

FEASIBILITY STUDY

Criteria and Boundary Conditions (2025)



Overview

This document sets the ground rules for a forthcoming Feasibility Study to upgrade, extend, rehabilitate, and partially close the Municipal Solid Waste Disposal Site (MSWDS) in Philipsburg, Sint Maarten, including the adjacent Irma Debris Disposal Site (IDS) on Pond Island. Developed by TAUW and Witteveen+Bos for the National Recovery Program Bureau (NRPB) under the Emergency Debris Management Project, it defines the boundary conditions (non-negotiable constraints) and feasibility criteria (how to measure viability and performance) that all solution alternatives must satisfy.

It does not select or evaluate a specific design; instead, it builds a consistent decision framework to assess candidate interventions—ensuring technical soundness, environmental and public health protection, financial realism, constructability in an island setting, and social acceptability. The framework is intended to shape the subsequent feasibility analysis, procurement documents, and implementation strategy for a robust, lower-risk, and future-oriented solid waste management solution.

Objectives and Audiences

The study aims to establish a transparent and structured framework—comprising boundary conditions and feasibility criteria—through which all design alternatives for the MSWDS upgrade will be developed, compared, and selected. This framework seeks to align key stakeholders, including the NRPB, Government of Sint Maarten, World Bank, and contractors, on realistic constraints and performance expectations, taking into account local spatial limits, budgetary ceilings, and implementation timelines.

The study aims to ensure a minimum disposal capacity that supports a smooth transition to an integrated sustainable waste management (ISWM) system, providing at least 10 years of service while minimizing or eliminating landfilling. It emphasizes robustness and reliability by favoring durable, low-maintenance designs using locally available materials and simple systems. Environmental protection and public health are central considerations, with designs required to achieve an acceptable risk-based level of protection given the site's proximity to communities and the Great Salt Pond. The study also seeks to improve site aesthetics to enhance social acceptance and support the tourism economy, while keeping costs and timelines within defined limits, specifically a CAPEX ceiling of USD 29 million and a construction schedule that allows completion by June 2028 within a 24-month contract duration.

This report targets the implementing agency and funders—NRPB, World Bank task teams, and oversight bodies—seeking a rigorous, shared framework for decision-making. Government counterparts, including ministries and agencies responsible for environment, public works, planning, and finance, are addressed, alongside technical practitioners such as engineers, planners, and operators who will design, construct, and operate the upgraded facility. Market participants, both international and local contractors and suppliers, use the report to assess bid feasibility, risks, and requirements. Policy and regulatory stakeholders are also considered, supporting the development of enabling regulatory and tariff frameworks for integrated SWM.

Background/Context

Site and systemic challenges

- The MSWDS has operated since the 1970s as an open dumpsite with limited environmental controls, recurrent fires, uncontrolled tipping (including hazardous materials), and significant leachate issues that threaten the Great Salt Pond. The site reaches up to 42 meters in places and is close to residential and commercial areas.
- Data gaps are persistent (e.g., waste volumes, composition, sources). Absence of a weighbridge and weak recordkeeping impede effective planning and cost recovery.

Post-Irma recovery frame

- Hurricane Irma (2017) catalyzed a national recovery effort funded by a Netherlands-financed Trust Fund and managed by the World Bank. The NRPB leads implementation. The MSWDS upgrade is a cornerstone of the Emergency Debris Management Project.
- The Government's "Ambition 2030" envisions a transition to ISWM (reduction, recovery, recycling, and eventual near-zero landfilling). Upgrading the existing disposal site is a near-term necessity to reduce risks while building capacity for that longer-term model.

Small-island constraints

- Sint Maarten's dense urbanization, limited land, and reliance on imported inputs constrain engineering options (e.g., setbacks, specialized systems). Hence, the framework adopts pragmatic, risk-based standards suited to local realities rather than idealized benchmarks that are infeasible to implement.

Findings

A. Spatial and physical boundary conditions

- Maximum crest elevation: ≤ 40 meters above Sint Maarten Peil (S.M.P.). Current local maxima (~42 m) require re-profiling; no further increase beyond the new controlled cap height is permitted.
- Setbacks: While global norms often suggest ~250 m from residences, this is infeasible locally. The minimum setback must be at least equal to or greater than the height of the nearest crest (with a hard floor of 30 m), focused on geotechnical safety and social acceptability.

- No horizontal expansion into the Great Salt Pond for landfilling: Expansion may only occur for essential protective or operational infrastructure (e.g., ring dike, perimeter drains, leachate controls) without diminishing pond water-bearing capacity.
- Land use designation: Adjacent parcels (e.g., IDS, former resettlement area, VROMI yard) may be repurposed for industrial waste-related uses, support facilities, or staging, subject to planning approvals.

B. Socio-economic and delivery constraints

- Soualiga Road continuity: The road bisecting Pond Island can be relocated within the island footprint but must remain operational with current capacity to ensure access to Philipsburg.
- Contractor facilities: Existing on-site operators (e.g., Steel Crushers B.V., Windward Roads N.V.) can be relocated on-site to enable optimal design; final locations must be coordinated.
- Budget and timeline: CAPEX ceiling is USD 29 million; maximum contract duration is 24 months to meet a June 2028 completion deadline.
- OPEX target: Post-upgrade operating costs should be at or below the current approximate USD 2 million/year, implying efficiency improvements despite improved environmental controls.

C. Environmental, health, and safety (EHS) conditions

- Geotechnical stability: No failure under normal operations is acceptable. While macro-slope failure risk in extreme earthquakes may not be reducible to zero, the design must minimize such risks and meet stability criteria for routine and design storm conditions.
- Stormwater and drainage: On-site and surrounding drainage capacity must be maintained or improved to prevent flooding and leachate mobilization.
- Gas management: Given low legacy gas generation, a passive venting system suffices for the existing mass; any new cell must include appropriate gas collection/venting suitable for its waste profile and safety requirements.
- Fire prevention and response: The site must be fully accessible to emergency responders, provide water access points, implement fire breaks and capping schedules, and include operational protocols for early detection and suppression.
- Visual impact: Final contours, cover, and landscaping should materially improve the site's appearance and reduce odor and litter, contributing to social license

D. Feasibility criteria and evaluation dimensions

- Capacity and lifespan: ≥ 10 years disposal capacity, accounting for anticipated waste inflow and diversion ramp-up under ISWM.
- CAPEX and OPEX: Fit within USD 29 million budget and target OPEX; consider lifecycle costs.
- Constructability: Preference for designs feasible with locally available materials and methods, minimal reliance on specialized imported components with long lead times.
- Procurement viability: Structure risks and packaging to attract qualified international bidders and secure competitive responses.
- Social acceptability: Reduce nuisances (fire, odor, litter), improve aesthetics, protect nearby residents and businesses, and enable stakeholder engagement.
- Environmental performance: Measurable reductions in leachate risks, emissions, and uncontrolled dumping; resilient drainage; risk-based compliance with standards.
- Operational robustness: Durable assets, simple systems, and clear operational protocols that can be maintained locally.

Implementation/Operational Insights

Pragmatism and robustness

- Favor low-maintenance, rugged systems over complex technologies that risk downtime or costly repairs in an island setting. Simplicity supports reliability, safety, and cost control.

Phased transition toward ISWM

- The upgraded site is a bridge to a longer-term ISWM model. It must deliver controlled capacity and environmental risk reduction now, while creating space and time to stand up upstream measures (recycling, MRFs, organics diversion, possible energy recovery), policies, and financing.

Risk allocation and procurement strategy

- Designs and bid documents should avoid excessive construction risks or ambiguous scopes that deter qualified contractors or inflate pricing. Packaging civil works, clarifying interface points, and offering reliable site data will be essential.

Cost discipline

- Lifecycle thinking is critical. Achieving OPEX at or below the existing baseline even with enhanced controls will require operational efficiencies (e.g., better traffic flow, planned capping, minimized rework from fires), and selective capital investments that reduce downstream costs.

Operational readiness and emergency response

- Access roads, fire water points, segregation areas, and perimeter patrol routes must be engineered into the site to enable swift intervention. Clear SOPs for waste acceptance, tipping, compaction, cover, and hot-spot monitoring reduce incident frequency and severity.

Lessons Learned

Inaction magnifies risk, as persistent fires, uncontrolled leachate, and public health hazards show that delaying improvements is ultimately more costly than investing in pragmatic risk-reduction measures. Effective solutions prioritize context over perfection; rigid adherence to international “gold standards,” such as full excavation and re-lining, is often infeasible, whereas risk-based approaches tailored to spatial and fiscal realities can deliver meaningful protection more quickly. Securing social license is also critical—improvements in aesthetics, odor and litter control, and visible site order are essential to maintain community acceptance and support a tourism-driven economy. Reliable data forms the foundation of sound planning and financial sustainability; without accurate weighbridge records, composition studies, and inflow tracking, performance management and tariff-setting are severely undermined. Finally, designs must accommodate maintenance realities, favoring durable materials, standardized parts, and simple controls where specialized technical support is limited or costly.

Implications and Recommendations

- Commit to ISWM sequencing: Use the 10-year disposal horizon to ramp up upstream waste reduction, segregation, recycling, and organics diversion. Establish realistic milestones and funding plans.
- Strengthen regulatory framework: Update and enforce permitting, environmental monitoring, and operational standards for waste facilities to institutionalize gains and deter backsliding.
- Implement cost-recovery mechanisms: Introduce or revise gate fees and service tariffs to fund OPEX sustainably; pair with transparency and performance metrics to build public trust.
- Integrate land-use planning: Zone adjacent parcels for waste-related industrial activities and safeguards (e.g., buffer strips, access corridors). Protect the Great Salt Pond’s hydrology through design and regulation.

- Invest in data systems: Install a weighbridge, digitize ticketing, and maintain robust recordkeeping to guide decision-making and underpin procurement and performance contracts.
- Design procurement for competition: Calibrate risk allocation, provide adequate site data, and structure lots or packages to attract qualified bidders at competitive prices.

Limitations and Areas for Further Work

At this stage, alternatives have not been analyzed or selected; the document establishes the criteria by which options will be evaluated, with the forthcoming Feasibility Study tasked to develop, model, and compare design alternatives against these benchmarks. Pending decisions remain regarding on-site contractor relocation and the detailed future use of identified parcels, which will require coordination and formal approvals. While current risk framing focuses on human health, a comprehensive assessment of ecological impacts on the Great Salt Pond is anticipated during the ESIA phase. Data gaps—including baseline waste quantities and composition, sub-surface waste characterization, and hydrological modeling—must be addressed to improve design certainty and reduce contingency allowances. Finally, site-specific emergency response planning for extreme weather and seismic events, including contingency infrastructure and drills, will be elaborated in the next project phase.

Conclusion

By translating a decades-long challenge into a structured framework, this document aligns ambition with deliverability. It sets clear, realistic boundaries and criteria that reflect Sint Maarten’s spatial constraints, fiscal realities, and urgent risk profile. For practitioners, it provides actionable guardrails—defining heights, setbacks, drainage needs, gas and fire management requirements, and constructability preferences—while anchoring budget and timeline discipline. For policymakers, it offers a pragmatic path toward better waste governance: stabilize the current system, reduce public health and environmental risks, and use the time gained to build the ISWM architecture (policy, infrastructure, financing, and behavior change) envisioned in Ambition 2030.

The core message is pragmatic progress: accept that “good enough, now” can be safer and more sustainable than pursuing ideal solutions that are not buildable. If implemented faithfully, this framework can transform the MSWDS from a liability into a manageable, regulated asset—one that buys the time and public confidence needed to advance toward an integrated, low-landfill future.

Methodology

Consolidation of existing site studies, ESIA/ESMPs, geotechnical and environmental reports, and legal/policy documents.

- Benchmarking against international standards (e.g., World Bank/IFC, RCRA) adapted to Sint Maarten’s constraints.
- Stakeholder consultations with NRPB, World Bank, and government agencies to validate priorities and constraints.
- Risk-based framing that privileges feasible, high-impact interventions over idealized but impractical solutions.
- Mixed-method evaluation design using quantitative thresholds (e.g., height, capacity, CAPEX, timelines) and qualitative scales for social acceptability, constructability, and procurement.

This summary was produced with the assistance of an AI language model based on the original report. The full report is available at sintmaartenrecovery.org/analytical-studies