Contractor 13. Contractor 14. Contractor 15. Contractor 16. Contractor 17. Contractor/ NRPB 18. Contractor	

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Noise	1. Maintain all construction equipment in accordance with manufacturer's specifications 2. Schedule construction and rehabilitation work during main work hours (07-19) and to minimize activity during weekends, holidays, etc. 3. Develop and implement a Construction Communications and Stakeholder Management Plan as a part of C-ESMP to inform businesses and residents of construction activities 4. Limit construction noise levels to applicable standards such as EHS Guidelines 5. The plants and equipment used in construction (including the aggregates crushing plant) must strictly conform to noise standards 6. All vehicles & equipment used in construction must be fitted with exhaust silencers 7. During routine servicing operations, the effectiveness of exhaust silencers will be checked and if found to be defective will be replaced 8. 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 9. Maintenance of vehicles, equipment and machinery will be regular and to the satisfaction of the Independent Supervising Engineer to keep noise from these at a minimum	1. Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor 6. Contractor 7. Contractor 8. Contractor 9. Contractor 10. Contractor 11. Contractor 12. Contractor 13. Contractor 14. Contractor 15. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	10. Construction of noise barrier between area where crusher / shredder are permanently located and off-site commercial / residential areas 11. Construction of a noise barrier between operational areas of steel crusher and/or concrete crusher and off-site commercial / residential areas where noise exceedance is modelled 12. 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 13. Implementation of speed restrictions of trucks on public roads to 30 km/hr reduce noise 14. Noise levels at the boundaries of the Site do not exceed 60dBA and 55dBA respectively during day (07:00-19:00) and evening and night (19:00-07:00) 15. Works do not result in a maximum increase in background noise levels of more than 3dB at the nearest receptor location off-site legally established and officially registered nearest receptor location off-site at the time of signing the Contract		
Geology and Soils	1. Fire Suppression of the subsurface fires to prevent void spaces from impacting slope stability 2. Proper placement of incoming waste material and hurricane debris to maintain the slopes at 3:1. For future reprofiling at indication of Contractor 3. Waste material that is excavated during fire suppression activities must be properly placed into the SWDS and IDS sites so to adhere to the 3:1	1. Contractor 2. MSWDS OPERATOR / Contractor 3. Contractor / MSWDS OPERATOR	Spot testing of incoming soil quality with laboratory analyses. Independent Supervising Engineer, NRPB &VROMI/ coordination, Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	ratio. In addition, in the event that a slope is disturbed during fire suppression activities, the slope will be restored to its previous condition 4. Monitoring of slopes adjacent to heavy equipment use and fire suppression activities 5. Remediation or disposal of contaminated soil identified during construction activities 6. Establish baseline soil quality in Contractor yard 7. Establish baseline soil quality in all areas outside the contractor yard and original waste processing area 8. Installation of soil protection measures at future waste processing facilities outside original MSWDS operational areas 9. Inspection of incoming soil for non-native species and adequate chemical soil quality	4. Contractor 5. Contractor 6. Contractor 7. VROMI 8. Contractor 9. Contractor	
Hydrogeology, hydrology and surface water quality	1. Use of temporary erosion control in areas of work 2. Install temporary storm water controls in areas where storm water runoff from operational areas is discharging directly into the Great Salt Pond 3. Establish quality of sediments in area of new ring dike 4. Establish quality of soil to be used for ring dike construction to be of equal or better quality than sediment quality of area where soil is to be deposited 5. Set-up surface water quality monitoring system during construction activities	1. Contractors 2. Contractor 3. Contractor 4. Contractor 5. Contractor	Surface water monitoring during construction activities Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Ecology	1. Continuation of the biological surveys to monitor the flora and fauna species located along the perimeter of the SWDS and IDS 2. Inspection of mangrove vegetation along SWDS and IDS for nesting birds and removal of identified vegetation only when no nesting takes place on species level in line with the ecological guidelines for the contractor in Appendix 7 3. Monitoring of oxygen levels in GSP and additional measures to increase oxygen levels during installation of ring dike when oxygen levels are too low for aquatic life 4. Minimize the removal of mangroves and replace mangroves that require removal with a like for like planting density of at least 1 per 0.8 m2	1. Contractor 2. Contractor 3. Contractor 4. Contractor	Quarterly biological survey during construction activities NRPB &VROMI/ Monitoring, Independent Supervising Engineer, Supervision and inspections
Ecology – Vector control	1. Promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides 2. Select and apply pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment 3. 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 4. Any pesticides that will be handled, stored, disposed of, and applied for vector control will comply with the minimum standards described in Appendix 6	1. Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor	Independent Supervising Engineer

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	5. Contractor will develop and implement a Vector Control sub-Plan. Contractor will refer to the Pest Management Guideline (see Appendix 6)		
Worker Health and Safety	1. Strict adherence to the various MSIPs (will be a part of the C-ESMP) for all construction workers, landfill workers and visitors. 2. Training for personal protective equipment, safe work practices, SEA/SH, and decontamination 3. Material salvagers and visitors will be prohibited from entry into the operational areas 4. Implementation of incident command structure with strict stop work authority should hazards occur that are difficult to manage or control 5. Provide workers with appropriate protective clothing, gloves, safety goggles, dust masks and slip-resistant shoes for waste transport workers and hard-soled safety shoes for all workers to avoid puncture wounds to the 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 6. For all activities in or close to the water; provide all staff with life vests and work in pairs at all times 7. For all activities at slopes steeper than 3:1, ensure workers are situated on upslope side of equipment 8. Provide all construction equipment, excavators, dozers with enclosed airconditioned cabs and roll-over protection	1. Contractor 2. Contractor 3. Contractor/VROMI 4. Contractor 5. Contractor 6. Contractor 7. Contractor 8. Contractor 9. Contractor 10. Contractor 11. MSWDS OPERATOR 12. Contractor 13. Contractor 14. Contractor 15. Contractor 16. Contractor 17. Contractor 18. Contractor 19. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections VSA (labour inspection)

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	9. Restrict access to operational parts such that only safety-trained personnel with protective gear are permitted to high-risk areas 10. Provide workers with communications tools, such as radios 11. Control and characterize incoming waste to avoid chemical exposure 12. Provide adequate personnel facilities, including washing areas and areas to change clothes before and after work 13. Prohibit eating, smoking, and drinking except in designated areas 14. Maintain good housekeeping in waste processing and storage areas 15. Clean and wash with disinfectant the cabins of heavy mobile equipment used at regular intervals 16. Provide LEL meters for drilling and excavation activities at the landfill site to measure methane concentrations and detect possible methane pockets 17. Provide truck wash facilities to limit off-site movement of contaminants 18. Have a GRM in place for all, 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 19. Adhere to local legislation and World Bank guidelines regarding labour conditions and is required to provide mitigation measures and plan on the implementation thereof in writing in the C-ESMP 20. Draft a Vector Control sub-Plan as part of the EHS management and Implement Vector control practises	20. Contractor	

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Public Health and Safety	1. Develop and implement a MSIP for Stakeholder Engagement, Consultation and Complaints as a part of C-ESMP. 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 2. Strict adherence to the Traffic Management Plan to decrease the potential of vehicular accidents both at the SWDS, IDS sites and the surrounding roadways 3. Limit the duration that waste material is exposed during operational activities, therefore, reducing the potential for increased pestilence 4. Implementation of incident command structure with strict stop work authority should hazards occur that are difficult to manage or control 5. Implement Vector control practises 6. Implement noise, dust and odour control practices and monitoring 7. Implement strict SEA/SH control of project labour through individual Contracts on the issue 8. Ensure community members are aware of the GRM and ensure easy access to both contractor and NRPB GRM mechanisms	1. NRPB / Contractor 2. Contractor 3. Contractor 4. Contractor 5. Contractor 6. Contractor 7. Contractor 8. Contractor/NRPB	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections
Aesthetic	1. Facilitate greening of non-operational areas through irrigation 2. Ensure use of local, natural materials for rock amour or other protection measures where possible. D&B Contractor to submit details of the proposed materials for the rock armour for prior approval of the Engineer. Approval shall only be granted if the materials proposed are	1. Contractor 2. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
	similar in shape, size, colour and chemical composition to the materials of the salt pan monument walls		
Archaeological, Historic, and Cultural Heritage	1. Ensure embankments of the site at the Great Salt Pond are of similar structure / view as the original Salt Pan banks by using locally available natural rocks. D&B Contractor to submit details of the proposed materials for the rock armour for prior approval of the Engineer. Approval shall only be granted if the materials proposed are similar in shape, size, colour and chemical composition to the materials of the salt pan monument walls 2. Keep in place existing Salt Pan structures and cover them without disturbing them with the Ring Dike where necessary	1. Contractor 2. Contractor	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections
Natural Disaster Risk	1. Maintain the SWDS/IDS landfill slope stability and profiling practices under the best practices and standards 2. Have in place a rapid response for emergency and protocols to comply with the national emergency plan 3. Conduct regular training and exercises for site staff regarding emergency procedures 4. Cease operations in case of impeding tropical storm or hurricane in compliance with national regulations, prepare site against impacts of heavy winds and rains to limit environmental impacts	1. MSWDS OPERATOR/ Contractor 2. Contractor / MSWDS OPERATOR 3. Contractor / MSWDS OPERATOR 4. Contractor / MSWDS OPERATOR	Independent Supervising Engineer, NRPB &VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Administration	1. Review and update the C-ESMP and associated subplans in 3 months intervals	1. Contractor	Independent Supervising Engineer, NRPB &VROMI – 3 monthly checks

*Table 10.2 Project Environmental, Social Impacts, Risks and Concerns with Mitigation Measures, Responsibilities and Means of Verification –Operational / **Closure Phase***

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Air Quality – Landfill Gasses	1. Control and maintenance of landfill gas biofilter facilities	1. VROMI	VROMI/ Monitoring, Supervision and inspections Use of LEL meter to detect methane and check for efficiency of biofilters
Air Quality	1. Implement dust control measures for Shredder and Crusher 2. Implement dust control measures for Steel Crushers / WWR to applicable standards such as hindrance permits	1. VROMI 2. Steel Crushers / WWR	VROMI/ Monitoring, Supervision and inspections
Noise	1. Limit noise levels for Shredder and Crusher to applicable standards such as EHS Guidelines and hindrance permit 2. Limit noise levels for Steel Crushers / WWR to applicable standards such as hindrance permits. Construction of noise barrier in case exceedance at point of receptor	1. VROMI 2. Steel Crushers / WWR	VROMI/ Monitoring, Supervision and inspections
Hydrogeology, hydrology and surface water quality	1. Maintain groundwater monitoring network	1. VROMI	VROMI/ Monitoring, Supervision and inspections

Environmental, Social Impact Risks and Concerns	Mitigation Measures	Responsibility	Means of Verification / Supervision
Soil	1. Install and maintain soil protection measures in accordance with Hindrance permit 2. Collection of liquids in accordance with Hindrance permit	1. Steel crushers / WWR 2. Steel crushers / WWR	VROMI/ Monitoring, Supervision and inspections
Aesthetic	1. Keep closed areas of the site green and landfill cover up to required thickness 2. Maintenance of mangroves 3. Maintenance of roads, fences, gates 4. Ensure use of local, natural materials for rock amour or other protection measures where possible 5. Maximum height of stockpiles to be enforced. Hindrance permit to include stockpile height	1. VROMI 2. VROMI 3. VROMI 4. VROMI 5. VROMI/Steel Crushers/WWR	VROMI/ Monitoring, Supervision and inspections
Natural Disaster Risk	1. Check MSWDS landfill slope stability prior to and following natural disasters 2. Have in place a rapid response for emergency and protocols to comply with the national emergency plan.	1. VROMI 2. VROMI	VROMI/ Monitoring, Supervision and inspections
Traffic	1. Access road to VROMI yard to be extended and paved	1. VROMI	VROMI/ Monitoring, Supervision and inspections

Our reference R007-1293149IKR-V05-nnc-NL

Appendix 3 Code of Conduct Minimum Requirements for Contractor

Our reference R007-1293149IKR-V05-nnc-NL

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 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 Air Monitoring Plan Guideline for Contractor

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

Appendix 4 Incidents and Accidents Reporting Forms

Part B: To be completed within 24 hours

B1: Incident Details			
Date of Incident:	**Time:**	**Date Reported to PIU:**	**Date Reported to WB:**
Reported to PIU by:	**Reported to WB by**:	**Notification Type**: Email/'phone call/media notice/other	
Full Name of Main Contractor:		**Full Name of Subcontractor**:	

B2: Type of incident (please check all that apply)[1]
Fatality ☐ Lost Time Injury ☐ Displacement Without Due Process ☐ Child Labor ☐ Acts of Violence/Protest ☐ Disease Outbreaks ☐ Forced Labor ☐ Unexpected Impacts on heritage resources ☐ Unexpected impacts on biodiversity resources ☐ Environmental pollution incident ☐ Dam failure ☐ Other ☐

[1] See Annex 1 for definitions

B3: Description/Narrative of Incident
Please replace text in italics with brief description, noting for example: *I. What is the incident?* *II. What were the conditions or circumstances under which the incident occurred (if known)?* *III. Are the basic facts of the incident clear and uncontested, or are there conflicting versions? What are those versions?* *IV. Is the incident still ongoing or is it contained?* *V. Have any relevant authorities been informed?*

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B4: Actions taken to contain the incident			
Short Description of Action	**Responsible Party**	**Expected Date**	**Status**
For incidents involving a contractor: Have the works been suspended (for example, under GCC8.9 of Works Contract)? Yes ☐; No ☐; Trading name of Contractor (if different from B1): Please attach a copy of the instruction suspending the works.			

B5: What support has been provided to affected people

Annex 1: Incident Types

The following are incident types to be reported using the environmental and social incident response process:

Fatality: Death of a person(s) that occurs within one year of an accident/incident, including from occupational disease/illness (e.g., from exposure to chemicals/toxins).

Lost Time Injury: Injury or occupational disease/illness (e.g., from exposure to chemicals/toxins) that results in a worker requiring 3 or more days off work, or an injury or release of substance (e.g., chemicals/toxins) that results in a member of the community needing medical treatment.

Acts of Violence/Protest: Any intentional use of physical force, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, deprivation to workers or project beneficiaries, or negatively affects the safe operation of a project worksite.

Disease Outbreaks: The occurrence of a disease in excess of normal expectancy of number of cases. Disease may be communicable or may be the result of unknown aetiology.

Displacement Without Due Process: The permanent or temporary displacement against the will of individuals, families, and/or communities from the homes and/or land which they occupy without the provision of, and access to, appropriate forms of legal and other protection and/or in a manner that does not comply with an approved resettlement action plan.

Child Labor: An incident of child labor occurs: (i) when a child under the age of 14 (or a higher age for employment specified by national law) is employed or engaged in connection with a project, and/or (ii) when a child over the minimum age specified in (i) and under the age of 18 is employed or engaged in connection with a project in a manner that is likely to be hazardous or interfere with the child's education or be harmful to the child's health or physical, mental, spiritual, moral or social development.

Forced Labor: An incident of forced labor occurs when any work or service not voluntarily performed is exacted from an individual under threat of force or penalty in connection with a project, including any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor-contracting arrangements. This also includes incidents when trafficked persons are employed in connection with a project.

Unexpected Impacts on heritage resources: An impact that occurs to a legally protected and/or internationally recognized area of cultural heritage or archaeological value, including world heritage sites or nationally protected areas not foreseen or predicted as part of project design or the environmental or social assessment.

Unexpected impacts on biodiversity resources: An impact that occurs to a legally protected and/or internationally recognized area of high biodiversity value, to a Critical Habitat, or to a Critically Endangered or Endangered species (as listed in IUCN Red List of threatened species or equivalent national approaches) that was not foreseen or predicted as part of the project

design or the environmental and social assessment. This includes poaching or trafficking of Critically Endangered or Endangered species.

Environmental pollution incident: Exceedances of emission standards to land, water, or air (e.g., from chemicals/toxins) that have persisted for more than 24 hrs or have resulted in harm to the environment.

Dam failure: A sudden, rapid, and uncontrolled release of impounded water or material through overtopping or breakthrough of dam structures.

Other: Any other incident or accident that may have a significant adverse effect on the environment, the affected communities, the public, or the workers, irrespective of whether harm had occurred on that occasion. Any repeated non-compliance or recurrent minor incidents which suggest systematic failures that the task team deems needing the attention of Bank management.

Part C: To be completed following investigation

C1: Investigation Findings
Please replace text in italics with findings, noting for example: *I. where and when the incident took place,* *II. who was involved, and how many people/households were affected,* *III. what happened and what conditions and actions influenced the incident,* *IV. what were the expected working procedures and were they followed,* *V. did the organization or arrangement of the work influence the incident,* *VI. were there adequate training/competent persons for the job, and was necessary and suitable equipment available,* *VII. what were the underlying causes; where there any absent risk control measures or any system failures,*

C2: Corrective Actions from the investigation to be implemented (To be fully described in Corrective Action Plan)		
Action	**Responsible Party**	**Expected Date**

Part C cont.: To be completed following investigation

C3a: Fatality/Lost time Injury information

Immediate cause of fatality/injury for worker or member of the public (please check all that apply) [2]:

1. Caught in or between objects ☐ 2. Struck by falling objects ☐ 3. Stepping on, striking against, or struck by objects ☐ 4. Drowning ☐ 5. Chemical, biochemical, material exposure ☐ 6. Falls, trips, slips ☐ 7. Fire & explosion ☐ 8. Electrocution ☐ 9. Homicide ☐ 10. Medical Issue ☐ 11. Suicide ☐ 12. Others ☐

***Vehicle Traffic:* 13. Project Vehicle Work Travel ☐ 14. Non-project Vehicle Work Travel ☐ 15. Project Vehicle Commuting ☐ 16. Non-project Vehicle Commuting ☐ 17.Vehicle Traffic Accident (Members of Public Only) ☐**

Name	Age/DOB	Date of Death/Injury	Gender	Nationality	Cause of Fatality/Injury	Worker (Employer)/Public

[2] See Annex 2 for definitions

C3b: Financial Support/Compensation Types (To be fully described in Corrective Action Plan template) **1. Contractor Direct ☐ 2. Contractor Insurance ☐ 3. Workman's Compensation/National Insurance ☐** **4. Court Determined Judicial Process ☐ 5. Other ☐ 6. No Compensation Required ☐**			
Name	**Compensation Type**	**Amount (US$)**	**Responsible Party**

C4: Supplementary Narrative

Annex 2: Definition of fatality/injury immediate causes

1. **Caught in or between objects:** caught in an object; caught between a stationary object and moving object; caught between moving objects (except flying or falling objects)
2. **Struck by falling objects:** slides and cave-ins (earth, rocks, stones, snow, etc.); collapse (buildings, walls, scaffolds, ladders, etc.); struck by falling objects during handling; struck by falling objects
3. **Stepping on, striking against, or struck by objects:** stepping on objects; striking against stationary objects (except impacts due to a previous fall); Striking against moving objects; Struck by moving objects (including flying fragments and particles) excluding falling objects
4. **Drowning:** respiratory impartment from submersion/emersion in liquid
5. **Chemical, biochemical, material exposure:** exposure to or contact with harmful substances or radiations
6. **Falls, trips, slips:** falls of persons from heights (e.g., trees, buildings, scaffolds, ladders, etc.) and into depths (e.g., wells, ditches, excavations, holes, etc.) or falls of persons on the same level
7. **Fire & explosion:** exposure to or contact with fires or explosions
8. **Electrocution:** exposure to or contact with electric current
9. **Homicide:** a killing of one human being by another
10. **Medical Issue:** a bodily disorder or chronic disease
11. **Suicide:** the act or an instance of taking, or attempting to take, one's own life voluntarily and intentionally
12. **Others:** any other cause that resulted in a fatality or injury to workers or members of the public

Vehicle Traffic

13. **Project Vehicle Work Travel:** traffic accidents in which project workers, using project vehicles, are involved during working hours and which occur in the course of paid work
14. **Non-project Vehicle Work Travel:** traffic accidents in which project workers, using non-project vehicles, are involved during working hours and which occur in the course of paid work
15. **Project Vehicle Commuting:** traffic accidents in which project workers, using project vehicles, are involved while travelling to (i) the worker's principal or secondary residence;

(ii) the place where the worker usually takes his or her meals; or (iii) the place where he or she usually receives his or her remuneration

16. **Non-project Vehicle Commuting:** traffic accidents in which project workers, using non-project vehicles, are involved while travelling to (i) the worker's principal or secondary residence; (ii) the place where the worker usually takes his or her meals; or (iii) the place where he or she usually receives his or her remuneration
17. **Vehicle Traffic Accident (Members of Public Only):** traffic accidents in which non-project workers/members of the public are involved in an accident while travelling for any purpose

Our reference R007-1293149IKR-V05-nnc-NL

Part B: To be completed within 24 hours - SEA/SH

B1: Incident Details		
Date of incident intake by the project/GM:	**Date Reported to PIU:**	**Date Reported to WBG:**
Reported to project/GM by: **Is a record of this incident in GM?** Yes ☐ No ☐	**Reported to PIU by**: ☐ GM operator ☐ Directly, by Survivor ☐ Directly, by third party ☐ Other: _____	**Reported to WBG by**: ☐ PIU ☐ Directly, by Survivor ☐ Directly, by third party ☐ Other: _____

B2: Incident type (please check all that apply) See Appendix 1 for definitions
Sexual exploitation ☐ Sexual abuse ☐ Sexual harassment ☐

B3: Provide the following details from the GM record	
Age of survivor (if recorded in GM):	Have the national legislation or mandatory reporting requirements been followed? Yes ☐ No ☐
Sex of survivor (if recorded in GM): Male ☐ Female ☐ Other ☐	Was the survivor referred to service provision?[1] Yes ☐ No ☐
Is the survivor employed by the project (as indicated by the survivor or complainant and reported in the GM)? Yes ☐ No ☐	Is the alleged perpetrator employed by the project (as indicated by the survivor or complainant and reported in the GM)? Yes ☐ No ☐

B4: Basis for further action	
a. Has the complainant provided informed consent to lodge a formal complaint? Yes ☐ No ☐	c. Has the survivor provided informed consent to be part of an investigation into misconduct? Yes ☐ No ☐
b. Does the employer have a suitable administrative process and capacity in place to investigate misconduct relating to SEA/SH in a survivor-centered way? Yes ☐ No ☐	d. Has the complaint been filed anonymously or through a third party? Yes ☐ No ☐
If the answer to any of these questions is no, has the GM assessed the risks and benefits of carrying out an investigation into the alleged misconduct, taking into account the survivor's safety and wellbeing? Yes ☐ No ☐	
Will an investigation into misconduct be undertaken in addition to an investigation into adequacy of project systems, processes or procedures? Yes ☐ No ☐	

Appendix 1: Incident Types

Incident Type	Example
Sexual Exploitation: 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. In Bank financed operations/projects, sexual exploitation occurs when access to or benefit from a Bank financed Goods, Works, Non-consulting Services or Consulting Services is used to extract sexual gain.	• A community member is promised employment on the World Bank financed project site in exchange for sex • A member of the project team connecting water lines to homes requests a sexual favor for access to water connection • A project worker denies passage of a woman through the worksite unless she performs a sexual favor
Sexual Abuse: Actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions. In Bank financed operations/projects, sexual abuse occurs when a project related worker (contractor staff, subcontractor staff, supervising engineer) uses force or unequal power vis a vis a community member or colleague to perpetrate or threat to perpetrate an unwanted sexual act.	• A project worker abuses a community member • A project worker has a sexual relationship with a child • A project worker befriends a child, supporting her and/or her family in exchange of sexual favors • A project worker stays in the cafeteria after dinner and sexually assaults a kitchen staff member • A project worker touches an administrative staff member's body • A supervisor for a subcontractor asks his female colleague to join him for a business dinner with the main contractor. After dinner he asks her to entertain "the boss" in his room as an appreciation for the contract and her work
Sexual Harassment: Any unwelcome sexual advance, request for sexual favor, verbal or physical conduct or gesture of a sexual nature, or any other behavior of a sexual nature that might reasonably be expected or be perceived to cause offence or humiliation to another, when such conduct interferes with work, is made a condition of employment, or creates an intimidating, hostile or offensive work environment. In Bank financed operations/projects, sexual harassment occurs within the context of a subcontractor or contractor and relates to employees of the company experiencing unwelcome sexual advances or requests for sexual favor or acts of a sexual nature that are offensive and humiliating among the same company's employees.	• A worker sends sexually explicit text messages to a coworker • A colleague leaves an offensive picture that is sexually explicit on a co-worker's desk • A project worker asks all female employees to great him with a kiss on the cheek every day before work • A project worker compliments his co-worker's body • A project worker continuously invites a co-worker out for drinks or dinner after being told that they are not interested

Part C: To be completed following investigation – SEA/SH

C1: Findings of the investigation	
Have sanctions against a perpetrator been recommended as part of an investigation into misconduct? Yes ☐ No ☐	Has an investigation into adequacy of project systems, processes or procedures been undertaken? Yes ☐ No ☐

C2: Corrective actions to be implemented (To be fully described in Corrective Action Plan)		
Short Description of Action (SEA/SH examples)	**Responsible Party**	**Timeline for completion/Status**
Referral of Survivor to holistic care services		
Undertake disciplinary investigation in accordance with GM timelines and confirmed process		
Disciplinary actions, including sanctions, to be applied following misconduct investigation by Employer		
Increased training on Codes of Conduct (CoC)		
Audit of implementation of SEA/SH safety mitigation		
Strengthened awareness training on project-related risks, CoC and how to report incidents for project-affected community		
Training for project supervisors on the need to follow guidelines of behaviour in CoC and their supervisory responsibilities		
Plan to improve coverage/quality of service provision		
Any other system strengthening measures or corrections for system failures that are necessary		

C3: For incidents involving a Contractor:
Has the incident been referred to the DAAB? Yes ☐ No ☐

Our reference R007-1293149IKR-V05-nnc-NL

Part B: To be completed within 24 hours - SOGI

B1: Incident Details		
Date of incident intake by the project/GM:	**Date Reported to PIU:**	**Date Reported to WBG:**
Reported to project/GM by:	**Reported to PIU by**: ☐ GM operator ☐ Directly, by victim[1] ☐ Directly, by third party ☐ Other: _____	**Reported to WBG by**: ☐ PIU ☐ Directly, by victim[1] ☐ Directly, by third party ☐ Other: _____

1. If reporting is by victim care must be taken to adhere to any requests for anonymity.

B2: Incident type requiring confidentiality (please check all that apply)
Violence on basis of SOGI ☐ Discrimination on basis of SOGI ☐ See Appendix 1 for definitions

B3: Basis for further reporting	
a. Has the victim provided informed consent for this incident to be reported? Yes ☐ No ☐	**b.** Does national legislation or mandatory reporting apply to this case? Yes ☐ No ☐ c. If yes, has it been reported? Yes ☐ No ☐
If the answer to both a. & b. questions is NO, further reporting of this allegation is not required. **However, further measures to strengthen SOGI prevention and mitigation on the project should be provided below.**	

Further measures to strengthen SOGI prevention and mitigation		
Short Description of Action (*Examples: Please replace text in italics below with brief description of actions to be taken*)	**Responsible Party**	**Expected Date**
Increased training on Codes of Conduct (CoC) and non-discrimination on the basis of SOGI		
Safety audit of project site focussing on SOGI		
Verification all employees sign and understand CoC		

Strengthened awareness on project-related risks, CoC and how to report incidents for project-affected community		
Active outreach to local civil society organisations working with social and gender minorities to ensure continuous risk monitoring and adaptation		
Training for project supervisors on the need to follow guidelines of behaviour in CoC and their supervisory responsibilities		
Plan to improve coverage/quality of service provision		
Additional training for GM focal points		
Other (please detail)		

B4: If consent has been provided or national legislation mandates reporting of the incident as indicated in B3, provide the following details from the available GM record	
Age of victim (if recorded in GM):	
Sex of victim (as recorded in GM):	Male ☐ Female ☐ Other ☐
Has the victim self-identified as sexual or gender minority or are there indications that the case is related to SOGI (i.e., use of homo- or transphobic language)?	Yes ☐ No ☐
Was the victim referred to service provision?	Yes ☐ No ☐
Is the alleged perpetrator employed by the project (as indicated by the victim and reported in the GM)?	Yes ☐ No ☐

B5: Basis for investigation	
Has the victim provided informed consent for this incident to be investigated?	Yes ☐ No ☐
If the answer to this question is yes, complete part C below using the results of the investigation	

Appendix 1: Incident Types

Violence on the basis of SOGI:

The threat or use of physical force that injures or abuses a person, or damages or destroys property, and that is motivated in whole or in part by the victim's real or perceived sexual orientation, gender identity, gender expression, or sex characteristics.

Discrimination on the basis of SOGI:

Discrimination means creating a distinction, exclusion, or restriction which has the purpose or effect of impairing or excluding a person based on their real or perceived sexual orientation, gender identity, gender expression, or sex characteristics from being on an equal basis with others.

Part C: To be completed following investigation where further reporting is permitted (see Incident Form SOGI Part B)

C1: Corrective actions from the investigation to be implemented (to be fully described in Corrective Action Plan)		
Short Description of Action (*Examples: please replace text in italics below with brief description of actions to be taken*)	**Responsible Party**	**Expected Date**
Referral of victim to holistic care services		
Disciplinary actions, including sanctions, to be applied following misconduct investigation		
Measures to prevent similar instances from happening in the future		
Measures to address gaps in procedural manuals or implementation of procedures that contributed		
Measures to change/modify program practices to prevent recurrence		
Where additional training might be needed		

[1] When a complaint is filed by a third party, or the survivor has not reached out to the project, the project may not be able to confirm this information. In these cases, it may not be advisable for the project GM to attempt to reach the survivor, as this may jeopardize confidentiality, safety, and agency. Projects may attempt to find safe ways to pass information indirectly (such as through broad efforts to inform) about services available.

Appendix 5 Monthly Reporting Template

Environmental, Social, Health & Safety Monthly Report Template

(*contractor to adjust content according to project specific requirements)

Cover Page

- Project Title
- Contractor's/Company's Name, Contact Information, Address
- Site Location
- Reporting Period
- Date of Report
- ESHS manager name
- ESHS Supervisor consultant name

Table of Contents

Include a table of contents

Project Progress Status

Brief Description of Project Progress Status for the reporting period

Accidents and Incidents

Provide a summary of all accidents/incidents reported during reporting period (and for previous periods in case still relevant)

Date of Incident/Accident/Non-Compliance	Description	Results (Injuries. Fatalities, Treatment)	Current Status/Update

Capacity Building / Training

Training Topic	Date	Location	hrs	Instructor	Participants	% of Workers
PPE use						
Working on excavations						
Scaffolds & Ladders						
Solid waste						
Wastewater, fuel, paints/solvents						
Fire extinguishing						
Code of Conduct						
SEA/SH						
GRM						

Inspection Schedule

(List ESHS site inspection dates of current and coming month)

Site Description	Date	Date	Date	Date	Date	Date	Date	Date
ESHS Inspector Name								

GRM

Workers and community complaints and actions (separate tables to be used for both)

Date of Lodging of Complaint	Site/Location of Complaint and Person Receiving	Nature of Complaint (Brief Description)	Action Taken to Resolve the complaint. If not resolved, state current status of the complaint, including follow-up actions

Training Overview

Provide an overview of trainings and toolbox discussions provided during the reporting period. (Training topics list is not inclusive. Please adjust according to project specific requirements)

Toolbox Topic	**Date**	**Location**	**min**	**Instructor**	**Participants**	**% of Workers**
Slips, trips and falls						
Work at height, use of ladders and scaffolding						
Work near existing services						
Manual handling						
Electrical hazards						
Working in confined spaces						

Falling objects						
Fire safety						
Traffic safety						
Construction plant, equipment and tools						
Excavation						
Hazardous materials						
Eye protection, head protection, hearing protection and so on						
Materials storage						
Behaviour in accordance with the CoC						
……						

(Toolbox topics list is not exhaustive. Please adjust according to project specific requirements)

Future Actions & C-ESMP Updates

Describe lessons learned, coming month initiatives for improvement and necessary future updates of the C-ESMP based on past experience.

Non-Conformances

Date	Site	Inspector	Description of Non-conformance	Corrective actions	Date of Implementation & Responsibility	ESHS ID

ESHS ID

1. PPE's use and signage.
3. Working on Heights (scaffolding, ladders, harnesses, lanyards, etc)
4. Community health & safety (Security fencing and signage, noise, safe pedestrian walkways, no road obstructions, traffic signs, etc)
5. Occupational health & safety (toilet, washing station, resting room, drinking water, first aid kit, emergency phone numbers, valid fire
6. extinguisher, etc)
6. Solid waste management, including dust prevention and a tide jobsite (skips, bins, tarps, recycling, etc)
7. Wastewater management
8. Hazardous materials. Mold management. Asbestos management. Fuels, paints, thinners, etc, storage & disposal.
9. Electrical hazards
10. Code Of Conduct violation, GRM/SEA/SH management, Accidents or Incidents reporting
11. Plans, Files and Records (C-ESMP reporting/updates, Permits/Licenses, Vehicles motor test/maintenance, training records, etc)

Our reference R007-1293149IKR-V05-nnc-NL

Metrics

Men Hours		Environmental Incidents		H&S Accidents		Near misses		Medical Leave days[1]		ESHS Meetings		ESHS Inspections		ESHS Manager hrs	
Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date

Non-Conformances (NCs)		Open NCs		Closed NCs		Stop Work Exercised		Warnings Given		Workers Removed from Site		CoC Violations		Grievances Submitted	
Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date

Grievances Resolved		Waste Produced		Waste Recycled		Water Consumption		Wastewater production		Fuel Consumption					
Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date	Current month	To date				

1. Caused by accident or occupational illness

Non-Conformances Statistics

ESHS ID	Explanation	Non-Conformances (Current Month)		Non-Conformances (Up to Date)	
		Total	Open	Total	Open
1.	PPE's use and signage.				
2.	Working on Heights (scaffolding, ladders, harnesses, lanyards, etc)				
3.	Community health & safety (Security fencing and signage, noise, safe pedestrian walkways, no road obstructions, traffic signs, etc)				
4.	Occupational health & safety (toilet, washing station, resting room, drinking water, first aid kit, emergency phone numbers, valid fire extinguisher, etc)				
5.	Solid waste management, including dust prevention and a tide jobsite (skips, bins, tarps, recycling, etc)				
6.	Wastewater management				
7.	Hazardous materials. Mold management. Asbestos				

	management. Fuels, paints, thinners, etc, storage & disposal.		
8.	Electrical hazards		
9.	Code Of Conduct violation, GRM/GBV management, Accidents or Incidents reporting		
10.	Plans, Files and Records (C-ESMP reporting/updates, Permits/Licenses, Vehicles motor test/maintenance, training records, etc)		

Files & Records

Minimum Records to keep

- Updated MSIPs or CESMP
- Permits and licenses as applicable to the project
- Accidents and Incidents
- Non-conformances and corrective actions database
- GRM records
- Employees work permits and copies of IDs (to confirm they are over 18)
- Signed Code of Conduct by all workers
- Training records (training dates, training place, name of instructor, training duration, name of participants, signatures of participants)
- Toolbox briefings (training dates, training place, name of instructor, training duration, name of participants, signatures of participants)
- Warnings given and workers removed from site
- Drivers licenses
- Vehicles motor test records
- Equipment maintenance records

Mitigation Measures Implementation & Performance

(Note: Contractor should include photographs to record onsite mitigation activities as applicable.)

(Minimum mitigation measures are described below. Contractor to further elaborate based on C-ESMP)

Monitoring Parameter/Activity	Percentage or Score	Comments
Jobsite General		
1. Clean and tide jobsite		
2. Posters and safety signs in place		
3. Emergency phone numbers posted		
Community Safety		
4. Barriers to prevent unauthorized access and fall in risks		
5. Safe pedestrian walkways		
6. No Obstruction on roads and sidewalks		
7. Traffic signs are placed wherever required		
Work Hazards & Occupational Health		
8. Personal Protective Equipment (hard hats, goggles, dust masks, boots, gloves, hearing protection)		
9. Access of trenches deeper than 1.2m		
10. Falling protection		
11. Stable surface for ladders		
12. Power tools safety		
13. First Aid kit		
14. Access to areas for rest (canteen)		
15. Hygiene facilities		
16. Drinking water supply		
Solid Waste		
17. Sufficient waste bins/skips in place		
18. Rain and wind protection		
19. Segregate materials for recycling		
20. Waste chain of custody records		
Dust		
21. Covered loose material stockpiles, waste skips and trucks		
22. Watering for dust prevention		
Wastewater		
23. Collection, storage and disposal in authorized facility		
24. Silt stormwater runoff		
Noise		
25. Noise level at site boundaries <60dBA		

26. Noise level at site boundaries with sensitive receptors <55dBA		
27. Workers noise exposure <85dBA		
28. Bending of metal sheets		
Hazardous Materials		
29. Stored inside covered premises and on impermeable surface		
30. Use of secondary spill containment equipment		
31. Spill Kit and Availability of absorption materials		
32. Safe storage of used oils and paint buckets		
Fire & Electrical Safety		
33. Fire extinguishers number and type according to Fire Safety Plan		
34. Flammable materials (fuel, waste, etc) are safely stored		
35. Flashback arrestors		
36. Use of electrical equipment that is RCD-protected		
37. Electrical equipment shall be in good working condition.		
38. Electrical equipment is protected from weather		
Labor Management		
39. Number of workers that signed the CoC		
40. Workers' salary and insurance contribution shall be paid by employer		
Files, Plans & Records		
41. Non-Conformances are logged		
42. Monthly Reports are submitted		
43. Workers are properly trained, including the Induction training before mobilization to site and regular toolbox talks.		
44. C-ESMP updates		
45. Equipment/Vehicles maintenance		
46. Safety Checklists		
47. Incidents & Accidents		
48. Complaints records (resolved and pending)		

Appendix 6 Pest Management Guideline

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 pesticides that are 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

Appendix 7 Ecological Guidelines for Contractor

[PDF attachment marker]

Our reference R007-1293149IKR-V05-nnc-NL

Appendix 8 Air, soil, water and H&S Monitoring Plan

Table A8.1 Air, soil, water and H&S Monitoring Plan

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
Baseline	**Air Quality** - Community Health Risk from air emissions (dust)	PM 10	Contractor	1 month prior to start of operations	3 monitoring stations: • Border between SWDS and commercial area (at vehicle inspection) • Northern side of IDS, at closest housing area • West side of GSP, downwind of the MSWDS	Dust measurements taken at 1.5 m above surface. Samplers in an area free of obstructions. With remote analyser for real time monitoring and registration of 24-hour mean	N.A.
Baseline	**Air Quality** - Community Health Risk from air emissions (dust)	Heavy metals (Al, B, Ca, Cr, Cu, Fe, K, Mg, Mn, Na, Sb, Si, Sn, Sr, Ti, Zn) and PAH, PM10 in dust	Contractor	1 month prior to start of operations	3 monitoring stations: • Border between SWDS and commercial area (at vehicle inspection) • Northern side of IDS, at closest housing area • West side of GSP, downwind of the MSWDS	Dust measurements taken at 1.5 m above surface. Samplers in an area free of obstructions. Monthly average analysed in ISO 17025 accredited laboratory	N.A.

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
Baseline	**Roads and Traffic** - Impact on road quality	Presence of cracks, damages	Contractor	Single baseline before start of operations of heavy machinery and import of soil by truck	Public roads the contractor intends to use, with special focus on Soualiga road between access road to VROMI Yard and Northern bridge over GSP (bridge included)	Visual Inspection, photo report of existing damages	N.A.
Baseline	**Noise** - Noise on the community	dbA	Contractor	Daily for a period of 24 hrs. Differentiate between daytime / evening / nighttime. Baseline for one week – during regular work week	At closest commercial / residential area house to SWDS/IDS (South) At closest commercial / residential area house to SWDS/IDS (North)	Continuous sound level meter for 24hrs / 7 days	N.A.
Baseline	**Geology and Soils -** Soil quality deterioration	Organic matter, clay content, dry weight, Ba, Cd, Co, Cu, Hg,	Contractor	Single baseline	All areas outside current dumpsite where contractor has operations (RAI) – approximately 16.000 m2	NE5740 – strategy for unsuspected site or similar	In case contamination identified above Dutch I-values

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
		Pb, Mb, Ni, Zn, PCB(7), PAH(10), TPH					– risk assessment
Baseline	**Geology and Soils -** Soil quality deterioration	Organic matter, clay content, dry weight, Ba, Cd, Co, Cu, Hg, Pb, Mb, Ni, Zn, PCB(7), PAH(10), TPH	VROMI	Single baseline	All areas outside current dumpsite (VROMI yard) **not in operation** by the contractor – approximately 59.000 m2	NE5740– strategy for unsuspected site or similar	In case contamination identified above Dutch I-values – risk assessment and remediation where needed
Baseline	**Geology and Soils -** Sediment quality in area of future ring dike	Organic matter, clay content, dry weight, As, Cd, Cr, Cu, Hg, Pb, Ni, Zn, DDT, HCB, PCB(7), PAH(10), TPH, TBT	Contractor	Single baseline	Along waterfront of SWDS and IDS with GSP, for section where new ring dike will be constructed	NEN 5720 or similar - additional requirement of maximum interval 100 m of shore length	Risk assessment – additional OHS measures for handling the materials in line with CROW 400 and/or ASTM E 2798
Baseline	**Hydrogeology, hydrology and surface water quality** - Water	pH, DO, Ec, Temperature, Turbidity, BOD, COD, TN, TP, E. Coli,	Contractor	Single baseline	Five sampling points: • Outlet drainage channel • NW side of SWDS • North side of SWDS	NEN 6600-2 or similar	N.A.

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
	quality deterioration	Chloride, Heavy Metals (As, Ba, Cd, Co, Cu, Hg, Pb, Mb, Ni, Zn), PFAS, TPH,			• Bridge at Soualiga road • NE side of IDS •		
Baseline	**Ecology -** Impact on project ecology	Fauna, Flora, Nesting birds, mangrove trees	Contractor	Single baseline, maximum 3 month before start of works	Along waterfront of SWDS and IDS with GSP in area of mangrove vegetation. And nesting birds on visible Salt Pan walls in proximity to IDS/SWDS	Visual inspection and identification by independent third party of mangrove vegetation and breeding birds	N.A.
Baseline	**Archaeological, Historic, and Cultural Heritage – Inventory of remaining Salt Pan structures present**	Presence of Salt Pan rock dikes	VROMI / MECYS / Contractor	Single baseline prior to start of works	Along water front of IDS, and SWDS, include adjoining 20 m in assessment	Visual Inspection, inspection of remaining submerged structures to record form, structure, condition and compostion, photo report of existing structures by independent third party	
Baseline	**Natural Disaster Risks** - Slope stability	Presence of crevasses and cracks, slope grade	Contractor	Prior to start of works	SWDS and IDS	Visual inspection of slopes for presence of large crevasses or cracks – annotation of their location on map. Drone survey for slope grade and, in case of too steep grade + large	N.A.

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
						crevasses or cracks, assessment of slope stability	
Construction	**Air Quality -** Occupational Health Risk from air emissions (dust)	PM 10	Contractor	Continues downwind in areas of operations with movement of wastes or soil	SWDS and IDS	Portable PM 10 meter	
Construction	**Air Quality -** Community Health Risk from air emissions (dust)	PM 10	Contractor	Continuous during operations	3 monitoring stations: • Border between SWDS and commercial area (at vehicle inspection) • Northern side of IDS, at closest housing area • West side of GSP, downwind of the MSWDS	Dust measurements taken at 1.5 m above surface. Samplers in an area free of obstructions. With remote analyser for real time monitoring and registration of 24-hour mean	Air quality standards for the islands of the Netherlands Antilles set by the Working Group on Environmental Standards Netherlands Antilles - Milieunormering Nederlandse Antillen (WMNA)

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
							(Eindrapport Milieunormen Nederlandse Antillen, 11 June 2007)
Construction	**Air Quality -** Occupational Health Risk from air emissions (landfill gas)	Methane, Lower Explosion Limits	Contractor	After installation of sections of LFG collection system. For each system connected to vertical drain	SWDS and IDS	Visual inspection using portable LEL-meter	For site operations – LEL at 5% - review by ESHS manager for safe working conditions
Construction	**Air Quality -** Community Health Risk from air emissions (dust)	Heavy metals (Al, B, Ca, Cr, Cu, Fe, K, Mg, Mn, Na, Sb, Si, Sn, Sr, Ti, Zn) and PAH in dust	Contractor	Quarterly during operations	3 monitoring stations: • Border between SWDS and commercial area (at vehicle inspection) • Northern side of IDS, at closest housing area West side of GSP, downwind of the MSWDS	Dust measurements taken at 1.5 m above surface. Samplers in an area free of obstructions. With remote analyser for real time monitoring and registration of 24-hour mean	Tolerable Concentration in Air (TCA) – after Baars AJ, Theelen RMC, Janssen PJCM, Hesse JM, Van Apeldoorn ME, Meijerink MCM, Verdam L, Zeilmaker MJ. (2001) Re-

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
							evaluation of human-toxicological maximum permissible risk levels RIVM report 711701025, National Institute for Public Health and the Environment, Bilthoven, the Netherlands.
Construction	**Roads and Traffic** - Impact on road quality	Presence of cracks, damages	Contractor	Monthly during periods with heavy machinery use of the Soualiga road	Soualiga road between access road to VROMI Yard and Northern bridge over GSP (bridge included)	Visual Inspection, photo report of existing damages, immediate repair and registration of repair	N.A.
Construction	**Roads and Traffic** –	Complaints, traffic fines, observations	Contractor	Continuously	Area between MSWDS and Port facilities	Central registration of all complaints and traffic fines of vehicles involved.	N.A.

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
	Adherence to traffic regulation	during operations					
Construction	**Noise** - Noise on the community	dbA	Contractor	–At least every three months during a regular working week. Daily from 07:00 till 19:00	At closest commercial / residential area house to SWDS/IDS (South) At closest commercial / residential area house to SWDS/IDS (North) Or between source area and location in case of complaints	Continuous noise level meter	Compliance with Eindrapport Milieunormen Nederlandse Antillen, 11 June 2007 Works shall not result in more than 3dBA increase at receptors
Construction	**Geology and Soils** - Import of contaminated soil with non-native species	Organic matter, clay content, dry weight, Ba, Cd, Co, Cu, Hg, Pb, Mb, Ni, Zn, PCB(7), PAH(10), TPH	Contractor	Every batch of 10.000 tons (maximum batch size) or from different origins. A month before shipment.	All imported soil and sediments (does not apply to rock fragments or treated materials)	Composite sample conform AP-04 or proof of virgin origins (quarry). Visual inspection of presence of non-native species or seeds and germination test, where detected, DNA testing	Soil quality complies for use as industrial soil according to US EPA. No visual presence of non-native species – in case presence seeds and

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
							germination test to establish no potentially invasive species are present
Construction	**Hydrogeology, hydrology and surface water quality** - Water quality deterioration	pH, DO, Ec, Temperature, Turbidity, BOD, COD, E. Coli, Chloride, Heavy Metals (Ba, Cd, Co, Cu, Hg, Pb, Mb, Ni, Zn), PFAS, TPH,	Contractor	Quarterly	Five sampling points: • Outlet drainage channel • NW side of SWDS • North side of SWDS • Bridge at Soualiga road • NE side of IDS •	NEN 6600-2 or similar	Compliance with Eindrapport Milieunormen Nederlandse Antillen, 11 June 2007 -or is heightened baseline, no significant (> 50%) increase of individual contaminants above baseline levels for more than 2 consecutive quarters

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
Construction	**Hydrogeology, hydrology and surface water quality** -Water quality deterioration – oxygen depletion	pH, DO, Ec, Temperature, Turbidity	Contractor	Daily during construction of ring dike	3 points at 10 m distance, in area where ring dike construction takes place	Field sampling	Implement mitigation measures when dissolved oxygen levels are below 3 mg/L
Construction	**Ecology -** Impact on project ecology	Nesting birds, protected species	Contractor	Every 3 months	Along waterfront of SWDS and IDS with GSP in area of mangrove vegetation	Visual inspection and identification based on instructions by independent third party	N.A.
Construction	**Worker Health and Safety** - Personnel Health & Safety. Risk of explosion, asphyxiation or harmful gases	Lower Explosion Limits	Contractor	Continuous when drilling and excavating in waste body	SWDS and IDS	Portable LEL meter for all operational equipment on-site	Following OHS guidelines
Construction	**Worker Health and Safety** - Social impact	Signed statements of all on-site employees, labour log, monitoring of housing of	Contractor	Quarterly, and for all new arrivals	At contractors' offices, on site during operations	Visual inspection and identification	N.A.

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
		international staff					
Construction	**Natural Disaster Risks** - Slope stability	Presence of crevasses and cracks, slope grade	Contractor	Bi-annually	SWDS and IDS	Visual inspection of slopes for presence of large crevasses or cracks – annotation of their location on map. In case of too steep grade + large crevasses or cracks, assessment of slope stability	N.A.
Closure / aftercare	**Worker Health and Safety** - Occupational Health Risk from air emissions (landfill gas)	Methane, Lower Explosion Limits at biofilter outlet	VROMI	Bi-annual after system has been finalized and handed over to operator	SWDS and IDS	Visual inspection using portable LEL-meter	
Closure / aftercare	**Various -** Environmental Impact	Status of implemented measures for damages (topcover, slopes, fencing, landfill gas collection system, surface	VROMI	Bi-annual after landfill area has been definitely closed	SWDS and IDS	Visual inspection	

Project Activity (phase)	Impact	Monitoring indicators	Responsibility	Frequency / duration	Location	Methods	Limit values
		water collection)					
Closure	**Geology and Soils -** Soil quality deterioration	Organic matter, clay content, dry weight, Ba, Cd, Co, Cu, Hg, Pb, Mb, Ni, Zn, PCB(7), PAH(10), TPH	Contractor	Single end status	All areas outside current dumpsite where contractor has operations (RAI) – approximately 16.000 m2	NE5740 – strategy for unsuspected site	In case reduction in soil quality due to contractors activities – risk assessment and / or remediation