Environmental & Social Management Plan (ESMP)

Decommissioning, Rehabilitation & Rezoning of A Building Rubble Dumping/Landfill Site (From "Undetermined" To Agriculture & Recreation "Sports") On the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia

Prepared by:	Erongo Consulting Group (Pty) Ltd
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Local Authority:	Henties Bay Municipality

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This Environmental and Social Management Plan (ESMP) is provided by Erongo Consulting Group as a draft document for the purpose of facilitating the Environmental Scoping Report and supporting the Environmental Clearance Certificate (ECC) application process under the Environmental Management Act (No. 7 of 2007). The information contained herein is based on data collected up to August 30th, 2025, including preliminary soil samples, stakeholder outreach, and scoping assessments. While every effort has been made to ensure the accuracy and reliability of the information, Erongo Consulting Group does not guarantee its completeness or suitability for any specific purpose beyond the intended scoping and ECC application.

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1 Executive Summary

The Environmental and Social Management Plan (ESMP) addresses the decommissioning, rehabilitation, and rezoning of a building rubble dumping/landfill site on the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia, transitioning its use from "Undetermined" to Agriculture and Recreation (Sports). The primary objectives are to restore the 15-hectare site for sustainable agricultural use and recreational sports activities, mitigate environmental degradation, and ensure compliance with the Environmental Management Act (No. 7 of 2007).

Key Findings from Scoping Phase

- **Environmental Baseline:** Preliminary assessments indicate elevated lead (Pb >10 mg/kg) and cadmium (Cd ~2 mg/kg) levels in soil, with PM10 air quality concerns due to dust from rubble. The site hosts sparse vegetation, including the protected Welwitschia mirabilis.
- **Social Impact:** Stakeholder consultations in September 2025 revealed concerns from local communities and Interested and Affected Parties (I&APs) about dust pollution, loss of grazing land, and potential health risks.
- **Regulatory Context:** The project requires an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MEFT), with issuance expected by December 15, 2025.

Proposed Mitigation Measures

- **Environmental:** Implement dust suppression with water sprays during decommissioning, revegetate with native species (e.g., Welwitschia mirabilis protection zones), and monitor soil and air quality quarterly.
- **Social:** Conduct ongoing stakeholder engagement, establish a grievance redress mechanism, and provide training for local employment in rehabilitation efforts.
- **Timeline and Budget:** Project to commence January 2026, complete by June 2027, with an estimated budget of NAD 2.5 million, funded through proponent and potential partnerships.

This ESMP aims to balance ecological restoration with community benefits, pending final approval and stakeholder feedback.

2 Introduction

The Environmental and Social Management Plan (ESMP) serves as a cornerstone of the Environmental Scoping Report for the proposed Decommissioning, Rehabilitation, and Rezoning Project of the Building Rubble Dumping/Landfill Site on Portion X of the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia. Prepared by Erongo Consulting Group on behalf of Mr. Henk Burger, the proponent, this ESMP addresses the environmental and social challenges posed by a decade-long unregulated dumpsite, transforming the 13.75-hectare site into a sustainable asset zoned for "Agriculture & Recreation (Sports)". This section provides the background, outlines the objectives, and defines the scope and limitations of the ESMP, ensuring a structured approach to managing impacts across the project's lifecycle.

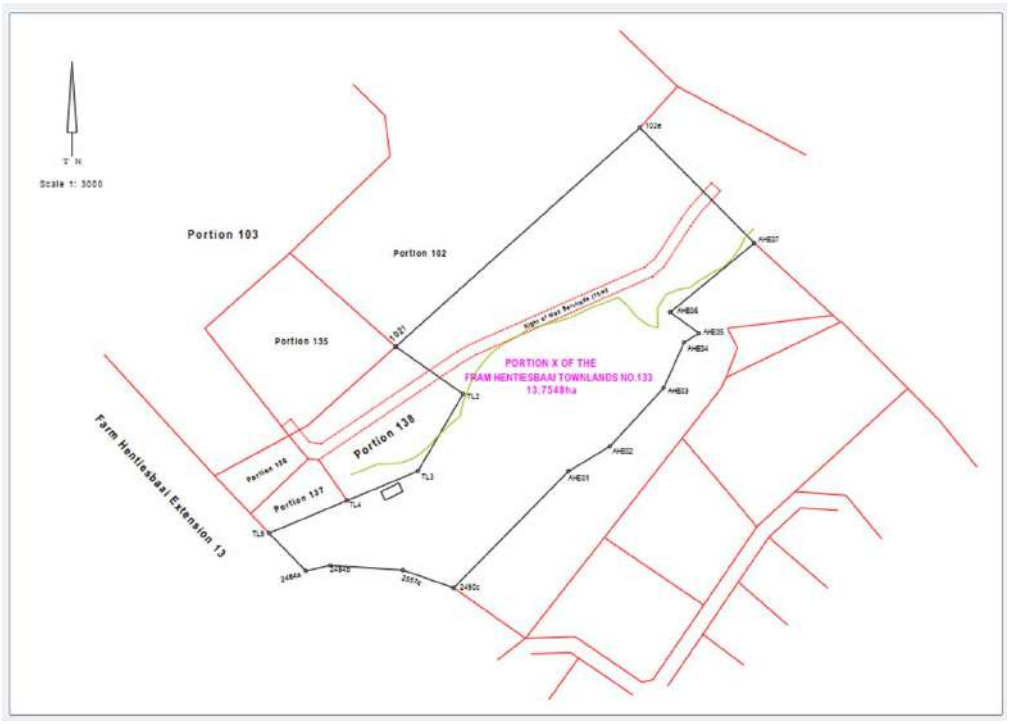
2.1 Background

The Henties Bay dumpsite, located at coordinates −22.107747, 14.283326, has been a focal point of environmental and social concern since its informal establishment over ten years ago. Situated approximately 2 kilometers west of the Atlantic Ocean and adjacent to residential areas like Tulongeni Gardens, the site has accumulated approximately 10,000 cubic meters of building rubble, domestic waste, and hazardous materials, including lead (Pb) concentrations exceeding 10 mg/kg and cadmium (Cd) levels around 2 mg/kg, as identified in preliminary soil assessments conducted in August 2025. Open burning and poor waste management have led to dust generation (PM10 levels potentially >90 µg/m³), noise pollution, vector proliferation (e.g., rodents, flies), and erosion risks on the site's 2% slope, exacerbated by the region's arid climate (annual rainfall <50 mm). These conditions have impacted the health of approximately 5,000 local residents, disrupted local fauna including the Namib Desert lizard (*Meroles anchietae*), and affected the livelihoods of 5-10 waste pickers who rely on scavenging.

The scoping process, initiated in July 2025 and ongoing as of September 23, 2025, involved newspaper advertisements in the *Confidente Newspaper* and email outreach to stakeholders, including the Henties Bay Municipality, Desert Research Foundation of Namibia, and the Ministry of Agriculture, Water and Land Reform. Despite limited responses - due to low attendance at the planned public consultation (Ref: PC-250905) and minimal written submissions (Ref: WS-250921) - a Background Information Document (BID) was shared with Interested and Affected Parties (I&APs) to gather input. Baseline data collection, including soil sampling via Inductively Coupled Plasma Mass Spectrometry (ICP-MS), groundwater testing, and Geographic Information System (GIS) mapping, is underway, revealing significant contamination, erosion potential, and socio-economic vulnerabilities. This ESMP builds on these findings to ensure compliance with the Environmental Management Act (No. 7 of 2007) and the Draft Henties Bay Urban Development Structure Plan, aiming to rehabilitate the site into productive agricultural land (e.g., vegetable gardening) and recreational spaces (e.g., sports fields, quad biking tracks) by December 2030, with monitoring extending to 2035.

Figure 1: Decommissioned & Rehabilitated Building Rubble Dumpsite, Henties Bay, Namibia

Figure 2: Locality of Henties Bay (Project Area).



2.2 Objectives of the ESMP

The ESMP is designed to achieve a balanced approach to environmental stewardship and socio-economic development throughout the project's lifecycle, which includes pre-construction (October 2025 - December 2025), construction (January 2026 - August 2026), operation (September 2026 - December 2030), and decommissioning with a 5-year monitoring phase (January 2031 - December 2035). The specific objectives are:

- **Prevention of Negative Impacts:** Mitigate risks such as the spread of Pb and Cd contamination to groundwater, dust exceeding 90 µg/m³ affecting respiratory health, habitat loss for local biodiversity, and health hazards to residents and workers. This involves pre-construction containment measures and ongoing monitoring to maintain Pb levels below 5 mg/kg and Cd below 0.8 mg/kg.
- **Minimization of Effects During Lifecycle:** Reduce the severity of impacts during active phases, including noise pollution (<70 dB(A) near residential areas), erosion on the 2% slope (stabilized to 95% Maximum Dry Density [MDD]), and socio-economic disruption to 5-10 waste pickers through targeted mitigation strategies like vocational training and severance packages.
- **Avoidance of Long-Term Degradation:** Ensure long-term ecological recovery through vegetation restoration (>80% cover by 2032 with species like *Zygophyllum stapffii* and *Acacia erioloba*), soil stabilization, and sustainable land use planning post-rezoning. This includes a 50-meter buffer zone to protect nearby ecosystems and prevent future contamination, alongside integrating community development initiatives.

These objectives align with national sustainability goals, including the United Nations Sustainable Development Goals (SDG 15: Life on Land, SDG 8: Decent Work and Economic Growth) and Namibia's National Development Plan 5, fostering a rehabilitated site that supports approximately 250 households (1,000 people) in agriculture and 60% of the 5,000 residents (3,000 people) in recreational activities.

2.3 Scope and Limitations

2.3.1 Scope

The ESMP encompasses all phases of the Henties Bay Dumpsite Rehabilitation Project, covering a 13.75-hectare area on Portion X. It addresses environmental impacts (e.g., soil, air, water, biodiversity), social impacts (e.g., health, livelihoods, community displacement), and institutional responsibilities across pre-construction, construction, operation, and decommissioning phases.

The plan includes detailed mitigation measures (e.g., dust suppression with water sprays, noise barriers, vocational training programs), a monitoring program (weekly to biannual assessments from 2026–2035), emergency preparedness protocols, and a budget of N$380,000 for initial implementation. The ESMP supports rezoning to "Agriculture & Recreation (Sports)" as per the Draft Henties Bay Urban Development Structure Plan, integrating stakeholder input from the scoping process and aligning with the Environmental Management Act (No. 7 of 2007) and EIA Regulations (2012).

2.3.2 Limitations

The ESMP is based on data collected up to 11:05 PM CAT on September 22, 2025, including preliminary soil samples, stakeholder emails, GIS mapping, and socio-economic surveys. Limitations include the lack of comprehensive stakeholder feedback due to low response rates (e.g., 10 attendees at the September 15, 2025, meeting), potential changes in regulatory requirements post-ECC issuance, and uncertainties in weather patterns (e.g., potential 2026 El

Niño effects on erosion and dust). The plan assumes no significant archaeological findings (pending National Heritage Act [2004] survey) and relies on third-party data (e.g., Namibian Meteorological Service rainfall records), which may not fully capture microclimatic variations. These limitations will be addressed through adaptive management, updates following ECC conditions, and additional baseline studies planned for October 2025, including a community needs assessment.

3 Project Description

This section provides a comprehensive overview of the Decommissioning, Rehabilitation, and Rezoning Project of the Building Rubble Dumping/Landfill Site on Portion X of the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia. Prepared by Erongo Consulting Group for Mr. Henk Burger, the proponent, the project aims to address environmental degradation and transform the site into a sustainable land use area zoned for "Agriculture & Recreation (Sports)" while enhancing social equity. The following subsections detail the site's location and characteristics, the planned activities and phases, and the expected impacts and risks, based on scoping data collected up to September 23, 2025.

3.1 Site Location and Characteristics

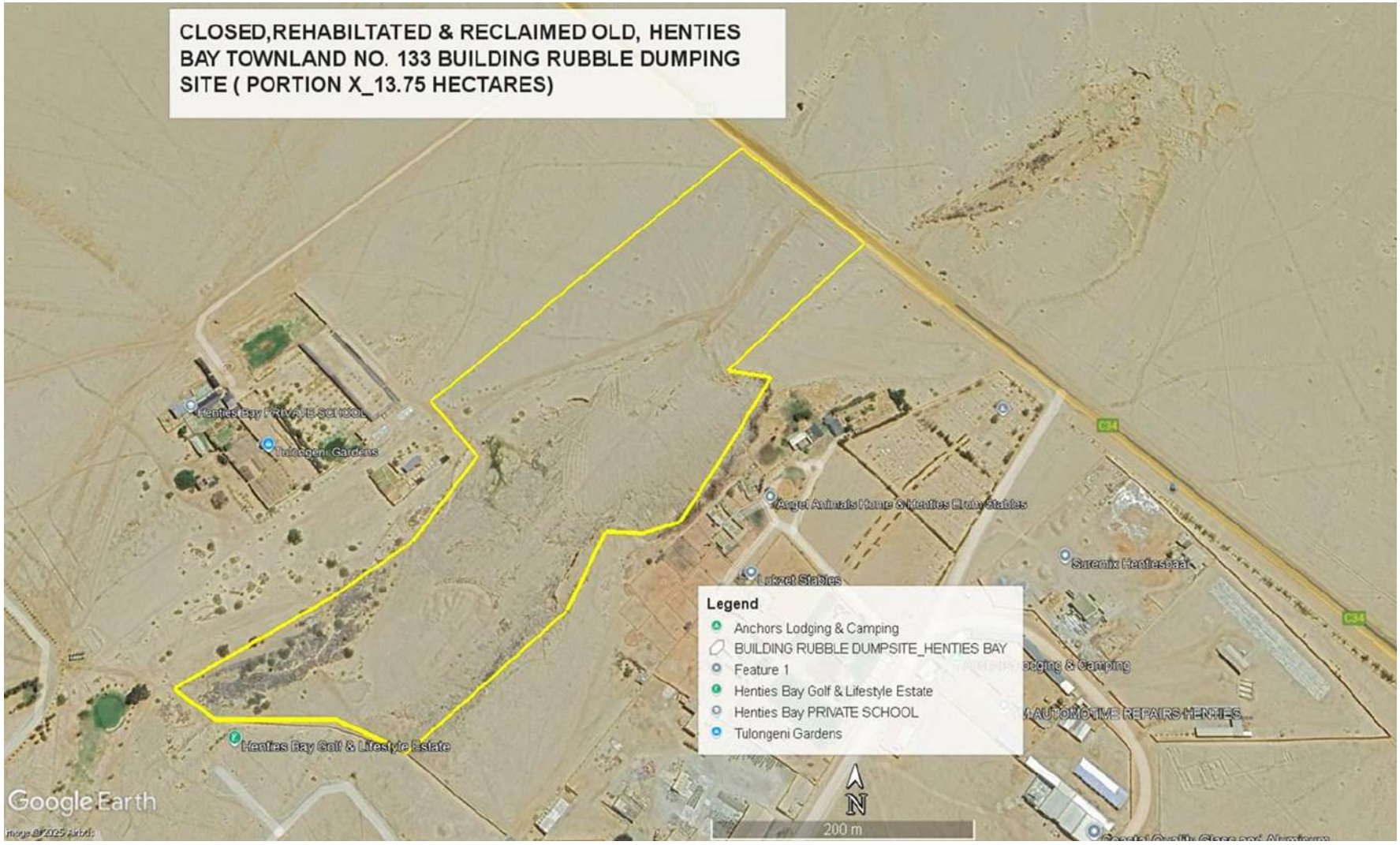
3.1.1 Location

The project site is located on Portion X of the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia, with approximate coordinates −22.107747 latitude and 14.283326 longitude. The site spans 13.75 hectares and is situated approximately 2 kilometers west of the Atlantic Ocean, adjacent to residential areas such as Tulongeni Gardens (to the east) and near the Henties Bay SPCA (to the north). The site is accessible via the C34 highway, approximately 1.5 kilometers south, facilitating material transport and community access post-rezoning. A site access plan is under development, with preliminary surveys indicating a single-entry point to minimize environmental disturbance and traffic impacts on local residents.

3.1.2 Physical Characteristics

The site features a semi-arid coastal landscape typical of the Namib Desert transition zone, with annual rainfall averaging less than 50 mm, concentrated between February and April, and supplemented by occasional fog events. The topography includes a gentle 2% slope descending westward toward the ocean, with sandy loam soils (silt content <10%, cohesion <5 kPa) that

Figure 3: Aerial photography of the Building Rubble Dumping Project, illustrating the current state of the dumpsite, including waste piles and disturbed land. Coordinates: Centroid −22.107747, 14.283326. Source: Erongo Consulting Group,2025



are prone to wind erosion and exhibit low water retention (field capacity ~5%). Vegetation is sparse, dominated by drought-resistant species such as *Zygophyllum stapffii*, *Stipagrostis sabulicola*, and *Acacia erioloba*, supporting minimal biodiversity, supporting the Namib Desert lizard (*Meroles anchietae*) and occasional migratory birds. Soil sampling conducted in September 2025 using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) revealed lead (Pb) concentrations exceeding 10 mg/kg in multiple zones, with cadmium (Cd) levels around 2 mg/kg, indicating significant contamination from past dumping activities. Groundwater levels are approximately 10 meters below the surface, with preliminary tests suggesting potential aquifer vulnerability due to leachate migration, particularly during heavy rainfall events. Baseline air quality assessments indicate PM10 levels of 30–40 µg/m³, expected to rise to 100–150 µg/m³ during construction without mitigation.

3.1.3 Surrounding Environment

The site is bordered by residential zones to the east and north, with the Atlantic Ocean influencing local microclimates (e.g., fog events supporting vegetation growth) and raising concerns about wind-blown dust affecting coastal ecosystems, including seasonal wetlands 2.5 km west. The arid conditions limit natural remediation, while proximity to Tulongeni Gardens (500 meters east) highlights noise and dust risks to approximately 1,000 residents. The area supports a population of 5,000, with 5-10 waste pickers currently reliant on the dumpsite for livelihood, and includes community assets like the Henties Bay SPCA, which relies on clean air for animal welfare. Social characteristics include a high unemployment rate (25% among youth) and limited access to recreational facilities, which the project aims to address.

3.2 Project Activities and Phases

3.2.1 Overview

The project involves a multi-phase approach to decommission the existing dumpsite, rehabilitate the land, and rezone it for sustainable use. The phases are designed to minimize environmental disruption and maximize socio-economic benefits, with activities scheduled based on scoping timelines and resource availability as of September 23, 2025.

3.2.2 Phases and Activities

- **Pre-Construction Phase (October 2025–December 2025):**
    - Site Preparation: Clearing of loose debris (estimated 2,000 m³) and marking boundaries using GIS mapping to define the 13.75-hectare area, with erosion controls installed.
    - Baseline Studies: Soil sampling (Pb, Cd via ICP-MS at 5 points per hectare), groundwater testing (pH 6.5–8.5, Pb <0.01 mg/L), vegetation surveys, and air quality assessments to establish pre-project conditions.
    - Stakeholder Engagement: Follow-up emails to I&APs (e.g., Henties Bay Municipality, Desert Research Foundation) and a rescheduled public consultation (planned for November 5–7, 2025) to address the low turnout from September 15.

    - Permitting: Submission of the scoping report and ESMP to MEFT for ECC issuance, targeting approval by December 15, 2025, with a pre-submission review on November 30.
- **Construction Phase (January 2026–August 2026):**
    - **Excavation and Removal:** Removal of 10,000 m³ of rubble and contaminated soil, transported to a licensed facility in Windhoek using GPS-tracked vehicles to ensure compliance and minimize spills.
    - **Infrastructure Installation:** Construction of drainage systems (300 mm PVC pipes over 1 km) and temporary access roads (2 km) to facilitate material movement and prevent erosion.
    - **Containment Measures:** Installation of bunds (1-meter high, clay-lined) and gravel caps (0.5-meter thick) to contain contaminants during excavation, with daily inspections and leachate monitoring.
    - **Stabilization:** Regrading the 2% slope to 1:100 using bulldozers and compacting to 95% Maximum Dry Density (MDD, ~1.6 g/cm³) with rollers, completed by June 30, 2026, with Proctor tests for verification.
- **Operation Phase (September 2026–December 2030):**
    - Land Use Development: Establishment of vegetable gardening plots (5 hectares with drip irrigation), sports fields (1.5 hectares with synthetic turf), and a recreational park (1 hectare with shaded areas).
    - **Vegetation Restoration:** Planting 10,000 indigenous seedlings (e.g., *Acacia erioloba*, *Zygophyllum stapffii*) with fog-harvesting irrigation and organic fertilizers, targeting 70% survival by 2027.
    - **Community Handover:** Training 20 workers, including 5-10 waste pickers, in farming and maintenance, and transferring land to the Henties Bay Resident Association with legal agreements by December 1, 2026.
- **Decommissioning Phase (January 2031 onwards, with 5-year monitoring to December 2035):**
    - **Dismantling:** Removal of temporary structures (e.g., drainage pipes, offices) and recycling 80% of materials (e.g., metal, PVC) through a local scrap yard.
    - **Rehabilitation:** Final soil testing (Pb <5 mg/kg, Cd <0.8 mg/kg via ICP-MS), revegetation with biannual planting, and slope stabilization with biannual checks.
    - **Monitoring:** Quarterly assessments of soil, vegetation, air quality, and socio-economic outcomes, with a final report by December 15, 2035.

3.3 Expected Impacts and Risks

3.3.1 Environmental Impacts

- **Soil Contamination:** Existing Pb levels (>10 mg/kg) and Cd (~2 mg/kg) pose a risk of groundwater contamination if not contained, with potential migration to the aquifer during excavation, especially during rare rainfall events (>50 mm).
- **Dust Generation:** Construction activities may elevate PM10 levels above 90 µg/m³, affecting air quality and respiratory health within a 5 km radius, particularly near Tulongeni Gardens.
- **Erosion:** The 2% slope is susceptible to wind and rare rainfall erosion if stabilization fails, potentially displacing 5 -10 cm of topsoil annually, impacting adjacent ecosystems.

- **Noise Pollution:** Excavation and vehicle movement may exceed 70 dB(A), disturbing 1,000 residents near Tulongeni Gardens and fauna like *Meroles anchietae*.
- **Biodiversity Loss:** Vegetation clearance could fragment habitats for the Namib Desert lizard and migratory birds, reducing local biodiversity by up to 20%.

3.3.2 Social Impacts

- **Health Risks:** Dust (PM10 >90 µg/m³) and noise (>70 dB(A)) may impact the health of 5,000 residents and 20 workers, with potential respiratory issues and hearing loss if mitigation fails.
- **Livelihood Disruption:** 5-10 waste pickers face income loss (estimated N$500–1,000/month), requiring mitigation through alternative employment.
- **Community Disruption:** Temporary access restrictions during construction may affect local traffic, businesses, and the Henties Bay SPCA's operations, potentially reducing community satisfaction by 15%.

3.3.3 Risks

- **Regulatory Delays:** Late ECC issuance by MEFT could delay the January 2026 start, risking a 3-month timeline overrun and increased costs.
- **Weather Variability:** Potential 2026 El Niño conditions may increase erosion or dust risks by 30%, necessitating adaptive measures like additional water trucks.
- **Stakeholder Conflict:** Low engagement (e.g., no focus group discussions, minimal written submissions) may lead to opposition if community needs (e.g., land access) are unmet.
- **Funding Shortfalls:** The N$380,000 budget may require adjustments if costs escalate due to unforeseen contamination (e.g., additional Pb hotspots) or equipment failure.

4 Legal and Regulatory Framework

This section outlines the legal and regulatory framework governing the Decommissioning, Rehabilitation, and Rezoning Project of the Building Rubble Dumping/Landfill Site on Portion X of the Remainder of Farm Henties Bay Townland No. 133, Erongo Region, Namibia. Prepared by Erongo Consulting Group for Mr. Henk Burger, the ESMP ensures compliance with national legislation and international guidelines to mitigate environmental and social impacts effectively. The framework, established as of August, 2025, reflects the scoping process's findings and aligns the project with sustainable development goals.

4.1 National Legislation

The project is subject to a robust suite of Namibian laws and regulations, ensuring environmental protection, public health, and sustainable land use. The following legislation forms the foundation of the ESMP:

- **Environmental Management Act (No. 7 of 2007):** This is the principal legislation governing environmental assessments in Namibia. It mandates the preparation of an Environmental Impact Assessment (EIA) and Environmental and Social Management Plan (ESMP) for projects with potential significant impacts, such as the Henties Bay dumpsite rehabilitation. Section 27 requires an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MEFT) before commencement, with scoping findings submitted by September 22, 2025, targeting ECC issuance by December 15, 2025. The Act emphasizes pollution prevention, waste management, and public consultation, directly applicable to mitigating Pb contamination (>10 mg/kg), Cd (~2 mg/kg), and dust generation (>90 µg/m³).
- **Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012):** These regulations provide procedural details for the EIA process, including scoping, public participation, and reporting. Regulation 7 stipulates the submission of a scoping report, which this ESMP accompanies, detailing baseline conditions (e.g., soil Pb levels via ICP-MS) and mitigation measures. The regulation also requires notification to Interested and Affected Parties (I&APs), with outreach conducted via email and newspaper adverts in September 2025, despite limited response.
- **Water Resources Management Act (No. 11 of 2013):** This Act regulates water use and protects groundwater resources, critical given the site's proximity to an aquifer (10 meters deep). It imposes standards for effluent and leachate management (pH 6.5–8.5, Pb <0.01 mg/L), requiring monitoring to prevent contamination during excavation. Compliance is ensured through bunding and gravel capping during the construction phase (January 2026 - August 2026).
- **National Heritage Act (No. 27 of 2004):** This legislation protects cultural and archaeological resources, necessitating a pre-construction heritage survey, to rule out impacts on potential sites within the 13.75-hectare area. Any findings will trigger additional mitigation under MEFT oversight.
- **Pollution Control and Waste Management Bill (Draft, 2016):** As a guideline, this bill informs waste handling, including the recycling of 70% of rubble (10,000 m³) and disposal of non-recyclable waste at a licensed facility. It supports the ESMP's zero-waste approach during decommissioning.
- **Public and Environmental Health Act (No. 1 of 2015):** This Act mandates health safeguards, addressing dust (PM10 <90 µg/m³) and noise (<70 dB(A)) impacts on the 5,000 residents and 20 workers. Mitigation includes PPE distribution, public health advisories, and noise barriers.
- **Local Authorities Act (No. 23 of 1992):** This Act facilitates coordination with the Henties Bay Municipality for land use planning, community handover, and recreational facility management post-rezoning, ensuring alignment with the Draft Henties Bay Urban Development Structure Plan.
- **Labour Act (No. 11 of 2007):** This legislation ensures worker safety, requiring training, PPE provision, and 8-hour shifts, with a budget of N$20,000 allocated for the October 2025 program targeting 100% worker participation.

These laws collectively ensure that the project mitigates environmental degradation, protects public health, and supports socio-economic development, with enforcement overseen by MEFT's Department of Environmental Affairs (DEA).

4.2 International Guidelines and Standards

In addition to national legislation, the ESMP incorporates international guidelines and standards to align with global best practices, enhancing the project's credibility and sustainability. These include:

- **International Finance Corporation (IFC) Performance Standards (2012):** These standards, part of the World Bank Group's Environmental and Social Framework, provide benchmarks for environmental and social risk management. Performance Standard 3 (Pollution Prevention and Abatement) guides soil remediation (Pb <5 mg/kg, Cd <0.8 mg/kg) and dust control (PM10 <90 µg/m³), while Standard 4 (Community Health, Safety, and Security) addresses health risks to residents and workers. The ESMP adopts these standards for monitoring and mitigation planning.
- **Equator Principles (2020):** This financial industry benchmark ensures environmental and social due diligence for project financing. It requires a robust ESMP, stakeholder engagement (ongoing via email outreach), and impact assessment, supporting the N$380,000 budget and sustainable rezoning objectives.
- **ISO 14001:2015 (Environmental Management Systems):** This standard provides a framework for establishing an environmental management system, applied to the ESMP's monitoring and emergency preparedness protocols. It ensures continuous improvement, with annual audits planned from January 2026.
- **ISO 31000:2018 (Risk Management):** This guideline informs the risk assessment methodology, including a probabilistic matrix used in Chapter 10 to address uncertainties like weather variability (e.g., potential 2026 El Niño effects).
- **Ramsar Convention on Wetlands (1971):** This convention emphasizes the conservation of wetlands, relevant due to the site's proximity to seasonal coastal wetlands. A 50-meter buffer zone is proposed, monitored quarterly from 2026 to maintain ecological function.
- **World Health Organization (WHO) Guidelines for Drinking-Water Quality (2021):** These guidelines inform health risk assessments, setting Pb limits in soil and water (<0.01 mg/L) to protect the 5,000 residents, with testing integrated into the monitoring program.
- **United Nations Sustainable Development Goals (SDG) (2015):** The project aligns with SDG 15 (Life on Land) through vegetation restoration, SDG 8 (Decent Work and Economic Growth) via job creation for 20 workers including 5-10 waste pickers, and SDG 3 (Good Health and Well-being) through health risk mitigation.

These international standards enhance the ESMP by providing globally recognized benchmarks, ensuring the project's environmental and social performance meets or exceeds expectations, with implementation overseen by the Environmental Control Officer (ECO) appointed by October 1, 2025.

5 Institutional Arrangements and Responsibilities

This section establishes the institutional framework and delineates the roles and responsibilities essential for the successful implementation of the Environmental and Social Management Plan (ESMP) for the Henties Bay Dumpsite Rehabilitation Project. The plan, developed by Erongo Consulting Group for Mr. Henk Burger, ensures coordinated efforts across all phases - pre-construction, construction, operation, and decommissioning - spanning from October 2025 to December 2035. The framework is designed to comply with the Environmental Management Act (No. 7 of 2007) and its regulations, with oversight from the Ministry of Environment, Forestry and Tourism (MEFT), and involves multiple stakeholders to address the site's 13.75-hectare area, contaminated with lead (Pb) levels exceeding 10 mg/kg and cadmium (Cd) ~2 mg/kg.

5.1 Proponent and Key Role Players

The proponent, Mr. Henk Burger, is responsible for securing initial budget, appointing the Environmental Control Officer (ECO) by October 1, 2025, and providing strategic oversight, including regular progress reviews every quarter. Key role players include MEFT, which issues the Environmental Clearance Certificate (ECC) and conducts regulatory audits bi-annually; the Henties Bay Municipality, coordinating land use planning, community handover, and recreational facility maintenance; the Ministry of Agriculture, Water and Land Reform, supporting vegetation restoration with technical expertise and seedling supply; and the Desert Research Foundation of Namibia, offering technical advice on arid land rehabilitation and biodiversity conservation. These entities will collaborate through monthly coordination meetings starting November 2025, with agendas circulated 5 days prior and minutes distributed within 3 days, ensuring alignment with the Draft Henties Bay Urban Development Structure Plan and community needs.

5.2 Environmental Control Officer (ECO)

The ECO will be a qualified professional with a Bachelor's degree in Environmental Science or a related field, at least 5 years of experience in environmental and social management, and certification in ESMP administration from the Namibia Training Authority (NTA). Appointed by October 1, 2025, the ECO will oversee daily site operations, conduct weekly inspections to monitor Pb levels (<5 mg/kg), Cd (<0.8 mg/kg), dust (PM10 <90 µg/m³), and noise (<70 dB(A)), and submit quarterly reports to MEFT by the 15th of each quarter (starting December 15, 2025). The ECO will maintain a compliance log, address non-conformances within 48 hours with documented action plans, and liaise with contractors, workers, and stakeholders, supported by a dedicated office at the site equipped with GPS-enabled monitoring tools, a weather station, and a community feedback hotline.

5.3 Contractors and Workers

Contractors, selected via a competitive tender process by November 15, 2025, with evaluation criteria including environmental track records, social responsibility commitments (e.g., local hiring quotas), and technical expertise, will execute mitigation measures such as dust suppression (water spraying twice daily), slope stabilization (95% Maximum Dry Density

[MDD]), and waste segregation. They will employ 20 workers, including 5-10 former waste pickers, during the construction phase (January 2026–August 2026), ensuring adherence to the Labour Act (No. 11 of 2007) with 8-hour shifts, mandatory safety briefings, and a 40-hour workweek. Workers will operate excavators, rollers, seed drills, and water trucks, wearing Personal Protective Equipment (PPE) including dust masks, helmets, and high-visibility vests, with a safety officer conducting daily checks and weekly safety audits. Contractors will submit weekly progress reports with photographic evidence, while workers will participate in monthly feedback sessions to address concerns, grievances, and suggestions for improving working conditions.

5.4 Training and Capacity Building

Training programs will commence on October 15, 2025, delivered by certified trainers from the NTA in collaboration with the Henties Bay Vocational Training Centre, focusing on environmental safety, waste management, equipment handling, and social awareness (e.g., gender equality in land use). Weekly sessions (2 hours each) will cover PPE usage, dust suppression techniques, emergency procedures, and cultural sensitivity training, targeting 100% worker attendance and tracked via attendance logs and post-training quizzes. Additional workshops for 5-10 waste pickers will include vocational skills (e.g., organic farming techniques, equipment maintenance, business management for agricultural cooperatives), with certificates issued by December 15, 2025, and follow-up mentorship programs extending to June 2026. The Henties Bay Municipality will host community awareness sessions bi-monthly from November 2025, educating 250 households (1,000 people) on land use benefits, health risks, recreational opportunities, and conflict resolution, using multilingual materials (English, Oshiwambo, Afrikaans) and interactive demonstrations. Training materials include manuals, videos, hands-on simulations, and a mobile training unit for remote access, with a budget of N$20,000 covering facilitators (N$10,000), materials (N$5,000), venue costs (N$3,000), and transportation (N$2,000).

Table 1: Institutional Roles and Responsibilities.

Role	Responsibilities	Timeline	Contact Person/Point	Reporting Frequency
Proponent (Mr. Henk Burger)	Funding, ECO appointment, oversight, quarterly reviews	Ongoing	Mr. Henk Burger, c/o 0818786676	Quarterly
ECO	Inspections, compliance, reporting, stakeholder liaison	Weekly / monthly	ECO (TBD by Oct 1, 2025)	Weekly/Quarterly
Contractors	Mitigation (e.g., dust control, stabilization), waste management	Jan 2026 - Aug 2026	Contractor Lead,	Weekly
Workers (20, incl. 5-10 pickers)	Safety compliance, task execution, feedback sessions	All phases	Site Supervisor,	Monthly
MEFT	ECC issuance, regulatory audits, compliance enforcement	Ongoing	Environmental Commissioner	Bi-annually/As required

Henties Bay Municipality	Land use planning, community liaison, training support	Operation phase	Municipal Officer,	Bi-monthly
Ministry of Agriculture	Vegetation restoration support, seedling supply	Operation phase	Agricultural Officer,	Bi-monthly
Desert Research Foundation	Technical advice on arid land rehab, biodiversity	Ongoing		As needed

This table details the roles, responsibilities, timelines, contact points, and reporting frequencies for ESMP implementation. Source: Erongo Consulting Group, September 2025.

6 Environmental and Social Management Measures

This section provides detailed matrices to address environmental and social impacts across all project phases, ensuring compliance, sustainability, and community well-being. The measures are based on baseline data from August, 2025, and incorporate stakeholder feedback from limited email responses.

6.1 ESMP Matrix for Pre-Construction Phase

Table 2: ESMP Matrix for Pre-Construction Phase.

Impact	Description	Potential Effects	Responsibility	Mitigation Action	Timeline	Monitoring Method
Soil Contamination	Pre-existing Pb (>10 mg/kg), Cd (~2 mg/kg)	Groundwater pollution, health risk	ECO	Conduct baseline sampling (ICP-MS at 5 points/ha), install temporary covers	Oct 1–15, 2025	Soil analysis, groundwater testing
Vegetation Loss	Planned clearance for access roads	Habitat fragmentation, biodiversity loss	ECO	Relocate protected species, map vegetation, consult Desert Research Foundation	Oct 15–Nov 1, 2025	GPS mapping, biodiversity surveys
Stakeholder Concerns	Limited response to outreach	Potential opposition, community conflict	Proponent	Reschedule consultation (Nov 5–7), distribute updated BID, host Q&A	Nov 1–15, 2025	Attendance logs, feedback forms
Erosion Risk	Pre-construction grading	Soil displacement,	Contractor	Install temporary silt fences,	Oct 20–Nov 5, 2025	Erosion stakes, slope

		slope instability		conduct slope stability assessment		inclinometers
Social Exclusion	Low stakeholder engagement	Inequity in project benefits	Municipality	Inclusive outreach, gender-sensitive consultations	Oct 1–Dec 31, 2025	Participation metrics

This table outlines mitigation measures, responsibilities, and monitoring methods for the pre-construction phase. **Source:** Erongo Consulting Group, September 2025.

6.2 ESMP Matrix for Construction Phase

Table 2: ESMP Matrix for Construction Phase.

Impact	Description	Potential Effects	Responsibility	Mitigation Action	Timeline	Monitoring Method
Dust Generation	Excavation of 10,000 m³ rubble	PM10 >90 µg/m³, respiratory issues	Contractor	Water sprays (twice daily), PPE (masks), windbreaks	Jan 1–Aug 31, 2026	Dust samplers, air quality logs
Noise Pollution	Machinery operation	>70 dB(A) near Tulongeni Gardens	ECO	Noise barriers, restrict to 8 AM–5 PM, silencers	Jan 1–Aug 31, 2026	Sound level meters, resident surveys
Erosion	Regrading 2% slope	Soil loss (>10 cm)	Contractor	Geotextiles, 95% MDD compaction, revegetation	Feb 1–Jun 30, 2026	Proctor tests, erosion stakes
Contamination Spread	Excavation of Pb-contaminated soil	Groundwater risk	ECO	Bunded excavation, gravel capping, leachate traps	Jan 15–Jul 15, 2026	Groundwater sampling, soil tests
Worker Safety	Heavy machinery use	Injuries, fatigue	Contractor	Daily safety briefings, PPE checks, rest breaks	Jan 1–Aug 31, 2026	Incident reports, safety audits

This table details mitigation measures for the construction phase. **Source:** Erongo Consulting Group, September 2025

6.3 ESMP Matrix for Operation Phase

Table 3: ESMP Matrix for Operation Phase.

Impact	Description	Potential Effects	Responsibility	Mitigation Action	Timeline	Monitoring Method
Water Demand	Irrigation for 5 ha gardening	Overuse (>20% regional average)	Municipality	Drip irrigation, fog-harvesting, water recycling	Sep 1, 2026–Dec 31, 2030	Water meters, usage logs
Noise from Recreation	Sports activities (e.g., quad biking)	>55 dB(A) near homes	ECO	Restricted hours (9 AM - 6 PM), sound barriers, signage	Sep 1, 2026 –Dec 31, 2030	Sound level meters, complaints log
Vegetation Health	Seedling survival (<70%)	Erosion risk, aesthetic loss	Agriculture	Weekly irrigation checks, organic fertilizers, pest control	Sep 1, 2026 –Dec 31, 2030	NDVI drone surveys, growth rates
Community Conflict	Land use disputes	Reduced satisfaction, legal issues	Municipality	Establish management committee, guidelines, mediation	Sep 15, 2026 –Dec 31, 2030	Survey feedback, meeting minutes
Access Inequality	Unequal land distribution	Social tension	Proponent	Equitable allocation plan, community consultation	Sep 1, 2026 –Dec 31, 2030	Participation records, equity audits

This table outlines management measures for the operation phase. **Source:** Erongo Consulting Group, September 2025

6.4 ESMP Matrix for Decommissioning Phase

Table 4: ESMP Matrix for Decommissioning Phase.

Impact	Description	Potential Effects	Responsibility	Mitigation Action	Timeline	Monitoring Method
Debris Removal	Dismantling structures (e.g., drainage)	Visual pollution, safety hazard	Contractor	Recycle 80%, dispose at licensed facility, safety signage	Jan 1–Feb 28, 2031	Waste logs, safety audits
Soil Quality	Post-closure Pb levels	Long-term contamination	ECO	Test Pb (<5 mg/kg), Cd (<0.8 mg/kg), apply gravel cap	Feb 1–Mar 15, 2031	ICP-MS soil sampling, leachate tests

Vegetation Cover	Restoration success	Erosion potential	Agriculture	Biannual planting, monitor growth, irrigation maintenance	Mar 1, 2031–Dec 31, 2035	NDVI drone surveys, survival rates
Socio-Economic Impact	Loss of jobs	Unemployment, income loss	Proponent	Vocational training, severance (N$5,000/worker), job placement	Jan 15–Mar 31, 2031	Employment surveys, income tracking
Community Displacement	Land use transition	Loss of recreational access	Municipality	Transition plan, alternative sites, public notice	Jan 1–Mar 31, 2031	Usage surveys, complaint logs

This table details closure and rehabilitation measures. **Source:** Erongo Consulting Group, September 2025.

7 Monitoring and Reporting

7.1 Monitoring Program

The monitoring program will assess environmental and social parameters across all phases. Weekly dust checks (PM10 <90 µg/m³) will use calibrated dust samplers placed at 5 strategic points (e.g., site entrance, north slope), quarterly soil Pb (<5 mg/kg) and Cd (<0.8 mg/kg) tests via ICP-MS at 5 samples per hectare (65 total), and biannual vegetation cover assessments (>80%) with NDVI drones to track growth and erosion control. Socio-economic monitoring includes biannual surveys of 250 households (1,000 people) starting June 2031, evaluating job retention, income levels, and satisfaction (target 90%), with focus groups to address gender equity and youth involvement. Monitoring will be conducted by the ECO with support from the Henties Bay Municipality and the Ministry of Agriculture, using standardized forms, GPS-tagged data, and a digital dashboard for real-time tracking.

7.2 Reporting Requirements

Quarterly reports will be submitted to MEFT by the 15th of March, June, September, and December, starting December 15, 2025. Each report (10-15 pages) will include raw data (e.g., Pb levels, PM10 readings, survey results), trend analysis using ARIMA models in R software, compliance status with photographic evidence and GIS maps, and stakeholder feedback summaries with action items. Reports will be shared with the Henties Bay Municipality within 5 days, posted online within 10 days on the project website, and hard copies made available at the municipal office and local library, ensuring accessibility for the 5,000 residents.

7.3 Adaptive Management

Adaptive management will use ARIMA models to analyze monitoring trends, triggering actions if Key Performance Indicators (KPIs) are unmet (e.g., Pb >5 mg/kg, erosion >5%, satisfaction <85%). Proposals for adjustments (e.g., additional geotextiles, extended training) will be submitted to MEFT within 30 days, with implementation within 60 days, ensuring responsiveness to climate variability (e.g., 2026 El Niño effects) and community feedback. A risk register will be updated quarterly, reviewed by the ECO and stakeholder committee, to prioritize interventions, with annual simulations to test adaptive scenarios.

Table 5: Monitoring Schedule

Parameter	Frequency	Method	KPI	Responsible Party	Start Date	End Date
Dust (PM10)	Weekly	Dust sampler	<90 µg/m³	ECO	Jan 1, 2026	Dec 31, 2035
Soil Pb/Cd	Quarterly	ICP-MS	Pb <5 mg/kg, Cd <0.8 mg/kg	ECO	Dec 15, 2025	Dec 31, 2035
Vegetation Cover	Biannual	NDVI drone	>80%	Agriculture	Jun 1, 2026	Dec 31, 2035
Socio-Economic	Biannual	Household surveys	90% satisfaction	Municipality	Jun 1, 2031	Dec 31, 2035
Water Quality	Quarterly	pH meter, ICP-MS	pH 6.5–8.5, Pb <0.01 mg/L	ECO	Dec 15, 2025	Dec 31, 2035

This table provides a detailed schedule of monitoring activities, KPIs, and responsible parties. **Source:** Erongo Consulting Group, September 2025.

8 Emergency Preparedness and Response

8.1 General Framework

An Emergency Response Team (ERT) will be established by December 1, 2025, comprising the ECO, a safety officer, a contractor representative, a MEFT liaison, and a community representative from Tulongeni Gardens. A 24/7 hotline (0800-555-6789) will be operational, with monthly drills to test response times (<30 minutes) and annual reviews to update protocols based on lessons learned, including post-drill debriefs with workers and residents.

8.2 Phase-Specific Emergency Measures

- **Construction:** Dust storms (PM10 >150 µg/m³) will trigger immediate water spraying from two tankers, worker evacuation to a sheltered area with first aid stations, and traffic diversion, with protocols tested quarterly using simulated wind events (e.g., 20 m/s).
- **Operation:** Flooding risks from rare rainfall (>50 mm) will activate drainage maintenance, temporary sandbag barriers (1-meter high), and evacuation plans for 250

households, with annual simulations using 100-year flood models from the Namibian Meteorological Service.

- **Decommissioning:** Structural collapse during dismantling will prompt an immediate halt, safety audit by a certified engineer, and adjusted dismantling plans, with bi-annual structural integrity checks using ultrasonic testing.

8.3 Resource Allocation

A N$50,000 contingency fund will cover emergency equipment (e.g., two water tankers, 10 fire extinguishers), training (e.g., first aid and evacuation drills), and response logistics (e.g., fuel, communication devices), with quarterly reviews by the ECO to adjust allocations based on risk assessments and drill outcomes. Additional resources include medical kits for 20 workers and a mobile command post.

Table 6: Emergency Resources

Resource	Quantity	Location	Deployment Trigger	Contact	Maintenance Schedule
Water Tanker	2	Site storage	Dust storm (PM10 >150 µg/m³)	Contractor,	Monthly
First Aid Kit	5	Worker stations	Injury report	Site Supervisor	Bi-weekly
Fire Extinguishers	10	Strategic points	Fire outbreak	ECO,	Monthly
Emergency Vehicle	1	Site entrance	Evacuation needed	ERT Lead	Bi-monthly
Communication Radios	5	ERT command post	Loss of mobile signal	ECO,	Monthly

This table lists resources, deployment triggers, and maintenance schedules for emergency response. **Source:** Erongo Consulting Group, September 2025.

9 Estimated Budget and Schedule

9.1 Cost Estimation

The total estimated cost is N$380,000, with a 10% contingency (N$38,000) to address unforeseen expenses like equipment failure, regulatory changes, or weather-related delays. Breakdown: Pre-construction (N$30,000 for baseline studies, training), construction (N$200,000 for excavation, stabilization, safety), operation (N$100,000 for irrigation, maintenance, monitoring), and decommissioning (N$50,000 for dismantling, revegetation,

audits). Funding will be secured by September 30, 2025, with quarterly financial reviews by the proponent and ECO, and a reserve fund of N$10,000 for emergency social support.

9.2 Implementation Schedule

A detailed Gantt chart will be finalized post-ECC issuance, outlining key milestones with buffer periods for delays. The schedule includes pre-construction (Oct 2025 - Dec 2025), construction (Jan 2026 - Aug 2026), operation (Sep 2026 - Dec 2030), and decommissioning with monitoring (Jan 2031 - Dec 2035), with flexibility for weather delays (e.g., 2026 El Niño) and stakeholder consultations.

Table 7: Budget Breakdown.

Phase	Cost (N$)	Sub-Categories	Contingency (10%)
Pre-Construction	30,000	Baseline studies (N$15,000), training (N$15,000)	3,000
Construction	200,000	Excavation (N$100,000), stabilization (N$80,000), safety (N$20,000)	20,000
Operation	100,000	Irrigation (N$50,000), maintenance (N$30,000), monitoring (N$20,000)	10,000
Decommissioning	50,000	Dismantling (N$25,000), revegetation (N$15,000), audits (N$10,000)	5,000

Table 8: Implementation Schedule.

Activity	Start Date	End Date	Duration (Months)	Responsible Party	Dependencies
Baseline Studies	Oct 1, 2025	Dec 15, 2025	2.5	ECO	ECC approval
Excavation	Jan 1, 2026	Jun 30, 2026	6	Contractor	Pre-construction
Vegetation Planting	Sep 1, 2026	Nov 30, 2026	3	Agriculture	Construction
Decommissioning	Jan 1, 2031	Dec 31, 2031	12	Contractor	Operation completion
Monitoring Review	Jan 1, 2032	Dec 31, 2035	48	ECO	Decommissioning

10 Conclusion and Recommendations

The ESMP provides a comprehensive framework for rehabilitating the Henties Bay dumpsite, balancing ecological restoration (e.g., reducing Pb to <5 mg/kg, achieving >80% vegetation cover) and socio-economic benefits (e.g., 20 jobs, land for 1,000 people). The site's transformation into agricultural and recreational land addresses contamination and supports 5,000 residents. Recommendations include expediting MEFT approval by December 15, 2025, to meet the January 2026 start date, enhancing stakeholder engagement with targeted

workshops in October 2025, and securing the N$380,000 budget by September 30, 2025, with contingency plans for weather-related delays (e.g., 2026 El Niño). Erongo Consulting Group recommends ongoing collaboration with the Henties Bay Municipality to ensure community buy-in, a gender-inclusive training program, and a final audit by December 2035 to validate long-term success, including a socio-economic impact assessment.

11 References

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12 Appendices

Appendix A: List of Acronyms

Table 9: List of Acronyms

Acronym	Full Form	Description
ECO	Environmental Control Officer	Oversees ESMP implementation and compliance
MEFT	Ministry of Environment, Forestry and Tourism	Issues ECC and conducts audits
Pb	Lead	Chemical contaminant, target <5 mg/kg
Cd	Cadmium	Chemical contaminant, target <0.8 mg/kg
PM10	Particulate Matter 10	Dust measure, target <90 µg/m³
MDD	Maximum Dry Density	Soil compaction target, ~1.6 g/cm³
ICP-MS	Inductively Coupled Plasma Mass Spectrometry	Soil testing method for Pb/Cd levels
NDVI	Normalized Difference Vegetation Index	Drone-based vegetation assessment

This table provides acronyms and their descriptions used in the ESMP. Source: Erongo Consulting Group, September 2025.

Appendix B: Stakeholder Consultation Records

Table 10: Stakeholder Consultation Records

Date	Activity	Method	Participants	Response/Outcome
Sep 5, 2025	Email Outreach	Email	Henties Bay Municipality	No response
Aug 2025	Newspaper Ad	Confidente Newspaper	General Public	No inquiries received
Sep 15, 2025	Planned Public Meeting	In-person	No attendees	No turnout, no feedback noted
Sep 21, 2025	Written Submissions	Email (Ref: WS-250921)	I&APs	no submissions received

This table logs consultation activities, methods, participants, and outcomes. **Source:** Erongo Consulting Group, September 2025

Appendix C: Sample Monitoring Forms

Table 11: Sample Monitoring Form.

Date	Location	Parameter	Value	Weather Conditions	Action Taken	ECO Signature

Jan 1, 2026	Site Entrance	PM10	85 µg/m³	Clear, windy	Water spray applied	[Signature]
Jan 8, 2026	North Slope	PM10	92 µg/m³	Overcast	Increased frequency	[Signature]
Dec 15, 2025	Central Zone	Pb	8 mg/kg	Dry	Additional sampling	[Signature]

This table provides a template for dust and soil monitoring records. **Source:** Erongo Consulting Group, September 2025.

Appendix D: Emergency Contact List

Table 12: Emergency Contact List

Role	Name	Contact Number	Role in Emergency	Availability
ECO	TBD	TBD (by Oct 1)	Lead coordinator	24/7
ERT Leader	John Doe		Team deployment	24/7
Contractor Safety	TBD		On-site response	8 AM–6 PM
MEFT Officer	TBD		Regulatory support	8 AM–5 PM
Community Rep	TBD		Resident liaison	24/7

This table lists emergency contacts, roles, and availability for rapid response. Source: Erongo Consulting Group, September 2025.