ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE DEEPENING AND STRENGTHENING OF BERTHS 8–11 AND ELECTRICAL WORKS FOR BERTHS 1–11, THE RO-RO YARD AND THE CONTAINER TERMINAL AT DAR ES SALAAM PORT, PLOT NO. 1/2, MVINJENI MTAA, KURASINI WARD, TEMEKE MUNICIPALITY, DAR ES SALAAM REGION

Proponent
Tanzania Ports Authority (TPA)
Bandari Tower – One Stop Centre
Plot No. 1/2, Sokoine Drive
P.O. Box 9184, 11105Ilala, Dar es Salaam, Tanzania
Tel: +255 22 2110401–8
Toll Free: 0800 110 032
Email: dg@ports.go.tz
Website: www.ports.go.tz

Firm of Experts
TANSHEQ Limited
P.O. Box 31517, 14110,
House Plot No. 8
3, Wakulima Road
Hananasif Estate, Kinondoni
Dar es Salaam, Tanzania
Tel: +255 735 100 105 / +255 713 695 552
Email: info@tansheq.co.tz
Website: www.tansheq.co.tz

Regulator
National Environment Management Council (NEMC)
Regent Estate, Regent Street, Plot No. 29/30 / 35 Regent/Migombani Street
P.O. Box 63154, 11404
Dar es Salaam, Tanzania
Tel: +255 22 2774852 / +255 22 2774889
Mobile: +255 713 608 930 / +255 735 608 930
Email: dg@nemc.or.tz
Website: www.nemc.or.tz

25 September 2026

Official Use Only

This page is intentionally left blank

EXECUTIVE SUMMARY

This Executive Summary presents the main findings of the Environmental and Social Impact Assessment (ESIA) for the Deepening and Strengthening of Berths 8–11 and Electrical Works for Berths 1–11, Ro-Ro Yard and Container Terminal at Dar es Salaam Port. It is written in simple, non-technical language so that decision-makers, stakeholders and the general public can understand what the project involves, where it will be located, what the main environmental and social issues are, and how they will be managed. The summary follows the format required by Tanzanian EIA regulations.

(a) Title and Location of the Project or Undertaking

The project that has been assessed is titled "Environmental and Social Impact Assessment (ESIA) for the Deepening and Strengthening of Berths 8–11 and Electrical Works for Berths 1–11, the Ro-Ro Yard and the Container Terminal at Dar es Salaam Port." In practical terms, this means that the existing container berths 8–11 at Dar es Salaam Port will be deepened and structurally strengthened, and the electrical infrastructure that supplies power to berths 1– 11 (and associated yard facilities) will be upgraded.

The project is located entirely within Dar es Salaam Port, in Plot No. 1/2 Mvinjeni, Kurasini Ward, Temeke Municipality in Dar es Salaam City, United Republic of Tanzania. The marine works will take place in the sheltered harbour basin at berths 8–11, which are currently operating as container berths. The onshore activities will be confined to existing port land, including current container yards, substation sites and cable corridors that run parallel to the quays. No works extend outside the existing port boundary; there is no encroachment into residential neighbourhoods, greenfield land or undeveloped coastal areas.

(b) Name of the Proponent and Contact

Project proponent is the Tanzania Ports Authority (TPA), represented by the Director General. The proponent's official contact is:

Director General
TPA Headquarters (Bandari Tower One Stop Centre, 1/2 Sokoine Drive, Ilala, Dar es Salaam,
P.O. Box 9184
Tanzania,
Telephone: +255 22 2110401/8
Email: dg@ports.go.tz

(c) Names and Addresses of EIA Experts/Consultants

The Environmental and Social Impact Assessment was conducted by:

Tansheq Limited,

P.O. Box 31517, Dar es Salaam)

Telephone: +255 0735100 105.

The study team was led by **Mr. Lusako Raphael**, the registered Team Leader for this ESIA. Mr. Raphael and his multidisciplinary team of experts (including specialists in waste management, environmental science, sociology, community development, and marine ecology).

(d) Brief Outline and Justification of the Proposed Project or Undertaking

The project has been conceived to address both capacity and safety constraints at Dar es Salaam Port. Container traffic at the port has grown rapidly and is projected to continue growing. Existing berth depths and infrastructure at berths 8–11 limit the size of vessels that can safely call and create bottlenecks in handling. The electrical systems serving berths 1–7 and associated equipment are also old and less efficient. The overarching justification is therefore to modernise and deepen existing berths, upgrade

electrical infrastructure, and thereby improve efficiency, safety and environmental performance of the port while remaining within its current footprint.

To clarify the context and justification, this section of the Executive Summary is broken down according to the sub-items required by the regulations.

This ESIA has been prepared using both project-specific investigations and relevant earlier technical and environmental studies undertaken for Dar es Salaam Port improvement works. In particular, the assessment has drawn on the WAPCOS EIS study report (2016), TECHNITAL and ACE studies on dredging, disposal-site assessment and related marine investigations, and the Final Feasibility Study Report for the strengthening and deepening of Berths 8–11 prepared by the STUDI/HPC joint venture (July 2023).

The ESIA has also used the 2023 Underwater Investigations report as a supplementary marine evidence source. That study provided marine water-quality, sediment and ecological information from both harbour-influence and non-influence locations, and has been used in this ESIA to strengthen marine baseline interpretation, trend comparison and the wider assessment of sensitive marine receptors.

These studies informed the understanding of berth design options, dredging requirements, bathymetric and geotechnical conditions, disposal-site alternatives, and the broader environmental setting. The present ESIA has used these earlier studies together with updated ESIA baseline information and stakeholder consultations to assess the environmental and social implications of the proposed works.

(i) Brief Description of the Project Environment

The project environment is the existing Dar es Salaam Port and its immediate surroundings. Physically, the port lies in a natural harbour along the Indian Ocean coastline, with a narrow entrance channel opening into a broader basin where berths and turning areas are located. Water depths at berths 8–11 are currently about 11–12 metres below Chart Datum, which is not sufficient for fully loaded Post-Panamax container vessels. The project will deepen these areas to approximately 14.5 metres and strengthen the quay structure.

The onshore area consists of reclaimed and heavily developed port land. The soils within the port are fill material and compacted surfaces that have been engineered over many decades; they have no agricultural value and contain no natural terrestrial ecosystems. The physical environment is therefore characterised by a long-established industrial setting, with paved yards, warehouses, cranes, storage areas and access roads.

The biological environment, particularly in the immediate marine footprint of the project, is likewise heavily influenced by port activities. The seabed around the container berths is composed mainly of silty sand with some finer sediments in depressions. Benthic organisms are present but their communities are relatively low in diversity and consist of species adapted to disturbance. There are no coral reefs or seagrass beds directly under or adjacent to the dredging and quay improvement areas. Sensitive marine habitats and protected areas do exist further away along the coast and around offshore islands, and these have been considered in the wider impact and cumulative impact analysis.

The socio-economic environment is dominated by the port’s role as the principal maritime gateway for Tanzania and several neighbouring countries. The port anchors an important logistics and service economy in and around Kurasini Ward. Temeke Municipality is densely populated and includes a mix of formal and informal settlements, local businesses and social services. Communities around the port obtain direct and indirect benefits through employment, trade and services, but also experience some negative effects such as traffic congestion, air pollution from trucks and noise from port operations. Importantly, the project area itself lies entirely within fenced port land, with no homes or community facilities inside its immediate footprint.

(ii) Project Stakeholders and their Involvement in the EIA Process

Because Dar es Salaam Port is a national and regional asset and the project could influence many people and interests, a broad range of stakeholders were identified and involved in the ESIA process. Stakeholders include government ministries and regulatory agencies, local authorities, port operators and users, nearby communities, small-scale economic actors such as fishers and market traders, and development partners.

The ESIA team, together with TPA, carried out stakeholder engagement in several stages. At the beginning of the process, scoping meetings were held with the National Environment Management Council, the Vice President's Office – Division of Environment, and relevant ministries and agencies to agree on the scope of the study, key issues and the terms of reference. These discussions helped shape the studies of physical environment, marine ecology and socio-economic conditions and ensured that the ESIA would address all required legal and policy aspects, including World Bank safeguards.

At the local level, meetings were organised with Temeke Municipal Council, Kurasini Ward Office and leaders at mtaa (street) level adjacent to the port. This allowed the project and its objectives to be introduced formally, and local leaders helped in mobilising residents, fishermen and small business owners for further discussions. Several community meetings and focus groups were held where the project was explained using visual materials and, where necessary, in Kiswahili to ensure broad understanding. People were invited to express their expectations and concerns, and these were carefully recorded.

Port-related stakeholders, such as TICTS (or the previous container terminal operator), truckers, freight forwarders, shipping agents and port workers, were consulted through targeted interviews and group discussions. These stakeholders provided detailed insight into how construction might affect operations and work patterns, and what mitigation measures would be practical and fair from their perspective.

Throughout the ESIA, there has been an emphasis on two-way communication. This means not only collecting views but also feeding back to stakeholders how their input influenced analysis and mitigation. A grievance redress mechanism has been designed to continue this engagement beyond the ESIA stage into construction and operation.

(iii) Explanation on Why Some Impacts Are Not Addressed

In this ESIA, all relevant impact categories identified during scoping have been addressed. No major impact topics were discarded simply because they were inconvenient to study. However, the scoping process did find that some potential issues are not relevant or are of such low significance that they only needed brief confirmation rather than detailed study.

For example, impacts on agricultural land or rural livelihoods were considered but screened out because the entire project footprint is on existing port land within an urban environment where there is no farming. Similarly, impacts on natural terrestrial habitats were considered; it was confirmed that the onshore areas affected by the project have been fully developed for port use for many years and do not contain natural forests, wetlands or other sensitive terrestrial ecosystems.

Cultural heritage was also examined. No known archaeological, historical or sacred sites or graves lie within the project area, and the history of port development suggests that much of the area has been heavily modified for longer than formal heritage recording has been in place. Nevertheless, the ESIA still includes chance-find procedures so that if any unexpected heritage resources are encountered during works, construction can be halted and appropriate authorities notified.

Because these issues were considered and screened through evidence, the ESIA can state that there are no important impacts left unaddressed. The main emphasis of the assessment is placed on those

environmental and social aspects that are genuinely at risk: marine water quality and habitats, port-community interactions, worker and community safety, and socio-economic effects on port users.

(iv) Developer, Consultant, Local Authorities and Other Organisations Consulted

The ESIA process was underpinned by consultation with a long list of institutions and organisations. The developer, TPA, was closely involved through its senior management and technical departments, including the Director General's office, the Engineering and Technical Services directorate, the Operations department and the Environmental Management Unit.

The consultant, Tansheq Limited, as noted above, served as the independent expert, but also engaged with several other parties to collect data and reflect different perspectives in the assessment.

At the national level, ministries and agencies were consulted. These include the Ministry responsible for works and transport, the ministry and departments responsible for fisheries and marine resources, the electricity utility TANESCO, the road agency TANROADS, the maritime regulator TASAC, and TRA. The Occupational Safety and Health Authority was involved in discussions around worker safety standards that will be applied during construction and operation.

Local authorities, especially Temeke Municipal Council and Kurasini Ward Office, were included not only to meet legal requirements but also because they have detailed knowledge of local socio-economic conditions, local development plans and existing complaints related to port activity. Their views helped shape the understanding of how the project fits into local plans and how it might best address issues like traffic congestion and service delivery.

Private sector and civil society stakeholders were also part of the consultation. The previous container terminal operator and their staff, truckers and other port users, fishermen and fish market vendors near the ferry area, small business owners along the access roads, and informal service providers were all given opportunities to comment. Local leaders helped ensure that women, youth, and other groups that might otherwise be overlooked were able to participate.

(v) Results of Public Consultation

Public and stakeholder consultation showed both a strong desire for improved port performance and understandable worries about how construction and more intensive operations might affect the environment and people's daily lives.

Many participants expressed those modernising berths 8–11 and upgrading electrical systems is necessary. They pointed out that the port is often congested and that delays affect the prices of goods and the reliability of services for the whole country and neighbouring states. In their view, improvements to the port will ultimately benefit the wider economy, create jobs and potentially improve household incomes.

At the same time, fishermen and fish market traders raised concerns that dredging and marine works could disrupt fish movements and temporarily affect catches or access to nearby landing points. They requested that the project consider timing works to avoid peak fishing periods, provide advance notice of any restrictions and, where necessary, identify temporary alternative landing arrangements. However, fishing within the port is prohibited by law (Ports Regulations, 2024 section 168.-(1)) and that is the practise now. Fishing areas are located very far from the project area in such a way that dredging activities will not affect fishing. Baseline fish catch data from the Dar es Salaam coastal waters, compared to data during and after for previous dredging for erth 1-7, showed fluctuations within normal range and no clear project-linked decline. However, advance notice shall be provided incase of any restrictions (if at all it happen) Landing area at the fish market (Feri) will not be impacted by the project hence there is no need for alternative landing arrangements.

Workers and managers at the container terminal were particularly interested in how their operations and employment would be affected during construction. They asked whether berths would be closed all at once or in phases, how long disruptions would last, and what would happen to staff if operations were reduced or relocated. TPA explained that works would be phased so that not all berths are taken out of service at once and that workers associated with TICTS operations at affected berths would be absorbed by TPA and/or provided with continuity of employment rather than laid off. This assurance was important in building support among workers and their representatives. However, Currently TICTS are not operating the container terminal anymore after their contract expire, TPA have absorbed all workers. The assurance is still there, during constructions operations will be phased, no staff will be laid off because of the project.

Community members living near port access routes pointed to existing problems with heavy trucks, including traffic congestion, dust, noise and safety risks for pedestrians, especially children. They stressed that any increase in construction traffic must be carefully managed and that mitigation such as speed limits, traffic marshals and improved road surface maintenance would be needed. They also requested that dust control measures be properly implemented, especially in dry seasons.

Overall, while there were clear concerns, most stakeholders accepted that these could be managed if the project followed the mitigation measures outlined in the ESIA. Many expressed willingness to cooperate if they are kept informed and have a functioning channel for complaints and dialogue.

(vi) Description of the Major Significant Impacts

The ESIA identifies major adverse and beneficial impacts for the construction, operation and eventual decommissioning phases.

During construction, the most significant environmental impact is the effect of dredging and associated marine works on water quality and marine life. Dredging will stir up sediments, increasing turbidity in the water column and potentially smothering benthic organisms on the seabed within the dredging footprint and at the disposal site. There is also localised risk of sediment plumes drifting into nearby areas outside the immediate work zone, although this risk is mitigated by the nature of the harbour and the positioning of disposal. Underwater noise from dredging and pile driving can disturb fish and any marine mammals that might occasionally visit the harbour. These effects are expected to be temporary and concentrated in and around the dredging areas, but without mitigation they could be significant.

Other important construction-phase impacts include the risk of accidental spills of fuel or oil, general pollution from poor waste management, and nuisances like dust and noise affecting workers and nearby communities. The intensity of these impacts will depend heavily on contractor practices. If equipment is poorly maintained or wastes are not properly stored and disposed, soil and water contamination could occur. Noise and dust, if uncontrolled, would add to existing urban environmental pressures and discomfort for residents along access routes.

From a social and economic perspective, a key impact is the temporary disruption of port operations when berths are taken out of service for strengthening and when electrical systems are upgraded. This can reduce berth capacity, cause delays to ships and affect the revenues of terminal operators and port users. For workers, there is anxiety about job security during the transition. For local businesses, particularly those reliant on vehicle traffic or port-related clientele, any major shift in traffic patterns or access could temporarily reduce income.

In the operational phase, deeper and stronger berths and improved electrical systems will change the port's risk profile. There will be an increase in the size and possibly number of vessels calling the port, which raises the baseline risk of marine accidents such as collisions, groundings or spills. If waste reception facilities and enforcement are not adequate, the volume of ship-generated wastes could lead to increased waste management challenges. However, improved shore power and modern electrical infrastructure will significantly reduce emissions and noise from ships at berth and from port equipment, yielding environmental benefits.

The ESIA concludes that, after applying the proposed mitigation and management measures, residual adverse impacts will typically be reduced to minor or moderate significance and will be localised or short-term. Long-term positive impacts, particularly in terms of economic benefits and improved environmental performance through electrification and modern facilities, are substantial.

(vii) Alternatives Considered

In line with good practice and regulatory requirements, the ESIA considered several types of alternatives.

The first is the “no-project” alternative. This scenario would avoid the construction impacts described above but would also leave the port with insufficient capacity and depth to handle larger vessels and growing traffic. Over time, congestion would likely worsen, delays and costs would increase, and some traffic might shift to competing ports, undermining Tanzania’s economic objectives. For this reason, the no-project alternative was deemed undesirable from a national and regional development perspective, even though it avoids temporary environmental impacts.

The second type of alternative relates to location. Because the project is an upgrade of existing berths within an established port, there was no realistic alternative location for the main works. However, there was a location choice for the disposal of dredged material. Several disposal options were examined, including nearshore disposal and offshore deepwater disposal. Nearshore disposal was found to pose higher risks to coastal habitats and fisheries, while offshore disposal at a sufficiently deep and distant site was identified as more environmentally acceptable. The selected offshore site was chosen to avoid sensitive habitats and minimise interference with fishing grounds and navigation.

The third type involves design and technology alternatives. Alternative quay strengthening solutions, different configurations of piles and deck systems, and different electrical technologies and substation arrangements were assessed. The chosen solutions emphasise structural reliability, safety, flexibility for future expansion, energy efficiency and reduction of environmental footprint, for example by enabling shore power. Various dredging approaches were also compared, and modern, more controllable methods were preferred.

Finally, construction phasing alternatives were examined. The ESIA compared closing all berths at once (which would shorten construction but severely disrupt operations) with a phased approach. The chosen solution is to phase works so that only one or part of one berth is taken out of service at a time. This longer but less disruptive approach was deemed more socially responsible and economically sensible.

Taken together, the alternatives analysis demonstrates that the selected project configuration and implementation strategy strike a reasonable balance between engineering, economic and environmental considerations.

(viii) Recommendations and Plan for Mitigation of the Impacts

The ESIA sets out a detailed plan of mitigation measures to address the impacts identified. These measures form the core of the Environmental and Social Management Plan (ESMP), which is binding on the proponent and contractors.

For the marine environment, the ESMP recommends careful planning and execution of dredging, including appropriate choice and maintenance of dredging equipment, use of silt curtains or other containment where warranted, and real-time monitoring of water quality parameters such as turbidity. Dredging should be timed, as far as practical, to avoid periods that are particularly sensitive for marine organisms, such as spawning seasons. Operational controls at the offshore disposal site, such as defined dumping zones, controlled release and observation for any unexpected effects, are also part of the mitigation plan.

To reduce risks of spills and pollution, the ESMP calls for robust management of fuels and hazardous materials, including secure storage with secondary containment, strict refuelling procedures, and readily available spill response equipment and trained personnel. A project-specific oil spill response plan will complement the wider port contingency plan to ensure rapid and coordinated action if an incident occurs.

Air quality and dust mitigation measures include watering of unpaved areas, covering or dampening of dusty loads on trucks, enforcement of speed limits on haul roads, and regular maintenance of machinery to ensure efficient combustion. Noise mitigation involves scheduling high noise activities in daylight hours, using noise-reducing technologies where feasible, and monitoring noise levels near particularly sensitive receptors.

Occupational health and safety mitigation is addressed through the development and implementation of a comprehensive health and safety management plan. This includes risk assessments, clear procedures for all high-risk activities, training, provision and enforcement of personal protective equipment, emergency response arrangements and regular safety inspections.

Socio-economic mitigation measures include careful scheduling and phasing of works with terminal operators to minimise operational disruption, and promotion of local employment and procurement so that communities can share in the project's benefits.

Each mitigation measure in the ESMP is assigned to a responsible party (for example the contractor, TPA, supervision consultant) with defined timing and performance indicators.

(ix) Environmental and Social Management

Mitigation measures only achieve their intended effect if they are systematically implemented and managed. For this reason, the ESIA includes a detailed Environmental and Social Management Plan that sets out how environmental and social issues will be integrated into the project's implementation.

The ESMP defines a clear management structure. TPA retains overall responsibility for environmental and social performance. The contractor is responsible for preparing and implementing a Construction Environmental and Social Management Plan that translates the ESMP into site-specific procedures. A supervision consultant, acting on behalf of TPA, will oversee the contractor's work and verify compliance. Regulatory authorities such as NEMC and OSHA will exercise oversight, inspect the site and enforce conditions of approval and legal requirements.

The ESMP requires that environmental and social management requirements be included in tender documents and contracts so that contractors are legally bound to implement them. It also requires training for both TPA staff and contractor staff on ESMP provisions, monitoring methods, health and safety, community relations and grievance handling.

Reporting mechanisms are established so that environmental and social performance becomes a regular part of project management. The contractor will prepare regular environmental and safety reports; the supervision consultant will compile these into consolidated reports for TPA and regulators. Any non-compliance will trigger corrective actions, and repeated or serious violations may lead to contractual penalties.

In this way, environmental and social management is not treated as a separate, optional activity, but as an integral part of the overall project management system.

(x) Proposed Monitoring and Auditing

Monitoring is a key component of the ESMP. It is how TPA, regulators and the community can verify that mitigation measures are in place and working, and that actual impacts are in line with predictions.

The monitoring programme covers environmental parameters, such as water quality in the harbour during dredging, dust levels near active construction areas, noise levels at the port boundary and near sensitive receptors, and the management of solid and liquid wastes. It also covers social indicators such as the number and type of community grievances received and resolved, the number of local people employed, and occupational health and safety performance.

For each parameter, the ESMP specifies where it will be monitored, how often, by whom and using what methods. For example, water quality might be measured daily at specified stations during active dredging; noise could be measured weekly during peak construction near community locations; and dust might be visually checked daily with quantitative measurements during critical periods.

Auditing supplements routine monitoring. Internal audits will be undertaken at key points during construction to assess whether the ESMP is being followed in practice and to identify opportunities for improvement. External audits, by NEMC or independent auditors, may be required as part of the environmental certificate conditions, especially at the end of construction and in early operation.

Monitoring and auditing results will be used in adaptive management. If data show an unexpected impact or ineffective mitigation, TPA and the contractor will review and strengthen the measures. This feedback loop ensures that environmental and social management remains responsive and effective.

(xi) Resource Evaluation or Cost–Benefit Analysis

The project requires significant investment in civil works, dredging and electrical infrastructure, as well as in environmental and social management measures. The ESIA summarises a resource evaluation and cost–benefit perspective, building on the underlying feasibility studies.

On the cost side, there are direct financial costs for construction, dredging, equipment and operations and maintenance. Additional, but comparatively smaller, costs relate to environmental and social mitigation and monitoring, such as water quality testing, noise measurements, training programmes and community engagement.

On the benefit side, deepening and strengthening berths 8–11 and improving electrical systems will allow Dar es Salaam Port to handle larger ships more efficiently, reduce vessel waiting times and improve productivity. This will lower the cost of transport for importers and exporters, enhance the competitiveness of Tanzanian and regional products, and generate higher revenues for TPA and for government through taxes and charges. In addition, there are benefits such as job creation, improved working conditions, and environmental improvements through reduced emissions from ships and equipment.

When these factors are considered over the life of the project, the analysis concludes that the economic and social benefits clearly outweigh the costs, including the costs of mitigation. From a resource use perspective, upgrading and modernising existing port infrastructure is also more efficient and sustainable than building entirely new facilities elsewhere.

(xii) Decommissioning

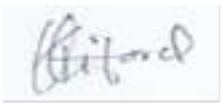
Although the project is designed to provide long-term benefits and the facilities are expected to operate for many years, the ESIA also considers the eventual decommissioning of project components. General principles for decommissioning are set out so that when the time comes, it can be undertaken responsibly.

Decommissioning would involve the removal or dismantling of equipment and structures that have reached the end of their useful life, such as cranes, electrical equipment or sections of quay that might eventually be replaced again. The same care applied to construction would be applied during decommissioning, with attention to dust, noise, waste management and health and safety.

Materials arising from decommissioning would be managed in accordance with waste hierarchy principles, favouring reuse and recycling where possible and ensuring that hazardous components are disposed of through licensed facilities. The site, whether it remains a port area or is converted to another use, would be left in a safe and environmentally acceptable condition.

The ESIA links decommissioning to the ESMP by stating that, at the time of closure or major replacement, a more detailed decommissioning plan would be prepared, based on the same legal and international standards, and that monitoring and, if necessary, an environmental audit, would be carried out to confirm that there are no unacceptable residual impacts.

LIST OF REGISTERED EXPERTS INVOLDED IN CONDUCTING THE STUDY

S/N	Experts	Specialty	Signatures
1.	Lusako Raphael	Team Leader	
2.	Eng. Anamary Philemon	Monitoring and Waste Management Expert	
3.	Erick Gagalla	Environmental expert	
4.	Rosemary Nyirenda	Sociologist	
Other Experts Involved in the Study			
1.	Hermina Chonya	Community Development Specialist	
2.	Nyasaila Nyakia	Sociologist	
3.	Veronica Msolla	Environmental Officer	
4.	Asia Abibu	Environmental Officer	
5.	Yerusalem Mwaipopo	Environmental Engineer	
6.	Joachim Marawiti	Environmentalist and GIS Expert	
7.	Dr. Nsajigwa Mbije	Marine Ecologist	

DOCUMENT QUALITY CONTROL PLAN

Rev	Action	Responsibility	Date
1.	Revised Draft IV	Tansheq	September 25, 2026
2.	Reviewed Internally	Tansheq	September 25, 2026
3.	Verified by the Client		
4.	Complied and proofread		

TABLE OF CONTENTS

EXECUTIVE SUMMARY ii
LIST OF REGISTERED EXPERTS INVOLDED IN CONDUCTING THE STUDY xi
DOCUMENT QUALITY CONTROL PLAN xi
TABLE OF CONTENTS xii
LIST OF FIGURES xxiii
LIST OF TABLES xxv
ACKNOWLEDGEMENT xxviii
LIST OF ABBREVIATION AND ACRONYMS xxix
CHAPTER ONE 1
1 INTRODUCTION 1
1.1 Background 1
1.2 Scope of the Study 1
1.3 Objectives of the ESIA 2
1.4 Duration of the Study 2
1.5 Study Approach 2
1.5.1 Issues Associated with the Proposed Project 3
1.5.2 Regulatory Framework with Associated Issues 3
1.5.3 Current Situation (Baseline Situation) 3
1.5.4 Issues from Key Stakeholders 3
1.5.5 Assessment of Positive and Negative Impacts 4
1.5.6 Consideration of Alternatives 4
1.5.7 Developing an Environmental Management Plan 4
1.5.8 Developing an Environmental Monitoring Plan 4
1.6 Structure of the Report 4
CHAPTER TWO 6
2 PROJECT DESCRIPTION 6
2.1 Introduction 6
2.2 Project Location and Accessibility 6
2.2.1 Location 6
2.2.2 Site Accessibility 6
2.3 Project Objectives and Justification 6
2.3.1 Project Objectives 6
2.3.2 Justification 8
2.4 Project Components and Design 10
2.4.1 Marine and Civil Works for Berths 8-11 10

2.4.2 Electrical Infrastructure Upgrades for Berths 1–7 15
2.4.3 Project Components and Indicative Quantities Summary 16
2.5 Phases of Implementation of the Dar es Salaam Port Improvement Project 17
2.5.1 Mobilization (Pre-Construction) Phase 18
2.5.2 Construction Phase 19
2.5.3 Operation and Maintenance Phase 20
2.5.4 Decommissioning Phase 20
2.6 Summary of All Aspects During All Phases of Project Implementation 20
2.6.1 Pre-Construction and Mobilization Phase 21
2.6.2 Construction Phase (Marine Works) 21
2.6.3 Construction Phase (Landside Works) 21
2.6.4 Operational Phase 22
2.6.5 Decommissioning Phase 22
2.7 Project Implementation Schedule 22
2.8 Estimated Project Cost 23
CHAPTER THREE 24
3 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK 24
3.1 Introduction 24
3.2 Constitution, Policies and Strategies 24
3.2.1 The Constitution of Tanzania (1977, Revised 1995) 24
3.2.2 National Development Vision 2025 24
3.2.3 National Environmental Policy (2021) 25
3.2.4 National Transport Policy (2003) 25
3.2.5 Construction Industry Policy (2003) 25
3.2.6 National Water Policy (2002) 26
3.2.7 National Health Policy (2017) 26
3.2.8 National Policy on HIV/AIDS (2003) 26
3.2.9 National Energy Policy (2015) 26
3.2.10 National Investment Promotion Policy (1996) 27
3.2.11 National Women and Gender Policy, 2000 27
3.2.12 National Adaptation Programme of Action of 2007 27
3.3 Legislation, Acts and Regulations. 28
3.3.1 Environmental Management Act, 2004 and (Miscellaneous) (No.3) Act, 2016 and 2021 28
3.3.2 The Ports Act No. 17, 2004 30
3.3.3 Tanzania Shipping Agencies Act, 2017 Act 31

3.3.4 Merchant Shipping Act No. 21, 2003 31
3.3.5 Employment and Labour Relation Act, 2019 32
3.3.6 The Marine Parks and Reserves Act, 1994 32
3.3.7 Occupational Health and Safety Act, 2003 33
3.3.8 Fisheries Act, No. 22 of 2003 34
3.3.9 Deep-Sea Fishing Authority Act (1998) 34
3.4 World Bank Environmental Safeguard Policies 35
3.4.1 OP 4.01: Environmental Assessment 35
3.4.2 OP 4.04: Natural Habitats 35
3.4.3 OP 4.11 Physical Cultural Resources 35
3.4.4 OP 4.12 Involuntary Resettlement **Error! Bookmark not defined.**
3.4.5 TPA Environmental Health and Safety Management System 36
3.5 International Agreements, Conventions and Policies 36
3.5.1 UNFCCC, Paris Agreement and Tanzania's Nationally Determined Contribution (NDC) 36
3.5.2 MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships) 37
3.5.3 Working Environment (Air Pollution, Noise and Vibration) Convention (No. 148), 37
3.5.4 The 1972 Convention on International Regulations for Preventing Collisions at Sea (COLREGs) 37
3.5.5 The Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention of 1972) 38
3.5.6 The United Nations Law of the Sea 1982 38
3.5.7 The 1991 Bamako Convention 38
3.5.8 The 1989 Basel Convention 38
3.5.9 1996 Convention on Biological Diversity 38
3.5.10 The 2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships 39
3.5.11 ILO Minimum Age Convention (C138), 1973 39
3.6 Institutional Framework for Managing Environment 39
3.6.1 Authorities Involved in ESIA 39
3.6.2 Minister Responsible for Environment 40
3.6.3 Director of Environment (DoE) 40
3.6.4 National Environment Management Council (NEMC) 40
3.6.5 Sector Ministries 40
3.6.6 Regional Secretariats 41
3.6.7 Local Government Authorities 41
3.6.8 Ward/Mtaa (Street)/Kitongoji (Hamlet) Level 41

CHAPTER FOUR 46
4 BASELINE OR EXISTING CONDITIONS 46
4.1 Introduction 46
4.1.1 Limitations of Baseline Data and Interpretation 46
4.2 Project Footprint and Zone of Influence 47
4.2.1 Project Footprint (Directly Affected Area) 47
4.2.2 Zone of Influence (Indirectly Affected Area) 47
4.3 Background of Dar es Salaam Port 49
4.3.1 Capacity 51
4.3.2 Port Features 52
4.3.3 Railway Linkage 54
4.3.4 Employment 54
4.3.5 Health Facilities 55
4.3.6 Water Supply 56
4.3.7 Solid Waste 58
4.3.8 Liquid Waste 59
4.3.9 Energy 60
4.4 Climate 60
4.4.1 General Weather Over Dar Es Salaam City 60
4.4.2 Results for Trend Test Analysis 63
4.5 Climate Change 66
4.5.1 Observed Climate Trends 66
4.5.2 Water Temperature 66
4.5.3 Signs of Rising Sea Level due to Climate Change 68
4.6 Ambient Air Quality 70
4.6.1 Frequency and Parameters for Sampling 71
4.6.2 Ambient Air Quality Results 72
4.6.3 Discussion 73
4.7 Noise Levels 75
4.7.1 Noise Monitoring Methodology 75
4.7.2 Noise Monitoring Results 77
4.7.3 Discussion 79
4.7.4 Noise Monitoring Results **Error! Bookmark not defined.**
4.8 Vibration Levels 80
4.8.1 Specification 80
4.8.2 Methodology 80

4.8.3 Vibration Results 81
4.8.4 Discussion 83
4.9 Marine Water Quality, Marine Sediments and Oceanographic Conditions 83
4.9.1 Baseline Datasets and Scope 84
4.9.2 Ambient Marine Water Quality 84
4.9.3 Marine Sediment Quality 87
4.9.4 Oceanographic Setting 88
4.9.5 Standards and Interpretation Note 89
4.10 Marine Ecology Baseline 90
4.10.1 Introduction 90
4.10.2 Methodology 90
4.10.3 Direct Marine Ecological Baseline in the Harbour Works Area 95
4.10.4 Wider Marine Ecological Baseline: Intertidal and Subtidal Habitats 96
4.10.5 Wider Marine Ecological Baseline: Coral Reefs, Seagrass and Mangroves 97
4.10.6 Biological Communities, Species and Ecological Condition 100
4.10.7 Main Existing Threats and Relevance to the Project **Error! Bookmark not defined.**
4.10.8 Conclusion **Error! Bookmark not defined.**
4.11 Baseline Information of the Selected Sediment Disposal Site 110
4.11.1 Geographic Location and Context 110
4.11.2 Water Quality **Error! Bookmark not defined.**
4.11.3 Overview of Oceanographic Conditions and Dispersion Potential 115
4.11.4 Seabed and Sediment Characteristics **Error! Bookmark not defined.**
4.11.5 Marine Ecology Baseline – Offshore Sediment Disposal Site **Error! Bookmark not defined.**
4.11.6 Sensitive Habitats **Error! Bookmark not defined.**
4.11.7 Human Uses and Socio-Economic Receptors – Offshore Sediment Disposal Site 118
4.11.8 Comparative Justification from Previous ESIAs (2016 vs 2020) 118
4.12 Socioeconomic Environment 120
4.12.1 General Area of Influence of the Proposed Project 121
4.13 Demography 121
4.13.1 Population 121
4.13.2 Ethnics and languages **Error! Bookmark not defined.**
4.13.3 Education **Error! Bookmark not defined.**
4.13.4 Economic Activities 122
4.13.5 Road infrastructure 123

4.14 Environmental Performance of the Berths 1–7 Project (Lessons Learned) 123
4.14.1 Adequacy of Past ESMPs 124
4.14.2 Implementation of Mitigation Measures and Monitoring 125
4.14.3 Outstanding Environmental & Social Issues 125
4.14.4 Biodiversity Impacts from Previous Dredging 125
4.14.5 Integration of Lessons Learned into Berths 8–11 126
CHAPTER FIVE 128
5 STAKEHOLDER IDENTIFICATION AND ANALYSIS 128
5.1 Introduction 128
5.2 Lessons Learned from Berths 1–7: Institutional Arrangements, Reporting and ESHS Management Implications for the Current Project 130
5.3 Stakeholder Consulted 131
5.3.1 Institutional Stakeholders 131
5.3.2 Other Stakeholders 131
5.4 November 2025 Stakeholder Consultation Update 131
5.5 Main Concerns and Comments of Stakeholders 132
5.6 Conclusion 137
CHAPTER SIX 138
6 ENVIRONMENTAL DUE DILIGENCE REVIEW OF PREVIOUS PORT EXPANSION ACTIVITIES 138
6.1 Introduction 138
6.2 Overview of Prior Port Improvement Works 138
6.3 Adequacy and Implementation of ESMPs 139
6.4 Environmental and Social Monitoring Performance 145
6.5 Unresolved or Residual Impacts 146
6.6 Institutional Responsibilities and Compliance Review 148
6.7 Cumulative and Legacy Impacts 149
6.8 Lessons Learned and Implications for Current ESIA 151
6.9 Conclusion 152
CHAPTER SEVEN 154
7 Chapter 7: Assessment of Impacts 154
7.1 Approach and Methodology for Impact Assessment 154
7.1.1 Impact Identification and Screening 154
7.1.2 Assessment Criteria – Magnitude and Sensitivity 155
7.1.3 Impact Significance Evaluation 156
7.1.4 Regulatory and Guideline Thresholds 157
7.2 Aspect and Impact Identification Matrix 157
7.2.1 Findings of the Interaction Matrix 161

7.3 Phased Assessment 161
7.3.1 Pre-Construction/Design Phase Impacts 162
7.3.2 Construction Phase Impacts 163
7.3.3 Operation Phase Impacts 173
7.3.4 Decommissioning Phase 177
7.4 Cumulative Impacts 185
7.4.1 VECs, Spatial and Temporal Boundaries 185
7.4.2 Other activities and environmental drivers 185
7.4.3 Baseline status of VECs 185
7.4.4 Assess cumulative impacts on VECs and significance of cumulative impacts 185
7.4.5 Management of cumulative impacts 188
7.5 Comparison with ESIA Findings for Berths 1–7 Improvements 188
7.5.1 Similar Nature of Impacts 188
7.5.2 Differences or New Considerations 188
CHAPTER EIGHT 191
8 PROJECT ALTERNATIVES 191
8.1 Introduction 191
8.1.1 The No Project Alternative 191
8.1.2 The Yes project alternative 191
8.2 Dredging technology 191
8.2.1 Dredging methods 191
8.2.2 Dredging Equipment (CSD vs TSHD) 192
8.3 New Berths Construction Methods and Techniques 193
8.3.1 Option 1: Rehabilitation 193
8.3.2 Option 2: New quay Pile Solution 193
8.3.3 Option 3: New quay-Caisson Solution 194
8.3.4 No-Go alternative 194
8.4 Consideration of Alternatives for Electrical Works 195
8.4.1 No Go Option 195
8.4.2 Technology Alternatives 195
8.4.3 Location Alternatives of Substations 196
8.4.4 Conclusion 196
CHAPTER NINE 197
9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) 197
9.1 Objectives and Principles of the ESMP 197
9.1.1 Overall Objectives of the ESMP 197

9.1.2 Guiding Principles and Mitigation Hierarchy 197
9.1.3 Linkage with Impact Assessment and Alternatives 198
9.2 Impact Mitigation and Enhancement Plan 199
9.3 Structure of the ESMP 199
9.3.1 Environmental and Social Management Plan 199
9.3.2 Environmental and Social Monitoring Plan 215
9.4 Institutional Responsibilities and Coordination 220
9.5 Capacity-Building and Training Plan 224
9.5.1 Training and Capacity-Building Activities 224
9.5.2 Equipment/Resource Provision 225
9.5.3 Responsible institutions for Capacity Building 226
9.6 Improvement upon Berths 1–7 ESMP Experience 226
9.7 Conclusion 228
CHAPTER TEN 229
10 COSTS BENEFIT ANAYLSIS 229
10.1 Introduction 229
10.2 Methodology 229
10.3 Description of Costs 230
10.3.1 Capital Investment Costs 230
10.3.2 Operational and Maintenance Costs 231
10.3.3 Environmental Mitigation and Management Costs 232
10.3.4 Social Mitigation, Compensation, and Disruption Costs 232
10.4 Description of Benefits 234
10.4.1 Direct Economic Benefits 234
10.4.2 Environmental Benefits 237
10.4.3 Social Benefits 239
10.5 Net Benefit Summary 242
10.6 Conclusion 244
CHAPTER ELEVEN 246
11 Decommissioning 246
11.1 Introduction 246
11.2 Objectives and Guiding Principles of Decommissioning 246
11.3 Possible Decommissioning Scenarios and Methods 247
11.3.1 Scenario 1: Complete Removal and Site Restoration 247
11.3.2 Scenario 2: Partial Removal and Infrastructure Handover/Repurposing 247
11.4 Decommissioning Methods 247

11.4.1 Marine Infrastructure Removal 247
11.4.2 Onshore Infrastructure Demolition 248
11.4.3 Site Rehabilitation 248
11.5 Anticipated Environmental and Social Impacts and Mitigation during Decommissioning 249
11.5.1 Post-Decommissioning Environmental Monitoring 249
11.6 Framework for Future Decommissioning Plan Preparation 249
11.6.1 Initiation and Preliminary Assessment 250
11.6.2 Formation of a Decommissioning Team 250
11.6.3 Detailed Plan Preparation 250
11.6.4 Regulatory Review and Approval: 250
11.6.5 Implementation and Adaptive Management 250
11.6.6 Final Audit and Handover 251
11.7 Conclusion 251
CHAPTER 12 252
12 Summary and Conclusion 252
12.1 Project Overview 252
12.2 Environmental and Social Baseline 252
12.2.1 Physical Environment 252
12.2.2 Marine Ecology 253
12.2.3 Terrestrial Ecology 253
12.2.4 Social and Economic Context 253
12.2.5 Existing Port Environmental Status 253
12.3 Key Impacts and Mitigation 253
12.3.1 Construction Phase 254
12.3.2 Operational Phase 254
12.3.3 Cumulative and Decommissioning Impacts 254
12.4 ESMP, Monitoring and Cost–Benefit Summary 255
12.5 Overall Acceptability and Recommendations 255
REFERENCES 257
Tanzanian Legislation and Regulations 257
National Policies and Strategy Documents 257
International Safeguard Policies and Standards 257
Industry Guidelines and Technical References 258
National Statistical, Socio-Economic and Demographic Sources 258
Climate and Meteorological Data Sources 258
Oceanographic, Nautical and Port Data Sources 259

APPENDIX I: TERMS OF REFERENCE 263
TERMS OF REFERENCES (TOR) FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR REHABILITATION OF BERTHS 8-11 AT DAR ES SALAAM PORT 263
APPENDIX II: STAKEHOLDER CONSULTED 271
MINUTES OF MEETING WITH STAKEHOLDERS AT KURASINI WARD 271
MINUTES OF MEETING WITH FISHERS AT MINAZI MIKINDA 283
TASAC LETTER 288
FERRY FISH MARKET LETTER 290
MARINE POLICE UNIT CHECKLIST 291
LETTER FROM MINISTRY OF LANDS, HOUSING AND HUMAN SETTLEMENTS DEVELOPMENT 297
FILLED CHECKLIST KINONDONI MUNICIPAL COUNCIL 303
FILLED CHECKLIST KIVUKONI STREET 304
FILLED CHECKLIST MCHAFUKOGE WARD 306
TEMEKE MUNICIPAL COUNCIL FILLED CHECKLIST 308
TRC FILLED CHECKLIST 309
DAR ES SALAAM CITY COUNCIL FILLED CHECKLIST 310
MARINE PARK AND RESERVE UNIT 312
OCCUPATIONAL HEALTH AND SAFETY AUTHORITY (OSHA) 316
FIRE AND RESCUE FORCE UNIT 318
APPENDIX III: OIL SPILL CONTINGENCY PLAN 320
1. INTRODUCTION 320
4. LEGAL AND REGULATORY FRAMEWORK 320
5. POTENTIAL SOURCES AND SCENARIOS OF OIL SPILLS 320
7. ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES 321
7.1 Incident Command Structure 321
7.2 Responsibilities 321
8. OIL SPILL RESPONSE PROCEDURES 321
8.1 Detection and Reporting 321
8.2 Initial Response Actions 322
8.3 Containment and Recovery 322
8.4 Use of Dispersants 322
9. HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION 322
10. COMMUNICATION AND NOTIFICATION 322
11. TRAINING, DRILLS, AND AWARENESS 322
12. EQUIPMENT AND RESOURCES 322
13. PLAN MAINTENANCE AND REVIEW 323
14. CONCLUSION 323

APPENDIX VII: SCREENING DECISION 324
APPENDIX VIII: RELEVANT PERMITS 326
APPENDIX X: DESIGN DRAWINGS FOR BERTHS 8-11 335

LIST OF FIGURES

Figure 1-1: Overview of the Impact Assessment Process (Source: EMA 2005) 3

Figure 2-1: Project Location (Source: Tansheq, November 2022) 7

Figure 2-2: Location of Berth 8-11 within the Dar Es Salaam Port (Source: Tansheq, 2023) 8

Figure 2-3: General Layout of the Dar Es Salaam Port Facilities (Source: Tansheq, 2023) 9

Figure 2-4: Some of Deck and Beams Deteriorated at Berths 8-11 (STUDI Survey, 2021) 11

Figure 2-5: Various deterioration grades observed at Berths 8-11 (STUDI Survey 2021) 12

Figure 2-6: Dredging Area for Berths 8–11 Indicating Use of Cutter Suction Dredger (CSD) 13

Figure 2-7: Cross Section of the Pavement 14

Figure 3-1: Institutional Framework 45

Figure 4-1: Project core area and area of influence. Sources: Tansheq, 2024. 48

Figure 4-2: Map of Dar es Salaam Port (Source: Accessed via TPA website, 2022) 50

Figure 4-3: Satellite Photograph of the Project Core Area (Source: Tansheq, 2022) 51

Figure 4-4: Port Features (Artist's prospective view of Berths 1-7, RoRo and Container Terminal: CHEC, 2022) 53

Figure 4-5: Showing Birth 1-7 and Main Entrance Chanel (Source: Tansheq, 2022) 53

Figure 4-6: Time series and an annual cycle (bar graph) from 1991 to 2020. Whereby, rainfall is in green, maximum temperature is in dark red, and minimum temperature is in blue colour. The dotted line is the trend line, and the black line is the average line (TMA 2022) 62

Figure 4-7: A wind rose for Dar es Salaam city covers a time interval of 30 years (1991-2020). The wind speed is illustrated in colour and the frequency of occurrence in a specific direction (TMA 2022) 63

Figure 4-8: Monthly Wind Rose, 1991 – 2020 (TMA 2022) 64

Figure 4-9: Rainfall and Max and Min Temperature Trends from 1991 to 2019 (TMA 2022) 65

Figure 4-10: Extreme Monthly Rainfall Values vs Average (Source: TMA, 2022) 66

Figure 4-11 Extreme Monthly Maximum Temperature Values vs Average (Source: TMA, 2022) 67

Figure 4-12: Extreme Monthly Minimum Temperature Values Against Average (Source: TMA, 2022) 67

Figure 4-13: Erosion induced probably by increasing sea level (Source: Tansheq, 2022) 69

Figure 4-14: Sampling Locations (Source: Tansheq, 2022) 71

Figure 4-15: Monitoring Location for Air Quality (Source: Tansheq, 2022) 72

Figure 4-16: Noise Monitoring Within the Port Area (Source: Tansheq, 2022) 76

Figure 4-17: Vibration Meter Used for the Study 81

Figure 4-18: In-situ Analysis of Water (Source: Tansheq, 2022) 85

Figure 4-19: The Bathymetry of the Project Site. 89

Figure 4-20: Map of Dar es Salaam Area Showing Sampling Points. (Source: Field Survey 2022) 91

Figure 4-21: Setting up a tape for coral reef study (a, b) preparing the transect setup, (b, c) data collection 92

Figure 4-22: Fish Observation at Sinda Island (Source: Tansheq, 2022) 93

Figure 4-23: Towing a Plankton Net (Source: Tansheq Field Survey 2022) 94

Figure 4-24: Tidal Flats and Salt Pans (Jangwani Mangrove Area) In Dar Es Salaam at Low Tide, Providing Habitat for Crustaceans and Feeding Grounds for Waterbirds 96

Figure 4-25: Some of coral species observed during this assessment; (a.) A mixture of Acropora sp and Porites sp; (b) a mosaic of other coral species on the southwestern side of the Mbudya Island 97

Figure 4-26: Showing Location of Mangroves and Coral Reefs (Source: Tansheq, 2022) 99

Figure 4-27: Mangrove Forest in A Dar Es Salaam Creek – Note the Dense Green Canopy of Avicennia Marina and Protruding Aerial Roots Along the Water's Edge. These Habitats Will Need to Be Carefully Considered During Port Development, As Even Indirect Impacts (Like Changes in Tidal Flow or Increased Sedimentation) Could Affect Them 100

Figure 4-28: Proposed Sediment disposal site **Error! Bookmark not defined.**

Figure 4-29: Locations of the proposed disposal points for the dredged materials (Tansheq Ecological Study, November 2021). 119

Figure 4-30: Showing layout of Berth 1-7 and main entrance channel (Source: Tansheq, 2024) 124

Figure 5-1: Public meeting held at different location within the Project's Areas of Impacts (Tansheq, October 2021) 132

LIST OF TABLES

Table 1-1: Structure of EIA Report 4

Table 2-1: Power Supply and Substation Design Basis 15

Table 2-2: Project Components and Indicative Quantities Summary 16

Table 3-1: Summary of Institutions in the EIA process with Role and Responsibility 42

Table 4-1: Spatial Boundaries for Baseline and Impact Assessment 49

Table 4-2: Port Features 52

Table 4-3: Indicative Project Water Demand and Supply Balance 57

Table 4-4: Monthly and Annual Climatology for Dar Es Salaam City (TMA 2022) 62

Table 4-5 Mann Kendall Trend Test Results 66

Table 4-6: Ambient Air Quality, Vibration and Noise levels Monitoring Stations 70

Table 4-7: March 2026 Ambient Air Quality by Sampling Location as 24-Hour Average Concentrations 72

Table 4-8: Monitored Noise Values 78

Table 4-9: Monitored Vibration Values (Tansheq, 2022) 82

Table 4-10: Vibration Values for March 2026 (Pre-Construction Baseline) (Tansheq, 2026) 82

Table 4-11: Marine baseline datasets used in Section 4.9 84

Table 4-12: Consolidated Ambient Marine Water Quality Framework 85

Table 4-13: Consolidated Marine Sediment Quality Comparison for Harbour Interpretation 87

Table 4-14: Key Location Parameters for Offshore Sediment Disposal Site**Error! Bookmark not defined.**

Table 4-15 Water Quality Comparison: Offshore Sediment Disposal Site vs Port Area **Error! Bookmark not defined.**

Table 4-16: Oceanographic Conditions at Offshore Sediment Disposal Site**Error! Bookmark not defined.**

Table 4-17: Sediment Quality Summary – Offshore Sediment Disposal Site and Port Areas **Error! Bookmark not defined.**

Table 4-18: Sediment and Seabed Characteristics at Offshore Sediment Disposal Site (Proposed disposal area) **Error! Bookmark not defined.**

Table 4-19: Ecological Baseline at Proposed Offshore Sediment Disposal Site **Error! Bookmark not defined.**

Table 4-20: Nearest Sensitive Habitats Relative to Proposed disposal area Site **Error! Bookmark not defined.**

Table 4-21: Baseline Status of Human Uses and Socio-economic Receptors 118

Table 4-22: Comparative Context for Offshore Disposal Sites Considered in Earlier Studies 120

Table 4-23: Project Population, Source: Dar es Salaam City Council Projected Population 2022, National Bureau of Statistics 2022). 121

Table 4-24: Livestock Keeping (Source: *Kigamboni Municipal Council, 2019,* Temeke Socio-Economic Profile, *Dar es Salaam City Council, 2018)*Error! Bookmark not defined.

Table 4-25: Industrial Activities (Source: National Bureau of Statistics (NBS), 2016 and the Ministry of Industry, Trade, and Investment (MITI), 2016) 122

Table 5-1: Levels of Public Participation 128

Table 5-2 Methods for Stakeholders Engagement 129

Table 5-3: Consolidated Stakeholder Issues from Earlier Consultations and the November 2025 Update Round 133

Table 5-4: **Representative of Institutional Stakeholders Consultated** 136

Table 6-1: *ESMP Mitigation Measures and Performance for Berths 1–7 Rehabilitation and Channel Dredging.* (Source: DSMGP Environmental Supervision Reports and Monitoring Data, 2019–2022 and ESIA Documents 141

Table 7-1: Impact Significance Matrix (Before Mitigation) 156

Table 7-2: Definitions of Impact Significance Categories 156

Table 7-3: Aspect–Impact Interaction Matrix (All Phases) - Rating: H = High, M = Medium, L = Low, N = Negligible / no notable interaction (before mitigation). 158

Table 7-4: Summary of Environmental and Social Economic Impact Assessment – Marine Works (Berths 8–11) 179

Table 7-5: Environmental and Socio-Economic Impact Assessment Summary Onshore Electrical Works (Berths 1–7) 182

Table 9-1: Environmental and Social Mitigation Plan – Berths 8–11 Project 200

Table 9-2: Mitigation measures for Berth 8-11 which are not discussed in Berth 1-7 Study 212

Table 9-3: Environmental and Social Monitoring Plan 216

Table 9-4: Summary of Roles and Responsibilities 223

Table 10-1: Breakdown of Investment Cost Components 230

Table 10-2: *Summary of Project Cost Components.* (Currency conversions: 1 USD ≈ 2300 TZS. Thus TZS 48 billion ≈ US$20.9 million.) 233

Table 10-3: Key Economic Benefits of the Port Improvement Project. (Sources as indicated; others based on TPA targets and reasonable projections.) 236

Table 10-4: *Summary of Costs vs. Benefits of the Project.* 243

ACKNOWLEDGEMENT

The consultants are indebted to the support provided by individuals and institutions without whom the preparation of this Environmental and Social Impact Study would not have been possible.

We appreciate the support we received in and out of the field from TPA and TICTS (former container terminal operator) management and staffs notably Ms Rosemary Ndesamburo and Mr. Thobias. M. Sonda (both from TPA), Mr. Recovatus Mandago (former TICTS Health Safety Environmental Specialist) and John Emmanuel Masasi (Health and Safety Coordinator)

We also appreciate all the people whose immense support enabled us to produce this report. We categorically recognize the people we consulted (stakeholders) by their names and positions in their respective institutions they represent for providing us with insightful inputs for this study.

We thank the National Environment Management Council (NEMC) for reviewing the scoping report and Terms of Reference. This has enabled the Consultant to address all pertinent issues raised by different stakeholders.

We further thank the staff of Tansheq Limited for their support in data collection and analysis, facilitation of stakeholder meetings as well as preparation of the ESIA.

LIST OF ABBREVIATION AND ACRONYMS

ACE	Asian Consulting Enterprises Pte. Ltd., Singapore/Asian Consulting Engineers Pvt. Ltd
AERMOD	American Meteorological Society (AMS) and U.S Environmental Protection Agency (EPA) Regulatory Model
AIDS	Acquired Immuno-deficiency Syndrome
AOI	Area Of Influence
BEI	Biological Exposure Index
BMU	Beach Management Unit
BRT	Bus Rapid Transit
CBD	Convention on Biological Diversity
CBOs	Community based organizations
CC	Construction Contractor
CD	Chart Datum
CDM	Clean Development Mechanism
CFS	Container Freight Station
CH4	Methane
CIA	Cumulative Impact Assessment
cm	Centimeter
CO	Carbon Monoxide
Co	Cobalt
CO_2	Carbon Dioxide
COLREGs	Convention on International Regulations for Preventing Collisions
CoP	Conference of Part
Covid 19	Corona Virus Disease of 2019
CRB	Constructors Registration Board

CSD	Cutter Suction Dredger
CT- scan	Computerized Tomography- Scan
DAWASA	Dar-es-salaam Water Supply and Sanitation Authority
dB(A)	Decibel
DMGP	Dar es Salaam Maritime Gateway Program
DNA	Designated National Authority
DoE	Director of Environment
DWT	Deadweight Tons
EA	Environmental Assessment
EHS	Environment Health and Safety
EIS	Environmental Impact Statement
EIS	Environment Impact Statement
EMA	Environmental Management Act
EPFIS	Equator Principles Financial Institutions
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan
ESS	Environment and Social standards
EWURA	Energy Water Utilities Regulatory Authorities
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHG	Green House Gases
GIIP	Good International Industries Practice
GIS	Geographical Information System
GRM	Grievances Redress Mechanism
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IAP	Interested and Affected Parties
ICD	Inland Container Depositing

IFC	International Finance Corporation
ILO	International Labour Organization
IPF	Investment Project Finance
ISO	Indian Standard Organization
JI	Joint Implementation
K	Kelvin
kg/kg	Kilogram per kilogram
Kg/TJ	Kilogram per Terajoule
KN/m^2	Knotical miles per Metter square,
KoJ	Kurasini Oil Jet
LATRA	Land Transport Regulatory Authority
m	Meter
m^3	Meter Cube
MARPOL	International Convention for the Prevention of Pollution from Ships
MDGs	Millennium Development Goals
mg/m^3	Milligram per meter cube
MLHHSD	Ministry of Lands, Housing and Human Settlement Development
mm	Millimeter
MNH	Muhimbili National Hospital
MoP	Meeting of Point
MRI	Magnetic Resonance Imaging
NAP	National Action Plan
NAPA	National Adaptation Program Action
NBS	National Bureau of Statistics
NBSAP	National Biodiversity Strategy and Action Plan
NEMC	National Environment Management Council
NEP	National Environment Policy

NFP	National Forest Policy
NGO(s)	Non-Governmental Organizations
NHIF	National Health insurance Fund
NSGRP	National Strategy for Growth and Reduction of Poverty
NSL	National Seabed Level
O_3	Ozone layer (Trioxide)
OHS	Occupational Health and Safety
OP	Operation Policy
OSHA	Occupational Health and Safety Authority
PA	Protected Area
PDD	Project Development Documents
PPE	Personal Protective Equipment
PM	Particulate Matters
ppm	Parts per million
RC	Reinforcement concrete
REDD	Reduced Emissions from Degradation and Deforestation
RET	Rare, Endangered and Threatened
RTG	Rubber Tyred Gantry
SO_2	Sulphur Dioxide
SPL	Sound Pressure Level
SSGS	Ship to Shore Gantry Crane
STD	Sexually Transmitted Disease
STDs	Sexually Transmitted Diseases
TAEC	Tanzania Atomic Energy Commission
TANESCO	Tanzania Electric Supplies Company
TAZARA	Tanzania and Zambia Railway
TICTS	Tanzania International Container Terminal Services

TMA	Tanzania Meteorological Agency
TNFR	Tanzania Natural Resources Forum
ToR	Terms of Reference
TPA	Tanzania Ports Authority
TLV	Threshold Limit Value
TRA	Tanzania Revenue Authority
TRL	Tanzania Railway Limited
TSHD	Trailing Suction Hopper Dredger
TSS	Total Suspended Solids
TZ	Transitional Zone
TZS	Tanzanian Shillings
UK	United Kingdom
UNCCD	United National Convection to Combat Desertification
UNCLOS	United Nations Law of the Sea
UNFCCC	United National Framework Convention on climate Change
URT	United Republic of Tanzania
USD	US dollar
UTI	Urinary Tract Infection
VANE	Violence Abuse Neglect and Exploitation
VCPOL	Vienna Convection on Protection of Ozone layer
VECs	Valued Environment and social components
VEO	Village Executive Officer
VPO	Vice President Office
WB	World Bank
WDF	Women Development Fund
WEO	Ward Executive Officer
WHO	World Health Organization

µm	Micrometer

CHAPTER ONE

1 INTRODUCTION

1.1 Background

Tanzania Ports Authority (TPA), as the implementing agency of the Government of Tanzania, is undertaking the Dar es Salaam Port Improvement Project under the Dar es Salaam Maritime Gateway Program (DMGP). This project is funded by the World Bank and must comply to the earlier versions of the World Bank's Safeguard Policies, including OP 4.01 (Environmental Assessment), OP 4.04 (Natural Habitats), OP 4.11 (Physical Cultural Resources), OP 4.12 (Involuntary Resettlement), and OP 4.36 (Forests), preceding the Environmental and Social Framework (ESF), which became effective on October 1, 2018.

The Project aims to enhance the port's capacity, efficiency, and environmental sustainability through the rehabilitation and deepening of Berths 8-11, construction of a new quay on piles, and electrical works for Berths 1-11, the Ro-Ro Yard, and the Container Terminal.

Given its strategic importance, Dar es Salaam Port serves as the main maritime gateway for Tanzania and neighboring landlocked countries, including Zambia, Malawi, Rwanda, Burundi, Uganda, and the Democratic Republic of Congo (DRC). The anticipated increase in container traffic to 2.5 million TEUs by 2032 (more than three times the current capacity) necessitates these improvements to accommodate Post-Panamax vessels and enhance port operations.

In compliance with Tanzania's Environmental Management Act, Cap. 191, and the Environmental Impact Assessment (EIA) and Audit Regulations, 2005 (amended 2018), this Environmental and Social Impact Assessment (ESIA) has been conducted to evaluate the potential environmental and social impacts of the project and propose mitigation measures.

1.2 Scope of the Study

The Environmental and Social Impact Assessment (ESIA) for the deepening and strengthening of Berths 8–11 and electrical works for Berths 1–11, the Ro-Ro Yard and the Container Terminal at Dar es Salaam Port aims to assess the environmental and social impacts of the proposed port improvement activities.

Details of the project components covered include:

- Deepening and strengthening of Berths 8-11 to 14.5m below Chart Datum (CD) and constructing a new quay on piles.
- Paving the container stacking yard behind Berths 8-11.
- Electrical power supply and installation for Berths 1-11, the Ro-Ro Yard, and the Container Terminal.
- Installation of substations to provide reliable power to port operations and reduce environmental impacts from ship emissions[1].

[1] The substations might also be used to manage the distribution of power to different areas of the port, ensuring that electricity is delivered to where it is needed most at any given time. The substations shall also provide power to ship docked at the Port hence enhancing, among other, environmental performance of the Port (Tanzania Port Authority, 2021).

1.3 Objectives of the ESIA

This ESIA aims to:

- Ensure regulatory compliance with Tanzanian laws and World Bank environmental and social safeguards.
- Identify, assess, and mitigate potential environmental and social risks.
- Promote sustainable development through an Environmental and Social Management Plan (ESMP).
- Engage stakeholders to integrate their concerns into project planning and decision-making.

1.4 Duration of the Study

In addition to that this Environmental and Social Impact Assessment was conducted from April, 2022 to July 2023 through all activities were taking place including Consultation and public involvement, Baseline collection, review of relevant legislations, impact evaluation and assessment analysis of the project alternatives, preparation of management plans and compilation of the report. However, the specific date of each activity is stated the respective chapter. In additional, after comments from the World Bank, additional studies were also conducted between February to March 2026.

This Environmental and Social Impact Assessment (ESIA) was conducted from April 2022 to July 2023, encompassing a range of key activities. These included stakeholder consultations, public engagement, baseline data collection, a review of relevant legislation, impact evaluation, and an assessment of project alternatives. Additionally, management plans were developed, and the final report was compiled as part of the process. Specific timelines for each activity are detailed in the respective chapters. Following feedback from the World Bank, additional studies were undertaken between February and April 2025 to address their recommendations.

1.5 Study Approach

The approach to this exercise is structured to cover the requirements under the Environmental Management Act (EMA) (United Republic of Tanzania, 2005). Broadly, it involves an understanding of the project background, the preliminary design and implementation plans as well as the phases of commissioning.

In addition, baseline information was obtained through physical investigation of the project site, desktop studies, and public consultations with members of the community living in the project areas, survey, photography, and discussions with the project Proponent.

The methodology used in this study follows specific procedures and guidelines set by the EMA (Tanzania Mainland, 2004). The process for conducting this EISA is closely related to the flowchart presented below.

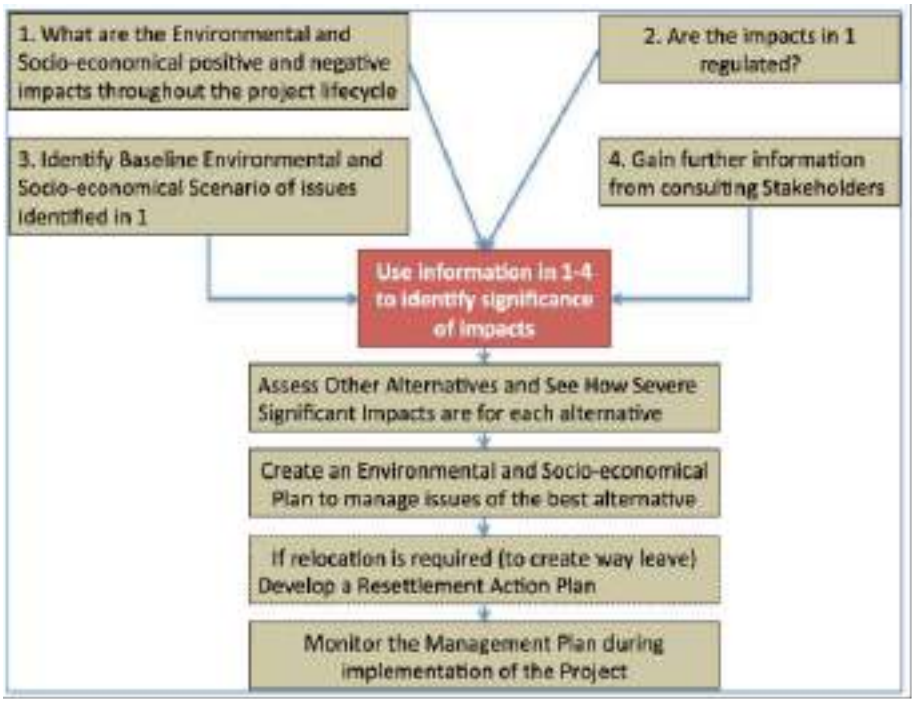


Figure 1-1: Overview of the Impact Assessment Process (Source: EMA 2005)

1.5.1 Issues Associated with the Proposed Project

Environmental and social Issues associated with re-construction activities for Dar es Salaam port were identified based on previous history and detailed project activities. These are detailed in Chapter 2.

1.5.2 Regulatory Framework with Associated Issues

Description of the relevant regulations and standards governing environmental quality, health and safety, protection of sensitive areas, sitting, and land use control are detailed in Chapter 4.

1.5.3 Current Situation (Baseline Situation)

To gauge the extent of impact, it is crucial to establish the status quo (Chapter 3). The consulting team conducted a baseline analysis of the current level of impacts. This involved a specialized study on flora and fauna, air, soil and water.

It also covered socioeconomic issues, noise, etc. The aim of ascertaining the baseline it to appreciate to what extent the proposed project can alleviate or exacerbate the current situation.

1.5.4 Issues from Key Stakeholders

This EISA also reports on the following:

- A list of stakeholders consulted together with a stakeholder analysis.
- The method used to get their views and issues of concern raised.

- Issues raised by the stakeholders and the way they were addressed.
- Records of stakeholder meetings, communications, and comments.

1.5.5 Assessment of Positive and Negative Impacts

Chapter 6 of this report critically reviews and analyses interaction between the proposed project and the existing environment. In this analysis, the consultant distinguished between significant positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Impacts, which are unavoidable or irreversible, are also identified. Wherever possible, impacts are described quantitatively in terms of environmental costs and benefits.

1.5.6 Consideration of Alternatives

This environmental assessment also involved an analysis of reasonable alternatives to meet the ultimate project objective as critically analysed in Chapter 7. This analysis included any alternatives examined while developing the proposed project and that from an environmental, socio-cultural or economic point of view may be sounder than the proposed project.

This also includes the 'no action' alternative, which assesses environmental conditions without project. It is described how the alternatives compare in terms of potential impacts, costs, suitability under local conditions, as well as institutional, training, and monitoring requirements.

To the extent possible, costs and benefits of each alternative are quantified, incorporating the estimated costs of any associated mitigating measures. Finally, this report described the reasons for selecting the proposed project over the other alternatives.

1.5.7 Developing an Environmental Management Plan

This report recommends feasible and cost-effective measures to prevent or reduce any significant negative impacts to levels that are acceptable. This involves:

- Estimating the impacts and costs of those measures, and of the institutional and training requirements to implement them.
- Preparing a management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.
- A management plan also covering the decommissioning phase of the project.

1.5.8 Developing an Environmental Monitoring Plan

This report contains a detailed plan to monitor the implementation of mitigation measures and the impacts of the project during its execution. This plan includes a cost estimate for carrying out the proposed monitoring plan.

1.6 Structure of the Report

This report is structured to follow the outline of Section 18 of the Environmental Impact Assessment and Audit Regulation of 2005 as amended 2018. Details of the content of the report are in Table 1-1

Table 1-1: Structure of EIA Report

Chapter	Description
Chapter 1	**Introduction** Provides a background to the proposed project, summarizing the rationale of the project
Chapter 2	**Project Background and Description** Describes the proposed project and its nature, together with the planning, design, and activities of the project
Chapter 3	**Policy, Administrative and Legal Framework** Describes the legal and regulatory framework for the ESIA, including relevant international conventions and local policies. Describes the authorized bodies that will be involved in the ESIA process
Chapter 4	**Baseline or Existing Conditions** Describes the existing biophysical and socio-economic environment that could be affected by the project.
Chapter 5	**Stakeholder involvement and Participation** This chapter describes how the people affected by the project either positively or negatively were involved in the project
Chapter 6	**Impact Identification and Assessment** This chapter describe on how impacts identified and how will be characterized to be compatible to the environment
Chapter 7	**Environmental Impact Mitigation Measures** In this chapter, the solutions for reducing severity of the negative impacts and enhancing the positive are being discussed.
Chapter 8	**Environmental and Social Management Plan** This chapter describes the systematic plan on how to implement the measures provided in chapter six, responsible personnel, and cost of implementation
Chapter 9	**Environmental and Social Monitoring Plan** In this chapter describes on how to control the parameters of elements which seems to be more adverse to both environment and community
Chapter 10	**Resource Evaluation or Cost Benefit Analysis** This chapter provides compilation of a comprehensive list of all direct and indirect costs, intangible costs, opportunity costs and the cost of potential risks and direct and indirect revenues and intangible benefits, such as increased production from improved employee safety and morale, or increased sales from customer associated with the project or decision
Chapter 11	**Decommissioning** Provides the formal process on how to remove or to stop the proposed project with environmentally friendly procedures
Chapter 12	**Conclusion and Recommendations** The ESIA study is given in this chapter and some measures are recommended for the sustainability of the project and the ecosystem.
References	**References** Provides a list of the sources used to compile this report
Appendices	**Appendices** Provides a list of evidence about the ESIA process and the Proponent.

CHAPTER TWO

2 PROJECT DESCRIPTION

2.1 Introduction

This chapter provides a detailed description of the Dar es Salaam Port Improvement Project, covering its location, accessibility, objectives, justification, components, and implementation phases. It also outlines key resource requirements, waste management strategies, environmental and social considerations, and the estimated cost and timeline for project execution. The project aims to enhance the port's operational efficiency, increase cargo handling capacity, and improve environmental sustainability.

2.2 Project Location and Accessibility

2.2.1 Location

The project is located at Dar es Salaam Port, which is Tanzania's principal maritime gateway, situated on the eastern coast of Africa along the Indian Ocean. Administratively, the port falls within Kurasini Ward, Temeke Municipal Council, Dar es Salaam Region. The project area encompasses Berths 1-11, the Ro-Ro Terminal, and the Container Stacking Yard.

2.2.2 Site Accessibility

The site is accessible via Nelson Mandela Road, which connects to major highways linking the port to inland transport networks. Entrance to the port is through TPA Gate No. 5 (600m southwest of the project site) and TPA Gate No. 8 (150m northeast near the Kurasini Oil Jetty). The port also has railway connections (Tanzania Standard Gauge Railway, Central Line, and TAZARA Railway) for cargo transportation.

2.3 Project Objectives and Justification

2.3.1 Project Objectives

As explain in Chapter 1, typical objectives of the project are as follow

- Increase cargo handling capacity to meet the projected 2.5 million TEUs by 2032.
- Accommodate Post-Panamax vessels by deepening Berths 8-11 to 14.5m below Chart Datum (CD).
- Improve port efficiency and turnaround time.
- Reduce environmental impacts, particularly air emissions, through electrification of port operations.

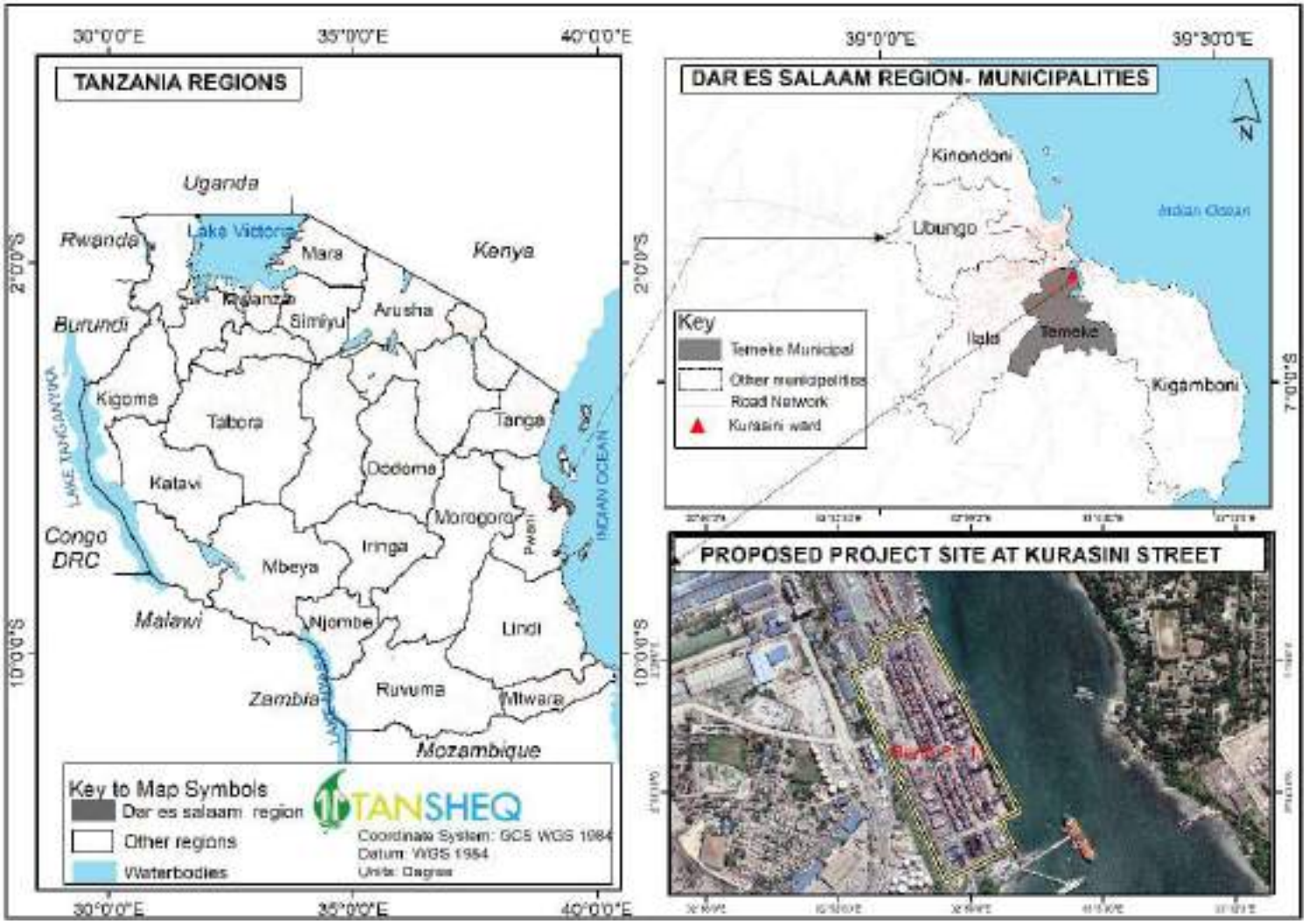


Figure 2-1: Project Location (Source: Tansheq, November 2022)



Figure 2-2: Location of Berth 8-11 within the Dar Es Salaam Port (Source: Tansheq, 2023)

2.3.2 Justification

The justification for this project is based on several key factors as detailed below:

- Strategic Importance: Dar es Salaam Port serves Tanzania and landlocked neighboring countries such as Zambia, Malawi, Rwanda, Burundi, Uganda, and the DRC.
- Infrastructure Modernization: Existing port infrastructure is aging and requires upgrades to meet international standards.
- Economic Growth: The project aligns with Tanzania's National Development Vision 2025 and regional trade agreements.

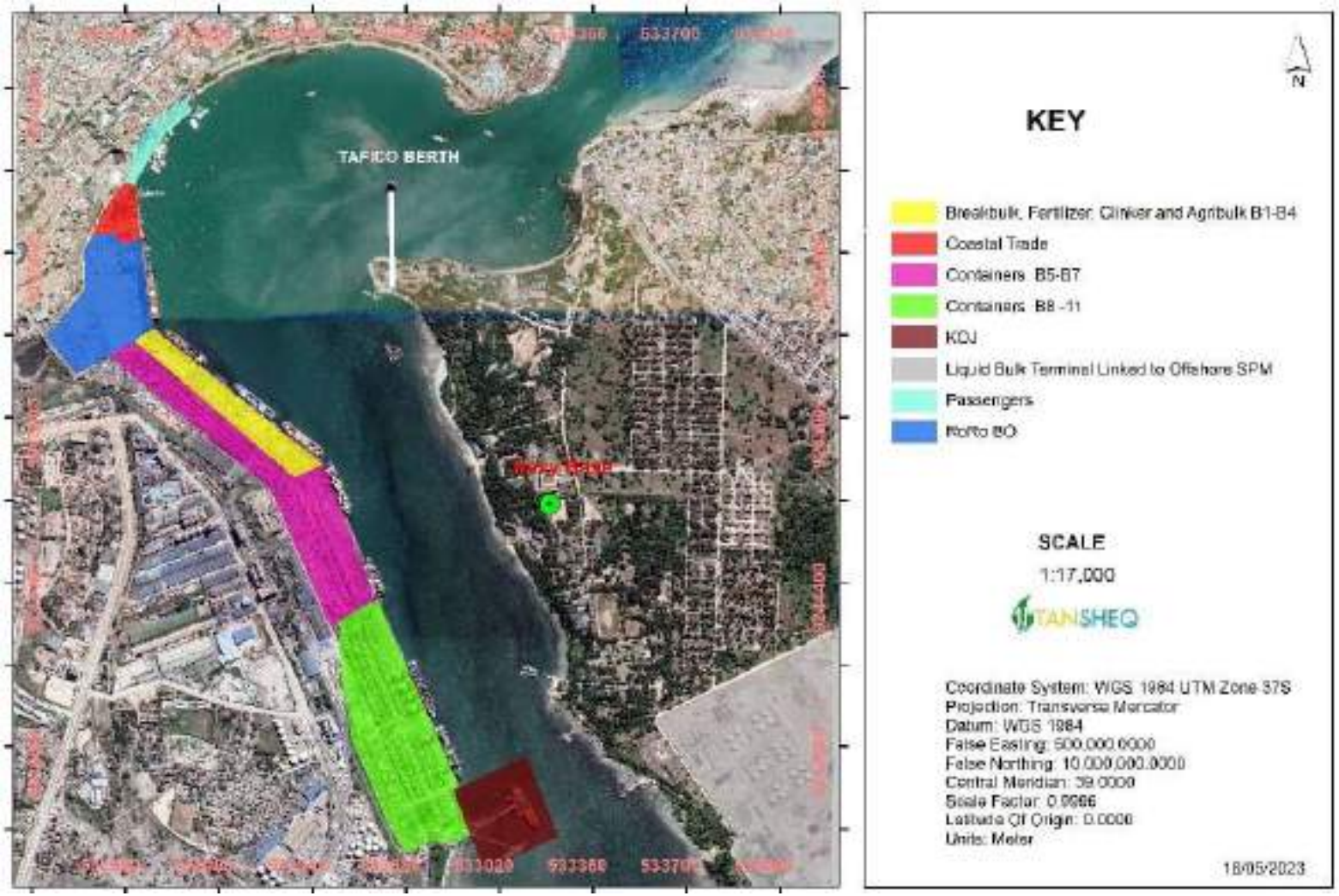


Figure 2-3: General Layout of the Dar Es Salaam Port Facilities (Source: Tansheq, 2023)

2.4 Project Components and Design

This section details the technical specifications, structural components, and design parameters of the proposed Dar es Salaam Port Improvement Project. Understanding the exact nature of the engineering designs and the sequence of planned activities is critical, as these technical parameters define the project's physical footprint and serve as the basis for identifying and evaluating potential environmental and social impacts in subsequent chapters.

The proposed interventions are strategically designed to modernize the port's capacity and efficiency, and are broadly categorized into two primary infrastructural components:

Component 1: Marine and Civil Works for Berths 8–11. This includes the capital dredging required to deepen the harbor basin and approach channel, the structural strengthening of the quay walls to accommodate larger vessels, and the associated management and disposal of dredged materials.

Component 2: Electrical Infrastructure Upgrades for Berths 1–7. This encompasses the installation of new onshore power supply systems, substations, and cabling networks designed to improve operational efficiency and safety along the general cargo and Ro-Ro berths.

The ensuing subsections provide a comprehensive breakdown of the design choices, required construction materials, machinery, and phased methodologies for each of these core components.

2.4.1 Marine and Civil Works for Berths 8-11

The primary objective of rehabilitating Berths 8-11 is to increase the depth to 14.5 meters below Chart Datum (CD), allowing the accommodation of larger vessels. The project also aims to replace and reinforce aging quay structures that have deteriorated due to prolonged exposure to marine conditions. By modernizing the mooring and fendering systems, the efficiency and safety of vessel berthing will be significantly enhanced. Compliance with international port safety standards and the reduction of environmental impacts through sustainable dredging techniques and sediment management are also key considerations. Typical activities involved are as detailed in the following subsections.

2.4.1.1 Topographic And Bathymetric Survey Status and Inclusion

Topographic and bathymetric surveys for Berths 8–11 were completed under the Final Feasibility Study and form part of the engineering design basis for the proposed berth deepening and strengthening works. The survey results are documented in Appendix 5: Topographic and Bathymetric Surveys Report of the Final Feasibility Study Report issued in July 2023. The topographic survey covered Berths 8–11 and adjacent relevant areas, while the bathymetric survey extended to approximately 250 m from the quay wall. The surveys were referenced to WGS84 / UTM Zone 37M and Chart Datum for Dar es Salaam Harbour. Outputs included observed topographic data, reduced depth data, contoured survey products and combined land-water mapping, which were used to inform the dredging layout, berth deepening configuration and detailed engineering design.

2.4.1.2 Structural Rehabilitation of Quay Wall

The existing quay structures at Berths 8-11 have suffered structural deterioration, requiring extensive reinforcement and reconstruction. The rehabilitation process includes the demolition of approximately **200 deteriorated piles**, removal of unstable sections, and the installation of a **new quay wall supported by 300 reinforced concrete piles**. The deck slabs and beams will be strengthened to support container handling equipment, and corrosion-resistant materials will be used to enhance structural durability in the marine environment.



Figure 2-4: Some of Deck and Beams Deteriorated at Berths 8-11 (STUDI Survey, 2021)



Figure 2-5: Various deterioration grades observed at Berths 8-11 (STUDI Survey 2021)

2.4.1.3 Dredging and Deepening of Berths

The current depth of Berths 8-11 is approximately 12 metres below Chart Datum (CD), which does not meet the requirements for accommodating larger, modern vessels. The dredging operation is designed to deepen the berths to 14.5 metres below CD.

The ESIA notes that the berth pocket sediments are “composed mainly of silty sand with some finer sediments in depressions”, indicating a relatively cohesive, compacted seabed. The current berth depth (~12 m CD) will be deepened to ~14.5 m CD, and the dredging will occur in the confined port environment. For these conditions, a **cutter suction dredger (CSD)** is most suitable. CSDs are

expressly recommended because they can “handle compacted and cohesive sediments” effectively. In contrast, trailing-suction hopper dredgers (TSHD) are optimized for loose, sandy material and generate high-volume overflow (which the ESIA warns “can intensify turbidity” near the worksite). Using a single anchored cutter-suction unit will thus maximize excavation efficiency in the silty sand, allow precise deepening of the berths, and minimize excess turbidity. In summary, the deepening of Berths 8–11 will be done with a CSD, as this method best matches the sediment character and depth and reduces environmental disturbance.



Figure 2-6: Dredging Area for Berths 8–11 Indicating Use of Cutter Suction Dredger (CSD)

Dredging Equipment Commitment

The dredging works for Berths 8–11 shall be undertaken using a Cutter Suction Dredger (CSD) for the berth deepening works shown in Figure 2-6. The use of a Trailing Suction Hopper Dredger (TSHD) is not the selected dredging method for this project. The CSD has been adopted because it is more suitable for the berth sediments and is expected to reduce sediment overflow and associated turbidity relative to a TSHD in the immediate berth area. If, during detailed planning or implementation, the Proponent proposes to use any dredging equipment materially different from the CSD-based approach assessed in this ESIA, such change shall first be subjected to environmental review and approval by the relevant authorities, and the ESIA/ESMP shall be updated as necessary.

2.4.1.4 Mooring and Fendering System Upgrades

The mooring and fendering systems at Berths 8-11 will be upgraded to improve vessel berthing efficiency. High-energy absorption fenders will be installed to protect both vessels and quay structures. Modernized mooring bollards and cleats will be introduced to accommodate higher berthing loads, and the mooring layout will be optimized to allow for safer and more efficient vessel docking.

2.4.1.5 Berth Expansion and Alignment

To align with Berths 5-7, the quay platform at Berths 8-11 will be extended by 11 meters into the sea. This expansion ensures seamless integration of port operations and increases overall berth capacity. The project will also involve the installation of rail tracks for container cranes, ensuring smooth cargo handling between berths. Access roads and storage areas will be rehabilitated to facilitate cargo movement within the port premises.

2.4.1.6 Container Stacking Yard Modernization

2.4.1.6.1 Paving and Modernizing the Container Terminal Yard Behind Berths 8-11

The project involves upgrading approximately **120,000 to 150,000 square meters** of the container stacking yard behind Berths 8-11 to enhance cargo handling efficiency and improve durability. Key aspects of the modernization include:

- **Paving with High-Strength Materials**
  - The existing surface will be replaced with a reinforced concrete pavement (typically 300–400 mm thick) to withstand heavy container loads and frequent traffic from reach stackers, forklifts, and rubber-tired gantry cranes.
  - High-performance asphalt concrete (100–150 mm thick) may be used in areas with lighter load requirements to provide a balance between strength and flexibility.
  - A **compacted sub-base layer** (500–600 mm thick) made of crushed stone aggregate will be installed to improve load distribution and prevent subsidence.
- **Enhancing Yard Layout and Traffic Flow**
  - Installation of clearly marked container stacking zones and designated traffic lanes to reduce congestion.
  - Deployment of automated yard cranes (where applicable) to optimize container stacking height and space utilization.
  - Introduction of RFID tracking systems for real-time monitoring of container movements.
- **Drainage and Stormwater Management for the Yard**
  - Integration of **reinforced concrete trench drains** along traffic lanes to capture runoff.
  - Use of **permeable concrete sections** in select areas to reduce surface water accumulation.
  - Sloping the yard at **1–2% gradient** toward drainage channels to prevent waterlogging.

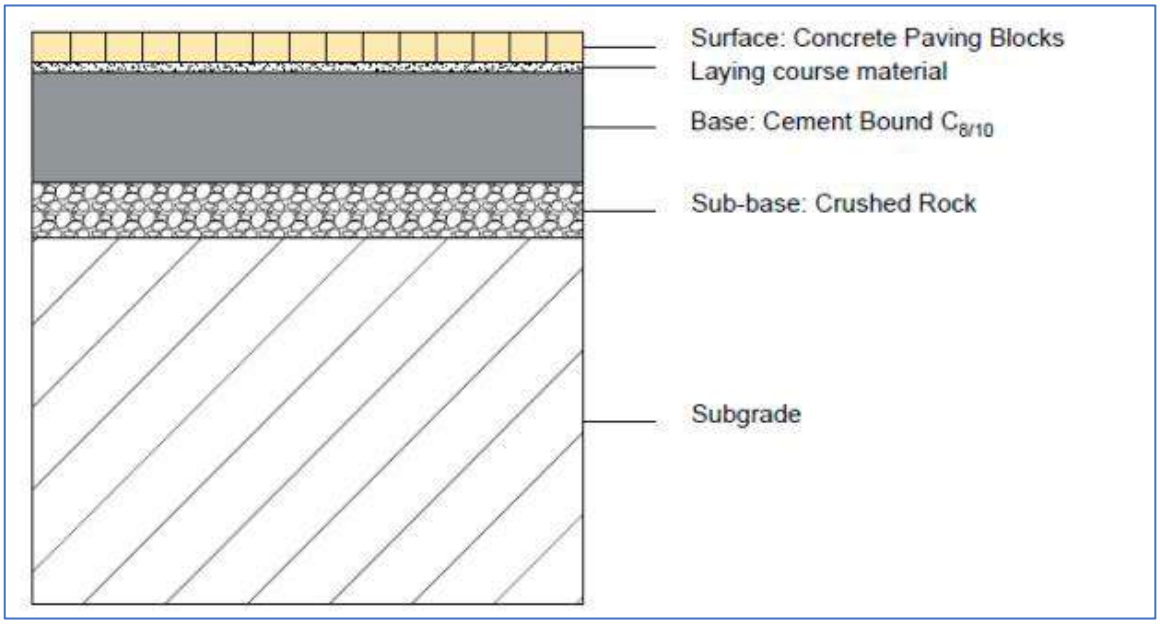


Figure 2-7: Cross Section of the Pavement

2.4.1.6.2 Enhancing Stormwater Management and Drainage Systems

This component involves upgrading the existing drainage system within the container yard and adjacent areas to prevent waterlogging and minimize infrastructure damage.

- Installation of High-Capacity Drainage Infrastructure
  - Reinforced concrete drainage channels (1.5–2.0 meters wide, 1.0–1.5 meters deep) to handle high runoff volumes.
  - Heavy-duty trench drains with cast iron grates along cargo lanes to prevent debris accumulation.
  - Underground stormwater retention tanks with a total capacity of 10,000–15,000 cubic meters to manage peak flows.
- Stormwater Treatment and Discharge Control
  - Construction of oil-water separators to filter hydrocarbons from runoff before discharge into nearby water bodies.
  - Sedimentation basins designed to trap suspended solids and prevent clogging of drainage pipes.
- Smart Drainage Monitoring System
  - Deployment of automated sensors to track water levels in drainage channels and retention tanks.
  - Integration of rainwater harvesting systems for non-potable use, reducing reliance on municipal water supply.

2.4.2 Electrical Infrastructure Upgrades for Berths 1–7

The electrical works component includes the development of **four substations** to support power distribution for Berths 1–11, the Container Terminal, the Ro-Ro Yard and associated operational areas within Dar es Salaam Port. The substations will be constructed in reinforced concrete with either raised floors or cable cellars, and transformer rooms will be provided with oil-collection pits for containment. The substations will incorporate oil-immersed transformers, gas-insulated medium-voltage switchgear, low-voltage switchgear, backup power systems, and associated distribution and protection equipment. The electrical distribution concept is based on an 11 kV medium-voltage network configured in loops for reliability and continuity of supply, with the substations stepping power down for low-voltage operational uses. The system is intended to provide 11 kV supply to STS cranes, supply power to railhead RMG operations, support reefer container services, lighting and other port loads, and facilitate shore-power functions that reduce emissions from ships and equipment operating within the port.

Table 2-1: Power Supply and Substation Design Basis

Substation / Facility	Indicative Size	Main Function	Voltage / Service Information	Remarks
Main Substation (Container Terminal)	32 m × 15 m × 5 m	Main power distribution to terminal operations	Connected to 11 kV MV loop; provides 11 kV supply to STS cranes and LV supply to terminal loads	Reinforced concrete structure with transformer room, oil containment and GIS switchgear
Reefer Substation	15 m × 3.5 m × 5 m	Power supply for reefer container operations	LV distribution for reefer services; ESIA states supply for 240 refrigerated containers	To be connected to overall port power distribution system
Gate Substation	3 m × 3.5 m × 3 m	Gate and ancillary operational loads	LV distribution for gate operations and associated services	Compact reinforced concrete substation
Ro-Ro Terminal Substation	11 m × 3.2 m × 5 m	Power supply to Ro-Ro terminal operations	MV/LV distribution for terminal services,	Located within port operational area

Substation / Facility	Indicative Size	Main Function	Voltage / Service Information	Remarks
			lighting and related operational loads	
STS Crane Supply	—	Supply to ship-to-shore cranes	11 kV, 50 Hz, 3-phase plus earth; ESIA indicates supply to 8 STS cranes	Power factor and harmonic limits to comply with applicable standards
Railhead RMG Supply	—	Supply to rail-mounted gantry operations	ESIA indicates 11 kV supply to 4 RMG cranes at the port railhead	Scope relates to electrical supply rather than rail civil works
Reefer Supply	—	Refrigerated container support	ESIA states supply for 240 refrigerated containers via low-voltage cabinets	To be distributed through reefer electrical panels
RTG Emergency Shore Power	—	Emergency supply when RTGs are stowed	460 V, 50 Hz, 63 A emergency shore supply	As described in the feasibility study
MV/LV Transformation	—	Voltage transformation and backup	Substations to include oil-immersed transformers and stand-by emergency generation	Final transformer ratings to be confirmed in detailed design / single-line diagrams

Note: Final transformer ratings, feeder schedules, redundancy philosophy and protection settings will be confirmed at detailed engineering design stage and reflected in the final single-line diagrams and equipment schedules.

2.4.2.1 Providing Shore Power Connections to Reduce Emissions from Docked Ships

Shore power, also known as cold ironing, enables docked ships to switch off their engines and use onshore electrical power, reducing emissions and noise pollution.

The shore power infrastructure will consist of dedicated 11 kV power distribution lines with frequency converters (50Hz/60Hz) to ensure compatibility with various international vessels. A mobile drum system will be used for shore power cables, allowing flexible connections for ships. Additionally, power receptacle boxes and pit outlets will be installed to provide direct ship connections.

The shore-to-ship power system will support multiple vessels with power capacities up to 6.6 kV and 460V, accommodating different ship sizes. Load monitoring and demand-side management will be incorporated to optimize power distribution.

2.4.3 Project Components and Indicative Quantities Summary

To improve clarity on the scale of works, the main project structures and physical components are summarised in Table 2-2 below. The table presents the principal permanent and ancillary project components, together with the quantities or dimensions currently available from the feasibility study and ESIA design basis. Where final counts or lengths are not yet fixed, these will be confirmed during detailed engineering design.

Table 2-2: Project Components and Indicative Quantities Summary

Project Component	Quantity / Extent	Key Description / Remarks
Deepened and strengthened berth structure	Approx. **726 m** long	New piled quay selected for Berths 8–11 reconstruction.

Project Component	Quantity / Extent	Key Description / Remarks
New quay width	Approx. **44.4 m**	Reinforced concrete platform supported by piles.
Final berth depth	**14.5 m below Chart Datum**	Target deepening for Berths 8–11.
Topographic survey coverage	Berths **8–11** and adjacent relevant areas	Survey basis for design.
Bathymetric survey coverage	Up to **250 m from quay wall**	Used for berth/dredging design basis.
Substations	**4**	Main Container Terminal, Reefer, Gate and Ro-Ro Terminal substations.
Main substation	**32 m × 15 m × 5 m**	Container terminal main power distribution.
Reefer substation	**15 m × 3.5 m × 5 m**	Supports reefer operations.
Gate substation	**3 m × 3.5 m × 3 m**	Supports gate operations.
Ro-Ro terminal substation	**11 m × 3.2 m × 5 m**	Supports Ro-Ro terminal operations.
STS cranes supplied	**8**	11 kV supply from substations.
RMG cranes supplied at railhead	**4**	11 kV supply for railhead operations.
Reefer container supply capacity	**240 containers**	Powered through low-voltage cabinets.
MV network arrangement	Loop configuration	Supplied by TANESCO for reliability and continuity.
Stormwater collectors	**50 cm × 50 cm**	Reinforced concrete U-channels parallel to quay.
Stormwater mains	Minimum **Ø600 mm**	Buried reinforced concrete pipes.
Stormwater manholes spacing	At least every **35 m**	Also at changes in direction, diameter and drops.
Walkway width	Minimum **1.4 m**	Safe pedestrian routes within the port area.
Fire engine access way	Minimum **6 m** useful width	Kept clear for rescue and emergency intervention.
Quayside free passage strip	**2 m** setback	To guarantee at least 1 m free passage for workers.
Lighting structures	High-mast and street-light installations	30 m high mast poles for container/traffic lighting and 8–12 m poles for roads; final number to be confirmed during detailed design.
Cable ducts, trenches, manholes and hand-holes	Included throughout electrical works footprint	For MV/LV, lighting and associated infrastructure; detailed lengths and final counts to be confirmed during detailed design.
Emergency RTG shore power	**460 V, 50 Hz** sockets	Used when RTGs are stowed.

Note: Final detailed quantities for cable lengths, number of hand-holes, lighting pole counts, switchboards, and any minor ancillary structures will be confirmed at detailed engineering design stage and reflected in the final drawings, schedules and bills of quantities.

2.5 Phases of Implementation of the Dar es Salaam Port Improvement Project

The implementation of the Dar es Salaam Port Improvement Project is structured in phases that ensure environmental, social, and technical considerations are integrated into the process. As required by the Environmental and Social Impact Assessment (ESIA) framework, these phases include Mobilization (Pre-Construction), Construction, Operation and Maintenance, and Decommissioning. Each phase incorporates environmental safeguards, stakeholder engagement, and sustainability measures to ensure minimal disruption to port operations and surrounding communities.

2.5.1 Mobilization (Pre-Construction) Phase

The mobilization phase is crucial for setting up the project foundation, ensuring environmental compliance, and securing the necessary resources before construction begins. This phase includes:

- Site Preparation and Surveys
- Permitting and Regulatory Compliance
- Stakeholder Engagement and Public Consultation; and
- Logistic and Material Sourcing

2.5.1.1 Site Preparation and Surveys

A series of technical investigations are conducted to assess the existing conditions and finalize the project design. These include:

- Geotechnical and Bathymetric Surveys: Evaluating soil and seabed conditions to determine the structural integrity required for deepening Berths 8-11 and constructing a new quay on piles.
- Topographical and Hydrological Assessments: Analysing land elevation, drainage patterns, and potential flooding risks to optimize the paving of the container yard and improve stormwater management.
- Environmental Baseline Studies: Establishing current environmental conditions, such as air and water quality, marine biodiversity, and noise levels, to measure future project impacts.

2.5.1.2 Permitting and Regulatory Compliance

The project must comply with Tanzanian environmental laws and World Bank environmental safeguards. Activities include:

- Securing ESIA Approval from NEMC: The National Environmental Management Council (NEMC) reviews the environmental assessment to ensure compliance with Tanzania's Environmental Management Act, Cap. 191.
- Obtaining Construction Permits: Necessary approvals from municipal and port authorities, including safety and zoning permits, are acquired.
- Alignment with International Regulations: Compliance with MARPOL 73/78, the International Maritime Organization (IMO) guidelines, and International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) standards.

2.5.1.3 Stakeholder Engagement and Public Consultation

Public participation is essential for integrating community concerns and ensuring local benefits. The consultation process includes:

- Meetings with Local Communities: Addressing potential displacement concerns, employment opportunities, and socio-economic benefits.
- Engagement with Government and Industry Stakeholders: Consulting Tanzania Ports Authority (TPA), TANESCO, TANROADS, TRA, TASAC, and maritime agencies to coordinate logistics and infrastructure development.
- Implementation of a Grievance Redress Mechanism (GRM): Ensuring affected stakeholders have a formal platform to raise concerns and receive timely resolutions.

2.5.1.4 Logistics and Material Sourcing

To minimize disruptions, the mobilization phase involves careful planning of resources and infrastructure setup:

- Procurement of Equipment and Construction Materials: Sourcing heavy-duty paving materials, steel reinforcements for quay construction, and electrical components for substations.
- Establishment of Temporary Facilities: Setting up workers' camps, storage yards, and safety zones with proper sanitation and waste management facilities.
- Health, Safety, and Environmental (HSE) Planning: Implementing worker safety protocols, first-aid stations, and fire response plans.

2.5.2 Construction Phase

The construction phase involves physical activities such as dredging, quay construction, electrical system upgrades, paving, and environmental mitigation measures. Construction activities involve:

- Dredging and Quay Construction
    - Deepening Berths 8-11 to 14.5m below Chart Datum (CD) to accommodate larger vessels.
    - Construction of a New Quay on Piles: Using reinforced concrete piles to replace aging structures and provide long-term durability.
    - Erosion Control and Sediment Management: Implementing silt curtains and sediment traps to prevent marine pollution during dredging.
- Paving of the Container Stacking Yard and Drainage Improvements
    - Use of Heavy-Duty Pavement Materials: Reinforced concrete (300–400 mm thick) or high-performance asphalt (100–150 mm thick) to withstand heavy container loads.
    - Stormwater Management System: Installation of trench drains, sedimentation basins, and oil-water separators to control runoff and prevent contamination.
- Electrical Works and Substation Installation
    - Upgrading the Power Supply System for Berths 1-11, the Ro-Ro Yard, and Container Terminal.
    - Installation of New Substations: Walk-in substations for medium-voltage (11 kV) distribution, reefer container power, and gate security systems.
    - Providing Shore Power Connections: Enabling docked ships to switch off engines and reduce emissions by using onshore electricity.
- Environmental Monitoring and Compliance
    - Noise and Air Quality Monitoring: Using real-time sensors to track dust, emissions, and vibration levels.
    - Waste Management Protocols: Proper disposal of hazardous waste, construction debris, and dredged materials.
    - Worker Safety Measures: Personal protective equipment (PPE), emergency response plans, and adherence to occupational health standards.

2.5.3 Operation and Maintenance Phase

Once construction is complete, the port enters the operation and maintenance phase, ensuring long-term functionality and environmental compliance. Activities shall include operational improvement, maintenance of infrastructure and equipment, as well as environmental and social monitoring,

- **Operational Improvements**
    - Efficient Cargo Handling: The upgraded infrastructure will increase cargo throughput and reduce vessel turnaround times.
    - Energy Efficiency and Sustainability: Adoption of LED lighting, solar power for auxiliary systems, and automated energy management systems.
    - Use of Shore Power: Reducing greenhouse gas emissions from docked vessels by connecting to onshore electricity.

- Maintenance of Infrastructure and Equipment
    - Routine Inspections and Repairs: Regular checks of quay structures, paving conditions, electrical substations, and drainage systems.
    - Emergency Response and Spill Containment: Oil spill contingency planning and rapid response drills to protect marine ecosystems.
    - Workforce Training and Development: Continuous skill development for port workers to operate and maintain new systems efficiently.
- Environmental and Social Monitoring
    - Regular Water and Air Quality Testing: Ensuring compliance with environmental regulations and reducing pollution risks.
    - Traffic and Logistics Optimization: Managing container movement to reduce congestion and enhance efficiency.
    - Community Engagement and Social Development: Supporting local businesses and providing employment opportunities.

2.5.4 Decommissioning Phase

While the project is designed for long-term operation, some components may require decommissioning due to technological advancements, structural wear, or changes in operational needs. Decommissioning activities include

- Dismantling of Outdated Equipment: Removal of old substations, quay structures, or shore power connections that become obsolete.
- Safe Disposal of Hazardous Materials: Ensuring that transformers, batteries, and electrical components are disposed of following environmental guidelines.
- Restoration of Decommissioned Areas: Rehabilitating affected sites by planting vegetation or repurposing areas for alternative uses.
- Post-Decommissioning Monitoring
    - Assessing Environmental Impacts: Evaluating how decommissioning activities have affected marine life, water quality, and local communities.
    - Sustainability Planning for Future Projects: Integrating lessons learned into future infrastructure upgrades.

2.6 Summary of All Aspects During All Phases of Project Implementation

For clarity, the various project activities (aspects) are summarized below by project phase. The list is extensive, so organizing the activities by phase helps to present them in a clear, logical order. **Note:** Only the activities (aspects) are listed here, without detailing the resultant impacts (these will be discussed in impact assessment chapter). Each item is phrased using parallel verbs for consistency.

2.6.1 Pre-Construction and Mobilization Phase

During this stage, essential preparations are undertaken to ensure a smooth transition into construction. Activities include mobilizing key equipment and resources, recruiting skilled personnel, procuring necessary materials, handling machinery, and managing on-site and access road traffic. By organizing these preparatory steps efficiently, the project team establishes operational readiness and mitigates potential risks, setting the stage for successful execution of marine and infrastructure works.

2.6.2 Construction Phase (Marine Works)

The selected structural option for Berths 8–11 is the construction of a new piled quay. This option has been adopted in place of rehabilitation of the existing quay and in preference to the caisson alternative. The selected solution consists of a reinforced concrete quay platform supported by piles and extending along approximately 726 m of berth length with a width of about 44.4 m. The selected piled-quay solution was preferred because it is better suited to the project constraints, including the presence of existing piles, adjacent structures, existing slope protection, required berth depth, and the need to maintain practical constructability within an active port environment. It is also considered more appropriate than rehabilitation because of the advanced deterioration and age of the existing Berths 8–11 structure, and more appropriate than the caisson option on technical and cost grounds.
For the adopted piled-quay option, the feasibility study further selected the pile arrangement and construction approach as follows: for the extended part of the quay (rows A, B and C), driven piles are to be used, specifically prestressed high-performance concrete tubular driven piles (PHC / spun piles); and for the remaining rows (D, E, F, G, H and I), the selected solution is bored cast-in-situ reinforced concrete piles covered by steel pipes. This combination was selected to improve constructability, minimize interference with the existing quay piles, avoid difficult pile driving through riprap and compacted ground, and facilitate implementation of the new berth structure.

Other Construction activities for marine work are as detailed in bullets below:

- Dredging in front of Berths 8–11 to deepen the seabed
- Allowing hopper overflow during dredging operations
- Operating the dredger and support vessels
- Installing reinforced concrete bored piles (marine)
- Installing PHC piles by ramming them into the seabed
- Demolishing existing reinforced-concrete decks (Berths 8–11)
- Disposing of demolished concrete (via landfill or reuse)
- Casting pile caps and beams *in situ* (marine)
- Prefabricating and installing new deck panels
- Installing fender systems
- Installing bollards and mooring equipment

2.6.3 Construction Phase (Landside Works)

The scope of work during this phase to includes marine and landside operations, demolition, installation, and infrastructure improvements, as detailed in the following subsections.

- Demolishing existing pavement layers in the yard
- Demolishing existing buildings, fences, and gates
- Removing or relocating existing utility services (water, power, data)
- Levelling soil and performing trenching
- Performing cut-and-fill works
- Compacting soil
- Installing new concrete pavement layers
- Installing concrete interlocking pavers
- Installing electrical infrastructure (light poles, conduits, cables)

- Installing lighting and drainage systems
- Constructing fences, gates, roads, and auxiliary buildings
- Preparing the site for substation buildings
- Installing substation equipment (GIS, transformers, backup systems, SCADA)

2.6.4 Operational Phase

A summary of the activities during this phase includes installation tasks, and site preparations necessary for developing the facility, as well as the operational procedures that will be implemented to ensure efficient management and functionality. The following details describe both the construction phase and subsequent operational responsibilities, setting the stage for the technical and logistical aspects addressed in subsequent sections.

- Managing vessel approach, berthing/unberthing, and tug assistance
- Conducting mooring and unmooring operations at upgraded berths
- Operating ship-to-shore (STS) gantry cranes and RTG/RMG yard cranes
- Operating yard equipment (e.g., reach stackers, terminal trucks)
- Managing internal traffic and idling in yard areas and on access roads
- Operating substations and shore power systems
- Storing fuel and dispensing it to equipment
- Operating the stormwater drainage system (including first-flush management)
- Handling sanitary wastewater from the terminal workforce
- Managing solid waste (packaging, domestic waste)
- Managing hazardous waste (oils, batteries, filters)
- Receiving and handling vessel waste (oily water, sewage, garbage)
- Conducting maintenance dredging as required
- Conducting night operations (use of lighting and generation of noise)
- Conducting emergency preparedness and response drills

2.6.5 Decommissioning Phase

The facility's key operational activities and decommissioning procedures encompass a broad range of responsibilities, including the management of power systems, fuel storage and dispensing, waste handling (both solid and hazardous), routine maintenance, and emergency preparedness. Additionally, the decommissioning phase involves a systematic approach to safely dismantling infrastructure and managing all associated materials. A detailed list of these activities is provided below:

- Planning to decommission activities and obtaining necessary permits
- Isolating and de-energizing electrical systems and substations
- Draining and removing oils and other hazardous substances
- Removing cranes, equipment, and utilities
- Demolishing pavements, buildings, and auxiliary structures
- Removing deck slabs, beams, and fenders from berths
- Cutting and extracting piles (where required)
- Handling and disposing of dredged or excavated sediment materials (if removal is needed)
- Segregating waste and recycling or disposing of concrete and steel debris
- Investigating and remediating any contaminated soil or sediment
- Performing backfilling, grading, and stormwater system closure works
- Restoring the site, including landscaping and revegetation

2.7 Project Implementation Schedule

The project will be executed over 36 months, with phased implementation to minimize disruptions to port operations. A detailed Gantt chart outlines critical milestones and expected completion dates.

2.8 Estimated Project Cost

Total estimated cost covers engineering, construction, environmental mitigation, and stakeholder engagement.

Funding is provided by the World Bank, Government of Tanzania, and private sector partners.

CHAPTER THREE

3 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Introduction

The purpose of this Chapter is to describe the relevant legal framework within which the project will take place. An overview of forward planning of transport and infrastructure in Tanzania is provided based on the policy and legislative context in which the development of ports rehabilitation projects takes place.

3.2 Constitution, Policies and Strategies

3.2.1 The Constitution of Tanzania (1977, Revised 1995)

The Constitution of the United Republic of Tanzania 1977 - 1995 (revised 1997) recognizes the basic rights and equality entitled, without any discrimination, protection, and equality of all persons before the law. The United Republic of Tanzania is committed to the conservation of the country's natural environment as is evident through the Constitution and various Mission Statements.

The Constitution establishes the fundamental legal framework for governance, including the protection of natural resources and environmental sustainability. It mandates that all development activities promote economic growth while safeguarding the environment and public health. The government has a duty to ensure that the exploitation of resources does not compromise the well-being of present and future generations.

This project must align with constitutional principles by ensuring that port expansion activities do not harm the environment or violate the rights of surrounding communities.

3.2.2 National Development Vision 2025

This third national five-year development plan (FYDP III) for the period 2021/2026 is a nationwide multisector document aiming at achieving the goals set in the national development vision 2025. To increase the resilience of livelihoods to disasters, main interventions shall be:

(i) strengthen environmental conservation and protection to mitigate adverse effects of climate change
(ii) social development, including health and education, human settlements, clean and safe water, and environment, paying attention to equitable access, gender and people with disabilities
(iii) strengthen sustainable use and management of oil and natural gas
(iv) conserve marine and freshwater fisheries protected areas
(v) promote biodiversity conservation;
(vi) develop climate change adaptation and impacts mitigation measures and reduce land degradation;
(vii) Minimize environmental pollution and resultant adverse effects on the environment and human health.
(viii) Establish programs and mechanisms for management, monitoring and assessment of water and wastewater quality.
(ix) Strengthen conservation and protection programs of water resources and water sources.

The port expansion contributes to Tanzania's goal of becoming a regional trade hub while integrating sustainability practices to protect natural resources.

3.2.3 National Environmental Policy (2021)

The overarching governing Tanzania's environmental management are the National Environmental Policy (NEP) of 2021 and the Environmental Management Act (EMA) of 2004. The NEP enables sectoral and cross-sectoral policy analysis to mainstream environmental considerations into all aspects of planning and development.

The National Environmental Policy (NEP) provides the foundation for environmental management and sustainability in Tanzania. It aims to integrate environmental considerations into national development planning, including pollution control, biodiversity protection, and resource efficiency.

The policy appropriately sets broad goals committing Tanzania to sustainable development of its natural resources heritage. The policy promotes the use of EIA as a planning tool that integrates environmental issues into the planning process, the implementation of the "polluter pays" principle and the use of precautionary principle (i.e. it is better to be roughly right in time, than to be precisely right in too late).

It also stipulates the use of numerous approaches in environmental management in Tanzania including; use of economic instruments, development of environmental standards, indicators and their use, and that environmental legislation is an essential component of effective environmental management.

The policy contends, "One of the cornerstones of the EIA process was the institution of public consultations and public hearings in the EIA procedures. In undertaking the EIA, TPA has observed one of the requirements of the national environmental policy and will continue to observe the requirements of the policy during the whole life cycle of the project.

The project must implement pollution control measures, biodiversity conservation programs, and resource-efficient infrastructure to comply with NEP directives.

3.2.4 National Transport Policy (2003)

The main objective of this Policy is to enhance transport systems and promote environmental protection. The mission is to develop safe, reliable, effective, efficient and fully integrated transport infrastructure and operations that was to meet the needs of travel and transport by improving levels of services at lower costs. Ultimately, the development of a reliable transport network should drive human development in a manner that is economically and environmentally sustainable.

Paragraph 5.13.2.2 of the Policy is pertinent to the proposed project as it stresses that in order to develop efficient and environmentally sound maritime transport services, increased investment and human capacity are required. Section 7.5 identifies Dar Es Salaam Port as one of the country's major seaports that was benefit from improved infrastructure and facilities for maximum exploitation of water transport for coastal waterways.

Further, paragraph 8.2.3 states the policy objective of improving seaport services to effectively cater for international transit traffic, and this aligns directly with the ultimate purpose that the proposed project aims to serve.

The project supports this policy by upgrading port infrastructure to accommodate increased cargo traffic while implementing environmental safeguards.

3.2.5 Construction Industry Policy (2003)

The Construction Industry Policy is a deliberate and managed process to improve the capacity and effectiveness of the construction industry to meet the national economic demand for buildings and other physical infrastructure facilities. The Policy is aimed at meeting the goals of the National Development Vision 2025.

The objectives of the Policy include to ensure application of practices, technologies and products which are not harmful to both the environment and human health.

In overall, the Policy governs the construction sector in Tanzania, ensuring safety, quality, and sustainability in infrastructure projects.

The port project must adhere to this policy by using sustainable construction materials, minimizing waste, and ensuring worker safety during construction activities.

3.2.6 National Water Policy (2002)

This policy promotes the sustainable management of water resources and requires projects to prevent water pollution through effective drainage and wastewater treatment systems.

The policy underscores the importance of holistic approach by saying that “all water abstractions and effluent discharges into water bodies shall be subjected to a water use permit or discharge permit to be issued only for a determined beneficial use and for a specified period.

Relevance to the Project

The project must implement stormwater management systems and wastewater treatment facilities to protect surrounding water bodies from contamination.

3.2.7 National Health Policy (2017)

The National Health Policy provides guidance for the improvement and sustainability of the population's health status by reducing disability, mortality, and morbidity statistics, and improving nutritional status and raising life expectancy.

The policy focuses on environmental health, sanitation, and disease prevention, particularly in large infrastructure projects.

Relevance to the Project

The project must incorporate occupational health and safety measures to protect workers and local communities from environmental health hazards.

3.2.8 National Policy on HIV/AIDS (2003)

The overall goal of the National Policy on HIV/AIDS is to provide a framework for leadership and coordination of the national multi-sectoral response to the HIV/AIDS epidemic. This includes formulation, by all sectors, of appropriate interventions that was effective in preventing the transmission of HIV/AIDS and other sexually transmitted infections, protecting, and supporting vulnerable groups, and mitigating the social and economic impacts of HIV/AIDS.

This policy mandates workplace programs for HIV/AIDS prevention, awareness, and care.

Relevance to the Project

The project must implement awareness programs for construction workers and port employees to reduce the risk of HIV/AIDS transmission.

3.2.9 National Energy Policy (2015)

The policy promotes efficient energy use and the adoption of renewable energy sources in industrial and infrastructure projects.

Relevance to the Project

The project should incorporate energy-efficient systems and explore renewable energy options to reduce operational costs and environmental impact.

3.2.10 National Investment Promotion Policy (1996)

This policy encourages private sector investment in infrastructure while ensuring sustainable development.

The project must align with this policy by promoting public-private partnerships and adopting sustainable investment practices.

3.2.11 National Women and Gender Policy, 2000

The key objective of the Policy is to provide guidelines that will ensure that gender sensitive plans and strategies in all sectors and institutions are developed. While the Policy aims at establishing strategies to eradicate poverty, it emphasizes gender equality and equal opportunity for both men and women to participate in development undertakings and to value the role played by each member of society. Specifically, this Policy advocates for opportunities for both men and women in projects including construction works and related activities, and for women to be involved at all levels of the project from planning to implementation.

On employment strategies for women, Section 30 of the Policy requires presence of equal employment opportunities between men and women depending on required qualifications at all level. In addition, there should be records of exact number of women and men at levels in order to assist monitoring and follow-ups, less bureaucratic special system in the provision of business licenses especially to women working in the informal sector.

Relevance to the Project

The Client must adopt such an approach during all stages of the implementation of this project that is in line with the aims of this Policy.

3.2.12 National Adaptation Programme of Action of 2007

The National Adaptation Programme of Action (NAPA) 2007 sets out to “identify immediate and urgent climate change adaptation actions that are robust enough to lead to long-term sustainable development in a changing climate.

It will also identify climate change adaptation activities that most effectively reduce the risks that a changing climate poses to sustainable development”. The main objectives of NAPA are:

- To identify and develop immediate and urgent NAPA activities to adapt to climate change and climate variability;
- To protect life and livelihoods of the people, infrastructure, biodiversity and environment;
- To mainstream adaptation activities into national and sectoral development policies and strategies, development goals, visions and objectives;
- Increase public awareness to climate change impacts and adaptation activities in communities, civil society and government officials;
- To assist communities to improve and sustain human and technological capacity for environmentally friendly exploitation of natural resources in a more sustainable way in a changing climate;
- To complement national and community development activities which are hampered by adverse effects of climate change; and

- To create a long-term sustainable livelihood and development activities at both community and national level in a changing climatic condition.

The NAPA is linked to various development policies including the United Nations Convention to Combat Desertification (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the Vienna Convention on the Protection of Ozone Layer. Several strategies and action plans related to some of these conventions are in place including the National Biodiversity Strategy and Action Plan (NBSAP) and the National Action Programme (NAP).

Relevance to the Project

The Dar es Salaam Port Improvement Project is a vital economic development initiative, but it also poses environmental and social challenges. The National Adaptation Programme of Action (NAPA) 2007 provides a crucial framework for addressing climate risks, protecting infrastructure, promoting sustainability, and aligning with national and international environmental commitments. Integrating NAPA into the ESIA ensures a climate-resilient, environmentally sustainable, and socially inclusive port development project, ultimately contributing to Tanzania's long-term economic and ecological well-being.

3.3 Legislation, Acts and Regulations.

3.3.1 Environmental Management Act, 2004 and (Miscellaneous) (No.3) Act, 2016 and 2021

Environmental Management Act (United Republic of Tanzania, 2004) (EMA) guides environmental management and is administrated by the National Environmental Advisory Committee, the Directorate of Environment and the NEMC.

The EMA provides a legal and institutional framework for among other things for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment and to provide for implementation of the National Environment Policy. Section 81 in Part six of the EMA requires the project Developer to undertake an EIA prior to the commencement or financing of a project or undertaking.

3.3.1.1 Environmental Impact Assessment and Audit Regulations, 2005 amended in 2018

The EIA process is described under the Environmental Impact Assessment and Audit Regulations No. 349 of 2005 ('the EIA Regulations') promulgated in terms of the EMA Sections 82(1) and 230(2) (h) and (q). The objectives of the NEMC are to undertake the enforcement, compliance, review and monitoring of EIA in terms of the EMA, including the facilitation of the public participation process in environmental decision-making.

The regulations provide the basis for undertaking EIAs and Environmental Audits for various activities, which require mandatory EIAs, but also activities that require registration and may or may not require EIA. Part three of the EIA and Audit Regulation, deals with project registration and screening procedures, part four deals with the EIA and part five deals with the Environmental Impacts Statement. If the EIA is found to be satisfactory and the residual environmental impacts of the proposed project acceptable according to part six of the EIA and Audit regulations, NEMC recommends the Minister for Environment to issue an Environmental Certificate for the Project as annotated in part 7 of the EIA and Audit regulations.

Referring to Environmental Management Act (EMA) 2004, and the first schedule of The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (United

Republic of Tanzania, 2018) which detail types of projects requiring and not requiring EIA, this project falls in Type A which are requiring a mandatory EIA.

Type A Projects are likely to have significant adverse environmental impacts and that in-depth study is required to determine the scale, extent and significance of the impacts and to identify appropriate mitigation. In the list of Type, A Projects, the proposed Port Rehabilitation activities fit descriptions in number 9(b) as the construction and/or expansion of ports and harbors.

It should be noted that this assessment will also include a substantial social component and therefore is termed an Environmental and Social Impact Assessment (ESIA). The EMA guides environmental management and is administrated by the National Environmental Advisory Committee, the Directorate of Environment and the NEMC.

At the end of the ESIA, process an environmental impact statement (EIS) is produced in accordance with the requirements of section 86 of the EMA and Part IV of the EIA Regulations. The Ministers decision regarding the project was informed by NEMC's recommendations based on the information emerging from this Environmental and Social Impact Assessment (ESIA) process and EIS provided in the final ESIA report.

3.3.1.2 Environmental Management (Air quality Standards) Regulations, 2007

The objectives of the Air Quality Standards Regulations are to set baseline parameters on air and emissions; enforce minimum air quality standards prescribed by the National Environmental Standards Committee; help developers such as industrialists to keep abreast with environmentally friendly technologies; and ensure protection of human health and the environment from various sources.

The ambient air quality baseline data has been collected, and it was used for monitoring air quality during construction and operation phases of the project. The Contractor and TPA shall abide to the maximum permissible levels by implementing suggested mitigation measures for minimising dust, noise and gaseous pollution.

3.3.1.3 Environmental Management (Water Quality Standards) Regulations, 2007

The objectives of the Water Quality Standards Regulations are to protect human health and conserve the environment; enforce minimum water quality standards prescribed by the National Environmental Standards Committee; enable the National Environmental Standards Committee to determine water usage for purposes of establishing environmental quality standards and values for each usage; and ensure all discharges of pollutants take account of the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned.

During construction and operation phases, water quality was continuously monitored. Water samples was collected and tested periodically to detect any possible contamination and implement remedial measures.

3.3.1.4 Environmental Management (Soil Quality Standards) Regulations, 2007

The objectives of the Soil Quality Standards Regulations are to set baseline parameters on soil limits for soil contaminations; enforce minimum soil quality standards prescribed by the National Environmental Standards Committee; prescribe measures designed to maintain, restore and enhance the sustainable productivity of the soil; prescribe minimum soil quality standards to maintain, restore and enhance the inherent productivity of the soil in the long term; enforce minimum soil standards prescribed by the National Environmental Standards Committee for such purposes as agricultural practices.

In compliance with this Regulation, TPA shall conduct soil quality analysis for monitoring purpose especially at the Gerezani creek and the aim will be protecting the workers from exposure of H2S from the decomposition of organic materials under sea which is expected during dredging process of the sediments. According to WHO, the workers are not allowed to be exposed to hydrogen sulfide concentrations above the occupational exposure limits of 10-15 mg/m^3 (7-10 ppm) (8-hours)

3.3.1.5 Environmental Management (Control of Ozone Depleting Substances) Regulations, 2007

The objectives of the Regulations for Control of Ozone Depleting Substances are to eliminate the production and consumption of ozone depleting substances in accordance with the phase out schedule of the Montreal Protocol; to regulate the production, import, export, trade, disposal and use of ozone depleting substances and its products; to control and monitor the amount of ozone depleting substances entering or leaving the United Republic of Tanzania; to provide a system of data collection that will facilitate compliance with relevant reporting requirements under the protocol; to promote measures, strategies, programmes, incentives, equipment and technologies in favour of the use of ozone friendly substances, products and equipment in line with national obligation specified by the Montreal Protocol; and to facilitate the link between the National Ozone Unit and the Ozone Secretariat of the Protocol. TPA will strive to observe this Regulation by collaborating with relevant government authorities such as

Tanzania Bureau of Standards, Vice President's Office-Division of Environment and Tanzania Atomic Energy Commission (TAEC) in regulating importation of the equipment containing ozone depleting substances.

3.3.2 The Ports Act No. 17, 2004

The Ports Act, 2004 plays a critical role in Environmental and Social Management of the Dar es Salaam Port Improvement Project by ensuring that the project complies with legal, environmental, and social regulations. It requires that the project prevent environmental pollution, engage stakeholders, manage hazardous materials, and align with international maritime laws.

Relevance to the Project

- Section 68 the Act mandates that all port-related activities to prevent environmental pollution by implementing measures to control waste disposal, oil spills, and other hazardous substances. This can be implemented by conducting risk assessment and developing Environmental and Social Management Plan (ESMP) to manage potential risks of water contamination, air pollution, and solid waste disposal within port limits.
- Sections 5 & 6 of the Act grants TPA the authority to approve, regulate, and supervise all port-related infrastructure projects, including berth expansion, dredging, quay construction, and land reclamation.
- Sections 69 & 70 of Act imposes strict regulations on the handling, storage, and disposal of hazardous materials within port areas. It requires port operators to establish safe and environmentally compliant waste disposal mechanisms.
- Section 8 of the Ports Act requires that major infrastructure projects undergo stakeholder consultations to ensure transparency and community involvement in decision-making.
- Section 72 of the Act mandates that Tanzania's ports comply with international conventions, such as MARPOL, the IMO regulations, and other global environmental treaties governing maritime pollution and emissions.

3.3.2.1 Tanzanian Harbours Regulations, 1991

These Regulations make provisions for the control and discharge of pollutants from vessels into the harbours of all Tanzanian ports. Articles 62 and 66-68 establish the standards and procedures for

control of garbage, waste, and sewage from vessels into harbour waters. Article 164 states that for vessels carrying petroleum, the regulations apply additional to other legislation in force.

Regulation 14-17 cover oil pollution, and state that it is forbidden to discharge oily ballast or bilge water within the 12 miles harbour limit, this is subject to a penalty of USD 100,000 fine and/or imprisonment. All discharge valves should be secure and in the event of any discharge or leaks from the vessel, the officer in charge should attempt its recovery and avoid it being swept overboard.

TPA will comply with the requirements of these Regulations by implementing Ballast Water Management Plan, Local Marine Oil Spill Contingency Plan, and revising the draft Waste Management Plan to be ready for approval and implementation.

3.3.3 Tanzania Shipping Agencies Act, 2017 Act

An Act to make provisions for the establishment of a shipping agencies corporation and for maritime administration to regulate ports, shipping services, maritime environment, safety and security and related matters.

Relevance to the Project

- Section 2(2) States that matters of maritime environment, safety, and security apply to the entire United Republic of Tanzania, emphasizing the Act's role in environmental oversight.
- Section 50: International Obligations Requires TASAC to enforce compliance with international maritime conventions, such as MARPOL, which are crucial for preventing pollution from ships.

3.3.4 Merchant Shipping Act No. 21, 2003

The Merchant Shipping Act No. 21 of 2003 governs maritime safety, security, and environmental protection in Tanzania's territorial waters. It establishes rules for ship operations, pollution control, and safety regulations, ensuring that maritime activities adhere to international standards. The Act is directly relevant to the Environmental and Social Management (ESM) of the Dar es Salaam Port Improvement Project due to its focus on marine environmental protection, port safety, pollution prevention, and labor rights. Below are its key applications in the ESIA process:

Section 314 – Prevention of Pollution from Ships

The Dar es Salaam Port Improvement Project involves increased shipping traffic, construction works, and dredging, all of which can lead to oil spills, ballast water discharge, and waste pollution. The project must include oil spill response plans, ballast water management, and ship waste disposal protocols to prevent pollution.

Section 318 – Prohibition of Discharge of Harmful Substances

This section prohibits ships from discharging harmful substances such as oil, sewage, and hazardous chemicals into Tanzanian waters. Strict monitoring of vessel compliance and installation of waste reception facilities at the port must be included in environmental mitigation measures.

Compliance with MARPOL Convention

The Act enforces compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL), which is crucial for protecting Tanzania’s marine ecosystems. The project must align with MARPOL standards for fuel emissions, oil spill prevention, and marine waste management to ensure sustainable port operations.

Section 328 – Liability for Marine Pollution

Establishes liability for marine pollution damage caused by shipping activities. The project must incorporate insurance and liability measures to ensure that companies responsible for pollution cover the cost of cleanup and environmental restoration.

Section 229 – Safety Regulations for Port Operations

The Act mandates safe handling of cargo, storage of hazardous materials, and emergency preparedness in port areas. The project must include risk assessments and emergency response plans for hazardous cargo handling and worker safety.

Section 233 – Port Security and Safety Standards

Ensures port safety regulations are in place to protect workers, cargo, and the environment from accidents and security threats. The port improvement project should integrate modern safety infrastructure, emergency response systems, and training programs for port workers.

Rights of Seafarers and Port Workers Protects the welfare, health, and safety of seafarers and port workers by enforcing labor rights and safe working conditions. The project should ensure fair labor conditions, provision of protective equipment, and medical facilities for workers involved in port expansion.

Section 295 – Compensation for Workplace Injuries

Establishes the requirement for compensation in case of accidents or occupational hazards for port workers. The Environmental and Social Management Plan (ESMP) must include occupational health and safety (OHS) measures, worker training, and accident response protocols.

Section 337 – Implementation of International Maritime Conventions

Tanzania is obligated to implement and enforce international maritime laws, including those on environmental protection. The Dar es Salaam Port Improvement Project must follow international environmental protocols, such as MARPOL, the London Convention on Waste Disposal at Sea, and the Ballast Water Management Convention.

3.3.5 Employment and Labour Relation Act, 2019

Generally, the Act among other things intends to provide the legal framework for effective and fair employment relations and minimum standards regarding conditions of work.

For example, it prohibits employment of children under 18 years of age; stipulated types of contracts that can be entered with employees; the maximum number of ordinary days or hours that an employee may be permitted or required to work; remuneration; leaves; unfair termination of employment; establishment of trade unions branches in workplaces; etc.

TPA and contractor shall observe these and other relevant provisions in this Act.

3.3.6 The Marine Parks and Reserves Act, 1994

The Marine Parks and Reserves Act, 1994 (Cap. 146) provides for the establishment, management, and protection of marine parks and reserves in Tanzania. It plays a crucial role in the Environmental and Social Management (ESM) of the Dar es Salaam Port Improvement Project, particularly in mitigating environmental impacts and ensuring the sustainable use of marine resources in the vicinity of the port.

Following sections of the Act demonstrates its relevance to the proposed project:

Protection of Nearby Marine Protected Areas (MPAs) (Section 10(1) – Protection of Marine Parks and Reserves)

The port's activities (dredging, ship traffic, and pollution) can indirectly affect Mbudya and Bongoyo Marine Reserves, which are located offshore from Dar es Salaam. These reserves are important for

biodiversity conservation, ecotourism, and fisheries. The project should assess potential spillover effects, including sedimentation, water quality degradation, and disruption of marine habitats.

Prevention of Marine Pollution (Section 14(1) & (2) – Prohibition of Waste and Pollutants in Marine Protected Areas)

Dar es Salaam Port is a major maritime hub, with risks of oil spills, ballast water discharge, and industrial runoff that could affect nearby marine ecosystems. Strong waste management and pollution control measures are required. The project must include an Oil Spill Contingency Plan, ballast water treatment, and regular water quality monitoring.

Protection of Coastal Fisheries and Livelihoods (**Section 12(1) & (3) – Regulation of Fishing Activities)**

Many small-scale fishers depend on coastal waters around Dar es Salaam for their livelihoods. Increased port activities, dredging, and land reclamation can disrupt fish breeding grounds and reduce fish stock availability. However, baseline fish catch data from the Dar es Salaam coastal waters, compared to data during and after for previous dredging for erth 1-7, showed fluctuations within normal range and no clear project-linked decline.

Coastal Erosion and Habitat Degradation (Clause: Section 11 – Coastal Conservation)

The port expansion may cause shoreline erosion, mangrove degradation, and sedimentation along Dar es Salaam's coastline, impacting ecosystems linked to marine protected areas. Erosion control measures, such as mangrove restoration and sediment management, should be included in the project's Environmental and Social Management Plan (ESMP).

Compliance with International Conservation Agreements (Section 17 – International Conventions)

The Marine Parks and Reserves Act aligns with international environmental agreements such as MARPOL (marine pollution prevention) and the Convention on Biological Diversity (CBD). The Dar es Salaam Port Improvement Project must comply with international standards for sustainable port development and marine conservation.

3.3.7 Occupational Health and Safety Act, 2003

The Occupational Health and Safety Act of 2003 deals with the regulation of health, safety, and welfare of workers. Some of the provisions of this Act are relevant to the project. The Act covers economic activities in constructions, agriculture, commerce, and offices.

In case of occupational accidents/illness, it is the responsibility of the labour department in the ministry to ensure the victim get compensated by the insurer of the employer. Moreover, the victim may also claim for work-injury benefit should he/she be a member of a social security scheme.

Relevance to the Project

The OSHA is of particular importance for contractors that construct the proposed facility, and they should be aware of their obligations regarding the workforce health and safety measures stipulated in this Act. There are specific Safety procedures and guidelines to be followed by both workers and their respective employers to ensure a Safe and conducive working environment.

3.3.8 Fisheries Act, No. 22 of 2003

This is an Act to repeal and replace the Fisheries Act, 1970 to make provision for sustainable development, protection, conservation, aquaculture development, regulation and control of fish, fish products, aquatic flora and its products, and for related matters. In relation to the proposed development at the Dar es Salaam Port, Section Part X, Sections (51)-1 and 52 are pertinent.

Part X, 51 (1) All biological resources and their intangible products whether naturally occurring or naturalized within fisheries including genetic resources belonging to the Government in accordance with Article 27 of the Constitution, shall be conserved and utilized for the people of this country in accordance with the provisions of this Act and any other written law on biological resources. Section 52 states that 'no person shall undertake any development activities in this Act, without undertaking Environmental Impact Assessment in accordance with any other written laws of Tanzania'. This EIA is part of the proposed project at the Port therefore complies with the requirements of the Fisheries Act.

On improved quality of the fisheries resources, Part VI, Section 24 states that the Minister shall by notice published in the Gazette, impose conditions that are necessary for ensuring the right of consumers to safe, wholesome, and unadulterated fish and fishery products. The Contractor and TPA will comply the required provisions of this Act during construction and operation phases of the project.

3.3.9 Deep-Sea Fishing Authority Act (1998)

The Deep-Sea Fishing Authority Act (1998) is a crucial legal framework governing deep-sea fishing activities in Tanzania's Exclusive Economic Zone (EEZ). It regulates the sustainable use of deep-sea fishery resources, enforces conservation measures, and manages fishing rights. The Dar es Salaam Port Improvement Project, which involves port expansion, dredging, and increased maritime activities, has direct and indirect implications for deep-sea fishing operations, marine biodiversity, and fisheries management.

Relevance to the Project

The relevance of the Deep-Sea Fishing Authority Act (1998) to the Environmental and Social Impact Assessment (ESIA) of the Dar es Salaam Port Improvement Project can be justified under the following key areas:

- Dredging and sedimentation, which can alter fish habitats and disrupt marine biodiversity.
- Increased ship traffic, which can lead to pollution and higher risks of oil spills affecting fish stocks.
- Changes in water quality, including temperature, salinity, and turbidity, which can impact fish migration and breeding grounds.

Based on the regard, the following should be considered during this ESIA study:

- The ESIA must assess potential impacts of port activities on deep-sea fisheries.
- The project should incorporate mitigation measures, such as regulating dredging activities and implementing spill response plans to protect deep-sea fishery resources.

- The ESIA should evaluate the impact of increased ship movements on deep-sea fishing zones and recommend strategies to minimize disruptions.
- Navigation and port authority regulations should be aligned with the Deep-Sea Fishing Authority Act to ensure sustainable coexistence of fishing and shipping activities.
- Waste management and pollution control for ships.
- Habitat restoration programs (e.g., artificial reefs, marine protected areas).
- Monitoring and enforcement mechanisms in collaboration with the Deep-Sea Fishing Authority.

- The ESIA must assess potential socioeconomic impacts on artisanal and industrial fishers.
- Stakeholder engagement with fishing cooperatives and associations should be conducted to address their concerns.

The Deep-Sea Fishing Authority Act (1998) aligns with various international agreements, including:

- United Nations Convention on the Law of the Sea (UNCLOS)
- Code of Conduct for Responsible Fisheries (FAO)
- Regional fisheries management organizations (RFMOs) governing the Western Indian Ocean

The Dar es Salaam Port Improvement Project must comply with these legal frameworks to avoid international disputes and ensure sustainable fisheries management.

3.4 World Bank Environmental Safeguard Policies

This project is funded by the World Bank and, accordingly, the applicable lender requirements for this ESIA are the relevant World Bank Safeguard Policies identified in this section. These requirements are applied together with the laws and regulations of the United Republic of Tanzania. No additional international lender framework is treated as governing this ESIA unless expressly required by the financing arrangement. The triggered safeguards are as detailed in submsequent subsections.

3.4.1 OP 4.01: Environmental Assessment

This operational policy requires Environmental Assessment (EA) for proposed projects to ensure that they are environmentally sound and sustainable. Under OP 4.01, the project will be screened and assigned any of the four categories:

- Category A: A proposed project is classified in Category A if it is likely to have significant adverse environmental impacts
- Category B: A proposed project is classified in Category B if it has potentially adverse environmental impacts on the human population or environmentally important areas. These impacts are site-specific, few of them are irreversible, and in most cases mitigation measures can be designed more readily than for “Category A” projects.
- Category C: A proposed project is classified in Category C if it is likely to have minimal or no adverse environmental impact.
- Category FI: A proposed project is classified as Category FI, if it involves investment of Bank funds through a financial intermediary, in sub-projects that may result in adverse environmental impacts.

3.4.2 OP 4.04: Natural Habitats

The conservation of natural habitats through specific measures to enhance the environment is essential for long-term sustainable development. This operational policy aims at promoting natural habitat conservation and avoiding unjustified or excessive damage to natural habitats. It is triggered when there is a possibility of significant loss or degradation of natural habitats due to any project activity. The policy also aims at benefitting the natural habitat.

3.4.3 OP 4.11 Physical Cultural Resources

Physical Cultural Resources (or PCR) as per World Bank Principles are defined as resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial

sites), aesthetical, or other cultural significance. The Operational Policy intends to preserve such structures and avoid their destruction or damage.

It is important to identify the PCRs and prevent or minimize the adverse impacts. If possible, compensate for these adverse impacts and enhance the positive impacts on PCRs through proper site selection and design.

3.4.4 TPA Environmental Health and Safety Management System

TPA's EHS management baseline is defined by its corporate Environmental Management Policy (2021) and Occupational Health & Safety (OHS) Policy (2022). Together these policies establish a comprehensive Plan–Do–Check–Act framework (aligned with ISO standards) to guide all port operations. In summary, key elements include:

- Environmental Policy (2021) – Establishes an ISO 14001:2015–compatible EMS and mandates compliance with the Tanzanian Environmental Management Act and related laws. It emphasizes pollution prevention and resource efficiency (waste minimization, reuse/recycling, energy savings) as core obligations. The policy requires setting and reviewing environmental objectives, engaging staff and stakeholders through training and communication, and continuously improving performance. It explicitly commits TPA to reduce its impacts (e.g. oil spills, emissions, ballast-water) and to implement best-practice waste, energy and environmental controls in all port activities.
- OHS Policy (2022) – Commits TPA to "provide safe and healthy workplaces, prevent work-related injury and ill health, and continually improve its OHS performance". It sets objectives to eliminate hazards and risks at work, prevent occupational diseases and accidents, and engage employees (via consultation, committees and training) in safety programs. The policy establishes an OHS management system aligned with national law (OHS Act 2003) and international standards – requiring risk assessment, emergency planning, provision of PPE, regular monitoring and review of safety measures, and enforcement (including sanctions for violations). Like the Environmental Policy, the OHS Policy enshrines a continual-improvement cycle: it mandates regular review of objectives, capacity-building (training/drills), and learning from incidents to refine controls.

Together, these policies form the baseline EHS framework for the port. They embed a structured management system (with documented procedures, committees, training and reporting tools) that drives Port and project activities toward strict legal compliance and alignment with ISO 14001/45001 principles. By codifying commitments to pollution control, resource efficiency, worker protection and continual improvement, the policies ensure that all future works are planned and executed under a robust EHS management regime.

Application to Concessionaires and Contractors

TPA's Environmental Policy (2021) and OHS Policy (2022) constitute the core EHS framework for this project. All concessionaires, terminal operators, contractors and subcontractors working under the project shall align their site-specific EHS procedures with the TPA system, applicable legal requirements and the project ESMP, and shall submit bridging EHS documentation before works commence.

3.5 International Agreements, Conventions and Policies

3.5.1 UNFCCC, Paris Agreement and Tanzania's Nationally Determined Contribution (NDC)

The United Nations Framework Convention on Climate Change (UNFCCC) provides the overarching international framework for global action on climate change. Under the UNFCCC regime, the Paris

Agreement now provides the principal international framework for national climate action, including mitigation, adaptation, climate resilience, and periodic communication of Nationally Determined Contributions (NDCs). Tanzania signed the Paris Agreement on 22 April 2016 and ratified it on 18 May 2018. Tanzania is also listed by the UNFCCC as having an updated **First NDC** on record.
For this project, the relevance of the UNFCCC and the Paris Agreement is that port development and operation should be planned in a manner that supports climate-resilient infrastructure, efficient energy use, reduction of avoidable greenhouse gas emissions, and adaptation to climate-related risks such as sea-level rise, storm events, coastal flooding, and temperature-related stress on infrastructure and operations. Accordingly, the proposed berth strengthening, deepening, and electrical upgrading works should incorporate climate-resilience considerations into engineering design, drainage, operational planning, energy efficiency, and environmental management.
Tanzania's NDC framework is also relevant to the project because it reflects the country's national climate commitments and priorities under the Paris Agreement. In this context, the project should support national efforts on climate adaptation and low-emission development through measures such as efficient electrical systems, reduction of unnecessary vessel and equipment emissions where practicable, improved stormwater management, and climate-informed design of port infrastructure. The Kyoto Protocol may be noted as part of the historical evolution of the international climate regime, but the primary current point of reference for this ESIA is the **Paris Agreement and Tanzania's NDC**.

3.5.2 MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships)

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78), was promoted by the International Maritime Organization (IMO) to prohibit all ships from discharging wastes at sea which could result in pollution of the marine environment. MARPOL 73/78 applies to oil tankers, cruise ships, general cargo and container vessels, tugs, ferries, yachts and small pleasure craft.

The objective of the convention is to reduce the volumes of harmful materials entering the world's ocean and the marine environment. MARPOL 73/78 requires that ships retain all the wastes on board until reaching port. However, certain wastes can be discharged under certain conditions such as the distance from shore, the type of waste and the condition of the waste. MARPOL 73/78 requires that countries provide adequate reception facilities in all their ports, harbors and anchorages.

To comply with MARPOL 73/78, Tanzania Ports Authority has identified the dredged material disposal site offshore after critical assessment of effect on benthic habitat and marine ecology in general and the vessel that will be transporting the waste to the respective selected sites.

3.5.3 Working Environment (Air Pollution, Noise and Vibration) Convention (No. 148),

Concerning the protection of workers against occupational hazards in the working environmental due to air pollution, noise and vibration, came into force in 1979. Tanzania acceded in 1984 to the provisions regulating air pollution and these provisions apply to the project.

3.5.4 The 1972 Convention on International Regulations for Preventing Collisions at Sea (COLREGs)

The Convention set out, among other things, the navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels. The rules in this Convention are relevant to the dredging activities that will take place to deepen and strengthen Berths 8 - 11 and are highlighted in Chapter 7 of this report.

3.5.5 The Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention of 1972)

As per the purpose of the Convention, the goal of waste management where dredged material is concerned is to identify and control potential sources of contamination from estuarine and marine sediments.

To this end, the project proponent must ensure that such identification and control measures are implemented with a view to developing and employing suitable prevention and source control strategies. Where the characteristics of the dredged material render its disposal as failing to meet Convention requirements, other treatment/management options should be considered.

3.5.6 The United Nations Law of the Sea 1982

UNCLOS 1982 has as a primary aim of this convention the establishment of a legal order designed to facilitate international communication and to promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of living resources and the protection and preservation of the marine environment.

Pollution Prevention Provisions of UNCLOS 1982 are contained in Part XII, which deals specifically with the protection and preservation of the Marine Environment. Article 192 outlines the duty States have in this regard. Article 194 sets out the general requirements of Part XII. States are to take, individually or jointly, all measures that are consistent with UNCLOS to prevent, reduce and control pollution of the marine environment from any source.

This includes measures for preventing accidents, dealing with emergencies, ensuring the safety of operations at sea, regulating the design, construction, equipping and manning of vessels and installations and, in accordance with Article 199 to eliminate the effects of pollution and prevent or minimize damage.

To this latter end, States are obliged to jointly develop and promote contingency plans for responding to pollution incidents in the marine environment. This convention has a specific significance with respect to the dumping of dredged material at sea, in a way that does not impact on the marine environment.

3.5.7 The 1991 Bamako Convention

On the ban of the Import in Africa and Control of Trans boundary Movement and Management of Hazardous wastes within Africa was ratified in 1993.

3.5.8 The 1989 Basel Convention

On Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal. The project shall adhere to both Bamako and Basel conventions to ensure that the ships do not bring into the country hazardous wastes by strictly abiding to the cargo declaration formalities.

3.5.9 1996 Convention on Biological Diversity

TPA must cooperate with other related contracting parties for the conservation and sustainable use of biological diversity. Article 14 of the Convention concerns impact assessments and minimizing adverse impacts; therefore, in this respect the Client is compliant with this Policy by commissioning the Consultant's completion of this EIA.

3.5.10 The 2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships

The provisions of this Convention aim to avoid and mitigate adverse effects on human health and the environment caused by ship recycling, and to enhance ship safety throughout a ship's operating life. Parties to the Convention are to cooperate in the detection of violations and the enforcement of the provisions of this Convention.

Where activities for the proposed project are concerned, the Convention includes regulations for the safe and environmentally sound recycling of ships that will guide TPA's monitoring of ships, particularly when the upgraded Port is operational.

3.5.11 ILO Minimum Age Convention (C138), 1973

The Convention is concerned with minimum age for admission to employment. The minimum age stated in Article 2 (3) of the Convention is not less than 15 years or 18 years' dependent on the nature of the work. The Convention prohibits child labor with a view to achieving the total abolition of child labour worldwide.

Members of the Convention are committed to pursuing national policies that have been designed to ensure effective abolition of child labour and to increase progressively the minimum age for admission to employment or work to a level consistent with the fullest physical and mental development of young persons. During construction the Contractor will abide by the provisions of this Convention.

3.6 Institutional Framework for Managing Environment

This section identifies authorities, institutions and sectors which are directly or indirectly related to the project development. These entities have been identified geographically by political boundaries as well as through regulations, institutional mandates, and structures.

These entities were adequately consulted during the ESIA process as prescribed through the institutional framework for environmental management. The relevant institution for handling ESIA requirements is the NEMC with input from the District Environment Management Committees, Ward Committees and Street Committees.

3.6.1 Authorities Involved in ESIA

According to the EMA of 2004 the institutional set-up for environmental management from a national level to village level includes:

- Minister Responsible for Environment;
- Director of Environment (DoE)
- National Environment Management Council (NEMC);
- Sector Ministries
- Regional Secretariats;
- Local Government Authorities, District, and Town Councils;
- Township, Village, Ward; Neighborhood (Kitongoji); and
- Street (Mtaa).

The DoE and NEMC are the main regulatory bodies for environmental management in Tanzania whilst the other sector ministries and agencies, play an important role in implementing and enforcing environmental decree. The environmental management functions of each institution are outlined in the Environmental Management Act.

3.6.2 Minister Responsible for Environment

The Minister shall be overall responsible for matters relating to environment and shall in that respect be responsible for articulation of policy guidelines necessary for the promotion, protection, and sustainable management of environment in Tanzania.

The Minister may issue general guidelines to the Sector Ministries, Government Departments, the Council, National Environment Advisory Committee, City, Municipal or District Environmental Management Committee, agency or any other public or private institution necessary for the purposes of implementation of or giving effect to the provisions of EMA.

The Minister may designate and shall, where appropriate, direct any of the before mentioned institutions and within specified time, to perform any function or do any activity or desist from performing any function or doing any activity because of which the environment or part of it is or may be seriously endangered or detrimentally affected.

3.6.3 Director of Environment (DoE)

The DOE heads the Office of the Division (Directorate) of Environment under the Office of the Vice President and is responsible for coordination, monitoring and assessment of various environmental activities.

The DOE is responsible to coordinate various environment management activities being undertaken by other agencies and promote the integration of environment considerations into development policies, plans, programmes, strategies, projects and undertake strategic environmental assessment with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania.

3.6.4 National Environment Management Council (NEMC)

The object and purpose for which the Council is established is to undertake enforcement, compliance, review and monitoring of environmental impact assessment and in that regard, shall facilitate public participation in environmental decision making, exercise general supervision and coordination over all matters relating to the environment assigned to the Council, under the EMA or any other written law.

The Director General of NEMC is appointed by the President. The Council and the Board of Directors consist of:

- A Chairperson appointed by the President;
- The Director of Environment;
- Seven members appointed by the Minister; and
- The Secretary to the Council (Director General).

3.6.5 Sector Ministries

An environmental sector sits within each Ministry. The duties of the sector include:

- Responsibility for ensuring compliance by the sector Ministry with the requirements of this Act;
- Responsibility for ensuring all environmental matters contained in other written law falling under sector ministry are implemented and report of their implementation is submitted to the Director of Environment; and

- Liaison with the Director of Environment and the Council on matters involving environment and all matters with respect to which cooperation or shared responsibility is desirable or required under this Act.

3.6.6 Regional Secretariats

The Regional Secretariat shall be responsible for co-ordination of all advice on environmental management in their respective regions and liaison with the Director of Environment and the Director-General on the implementation and enforcement of this Act.

The Regional Secretariats are headed by a Regional Environment Management Expert. The expert is responsible for advising the local authorities on matters related to the implementation and enforcement of the EMA. Furthermore, the expert links the region with the Director of Environment and Director General of NEMC.

3.6.7 Local Government Authorities

A local government Environmental Management Officers are designated or appointed at each City, Municipal, District and Town Council. The responsibilities of the Environmental Management Officers among others include:

- Ensuring enforcement of EMA;
- Advising the Environment Management Committee on all matters relating to environment;
- Promoting environmental awareness relating to protection of the environment and the conservation of natural resources;
- Gathering and managing information on the environment and the utilization of natural resources;
- Preparing periodic reports on the state of the environment;
- Monitoring the preparation, review and approval of environmental impact assessments for local investment; reviewing by-laws on environmental management and on sector specific activities related to environment; and
- Reporting to the Director of Environment and the Director General on the implementation of the EMA.

The Environment Management Committee is responsible for functions set out under the Local Government Act. In addition, they perform functions as prescribed by the EMA and they may be assigned by the Minister to carry out directives related to the promotion and enhancement of sustainable management of the environment. The Township Environment Management Committees are responsible for:

- The proper management of the environment in respect of the area in which they are established;
- Performing duties as assigned under EMA or by the Minister or Council;
- Carrying out directives given by the Minister to promote and enhance sustainable management of the environment; and
- Performing any functions as set out under the Local Government (District) Authorities Act.

3.6.8 Ward/Mtaa (Street)/Kitongoji (Hamlet) Level

The District Council designates an Environment Management Officer for each administrative area of a township, ward, village, Kitongoji (neighborhood/hamlet) and Mtaa (street). The Environmental Management Officers are responsible for coordinating all functions and activities related to the protection of environment within their designated areas.

Table 3-1: Summary of Institutions in the EIA process with Role and Responsibility

Level	Institution	Role and Responsibility
National	Vice President's Office (Division of Environment)	• Co-ordinate Environmental Management Policy, Environment Management Act and EIA guidelines • Approves, signs and issues Environmental Certificate • Advise Government on all environmental matters • Enforces and ensures compliance with the national environmental quality standards • Provides policy direction and leadership in all matters, particularly those pertaining to hazardous waste management under the Environmental Management Act
	National Environment Management Council (NEMC)	• Project registration, approval of ToR, and review of EIA and EA • Environmental Monitoring and Compliance Auditing • Advises Government on all environmental matters
Ministry	Ministry of Industry, Trade and Investment	• Issuing policy guidance • Providing legal frameworks • Enforcement of laws and regulations • Setting operation standards for energy generation projects • Project monitoring.
	EWURA under the Ministry of Energy and Minerals	• Regulation of fuel business as well as water utilities in the country • Issuing of permits to oil companies • Monitoring of petroleum industry operation
	Ministry of Lands, Housing and Human Settlements Development	• Land use planning • Issuing of Right of Occupancy. • Valuation and compensation.
	Ministry of Health Community Development, Gender, Seniors and Children (Government Chemist Laboratory Agency - GCLA)	• Analysis of chemical content • Designated National Authorities for the Control of Industrial and Consumer Chemicals • Registration of Industrial and Consumer Chemicals • Management and control of the production, importation, transportation, storage, dealing, and disposal of chemicals
	Ministry of Water and Irrigation	• Issuing Water extraction permit • Provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring on water issues.
Institution	Occupational Safety and Health Authority (OSHA)	• General understanding and views about the project • Requirements of the project in terms of safety at the workplace • Land use in the area of vicinity in terms of safety
	Tanzania Investment Centre (TIC)	• Facilitating investment activities in the country • Overseeing investment activities

Level	Institution	Role and Responsibility
	Tanzania Port Authority	• Project implementation • Project monitoring and internal auditing
	Tanzania Shipping Agency Corporation	Tanzania Shipping Agencies Corporation (TASAC) was established under Tanzania Shipping Agencies Act Cap 415 to regulate the Maritime Transport Industry in Mainland Tanzania. It **provides role of maritime administration, regulate maritime sector and facilitate shipping business and carry out shipping agency business**.
	Fire and Rescue Force Unit	• Advising on installation of fire management system within the port • Certifying and assessing the project site and premises on fire emergencies • Extinguishing fires in their area. • Protecting life and property in the event of fires in their area. • Rescuing and protecting people in the event of a road traffic collision, and. • Rescuing and protecting people in the event of other emergencies
Region and District	Dar es Salaam City Council	• Oversee and advice on implementation of national policies at city level • Oversee enforcement of laws and regulations • Advice on implementation of development projects and activities at city level
	Temeke District Commissioner office	• Oversee and advice on implementation of national policies at District level • Oversee enforcement of laws and regulations • Advice on implementation of development projects and activities at District level
	Temeke Municipal Executive Director Office	• Chief Executive Officer for all development activities in the Municipal level
	Temeke Municipal – Environment/ Planning/ Community Development Departments etc.	• Baseline data on social and economic conditions • Extension services • Plan and coordinate activities on community-based natural resource and environment management • Enforcement of laws and regulations • Responsible for waste management within Municipal
Ward	Kurasini Ward	• Oversee general development plans for the Ward. • Provide information on local situation and extension services • Technical support & advice • Project Monitoring
	Chairman, Communities groups (Members of Mtaa Council)	• Information on local social, economic, environmental situation • View on socio-economic and cultural value of the sites • Rendering assistance and advice on the implementation of the project

Level	Institution	Role and Responsibility
		• Project Monitoring (watchdog for the environment, ensure well-being of residents and participate in project activities

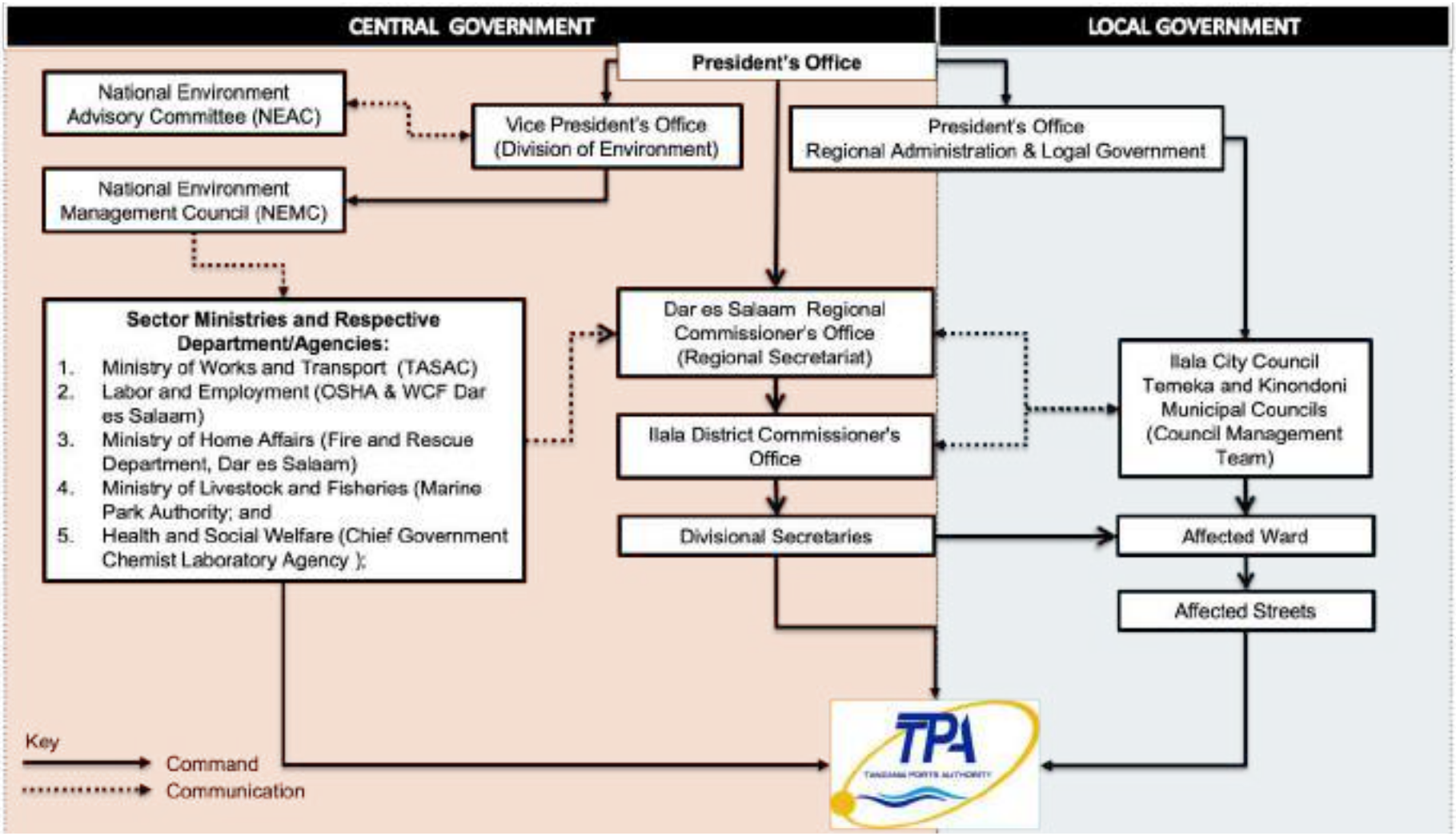


Figure 3-1: Institutional Framework

CHAPTER FOUR

4 BASELINE OR EXISTING CONDITIONS

4.1 Introduction

Under this section, the ESIA study provides baseline information on the physical environment, environmental quality, biological communities including fisheries, socio-economic profile of the area and infrastructure.

The physical information focuses on Indian Ocean where the Dar es Salaam port is located, topography and soils, climate, water resources and land use patterns. Environmental media includes water quality alongside the port, air, and noise levels while the biological communities include fish and invertebrates, macro fauna such as wildlife, birds, aquatic macrophytes (e.g., Water hyacinth) and floral communities.

The baseline information will provide for a benchmark for implementation of monitoring plans to assess the impact of the rehabilitation activities and the operational phase of the Dar es Salaam Port on the environment.

Establishing the baseline environmental conditions is essential for describing the receiving environment, the status quo and for identifying and predicting potential impacts. It is therefore important that the baseline environmental data that are collected are relevant and able to address the questions raised during the scoping phase.The process of environmental baseline investigations included the combination of some/all the following tasks:

- An appropriate combination and balance of desktop studies, field surveys, site information collection and technical consultation.
- Consideration of all available documentary records, research papers and other relevant information.
- Use of recognized survey and analysis techniques.
- Identification and provision of appropriate (preferably quantitative) descriptions of the baseline environmental conditions.
- Identification of key environmental features that may enhance, constrain, or limit the direction and rate of environmental change.
- Explanation of links, interactions, and dependencies between environmental components.
- Verification of desktop and other information by systematic field surveys.
- Acknowledgement of the implications of gaps and limitations in information and data.

4.1.1 Limitations of Baseline Data and Interpretation

The baseline presented in this chapter has been developed from a combination of 2019 reference data, 2022 surveys, the 2023 Underwater Investigations, and March 2026 pre-construction updates**,** rather than from one single survey campaign covering all themes. As a result, some datasets are used for direct footprint characterization, while others are used for trend comparison, contextual interpretation, or wider receptor screening. Some recent measurements, particularly for ambient air quality, are based on short-duration monitoring and should therefore be interpreted as screening-level pre-construction data rather than as direct long-duration compliance measurements unless the averaging period is harmonized. The marine baseline likewise combines harbour-focused datasets with broader receptor-screening information from the Underwater Investigations and wider ecology studies. In addition, the March 2026 data represent pre-construction conditions only, since no dredging or rehabilitation works had yet commenced in the present project area. These limitations do not undermine the usefulness of the baseline, but they should be recognized when interpreting the results and designing future monitoring.

4.2 Project Footprint and Zone of Influence

For clarity, this ESIA distinguishes between the **Project Footprint**, being the area directly occupied or physically disturbed by project activities, and the **Zone of Influence**, being the area outside the footprint where indirect environmental and social effects may reasonably occur. This distinction is necessary because the project does not cover all port operations in general; rather, it covers specific physical interventions associated with the deepening and strengthening of Berths 8–11 and the associated electrical upgrading works within the port. Accordingly, the baseline and impact assessment focus first on the project footprint and then on the surrounding areas that may be indirectly affected through traffic, noise, marine turbidity, navigation interactions, temporary construction facilities and related port-access activities. Figure 4-1 should therefore be read as showing the project footprint and its surrounding zone of influence, not the entire port as if all its operations formed part of the project scope.

4.2.1 Project Footprint (Directly Affected Area)

The **project footprint** is the area that will be directly occupied, excavated, dredged, constructed upon, or otherwise physically disturbed by the proposed works. For this project, the footprint comprises:

(i) the marine works area at Berths 8–11, including the berth deepening and strengthening works;
(ii) the immediate quayside and terminal surfaces where related structural works will occur;
(iii) the landside electrical work areas, including substations, cable corridors, electrical trenches, associated connection works and related infrastructure within the port estate; and
(iv) any project-specific temporary work areas established within the port, such as laydown areas, material storage areas and other approved construction support areas.

The project footprint is therefore not the whole Dar es Salaam Port and should not be interpreted as including all existing port operations, all other berths, or general port activities beyond the specific physical interventions assessed in this ESIA.

4.2.2 Zone of Influence (Indirectly Affected Area)

The **zone of influence** comprises areas outside the project footprint where indirect environmental or social effects may reasonably occur because of project implementation. For this project, the principal zone of influence includes:

(i) the immediate marine area surrounding Berths 8–11 where temporary effects such as increased turbidity, suspended sediments, vessel movement and underwater noise may occur during construction;
(ii) the nearby port access and circulation routes, including the main access points and road links used by project-related traffic and equipment movement;
(iii) surrounding port-edge and nearby community receptors, including locations potentially affected by construction traffic (kilwa road and Mandela road, noise, dust, safety risks or temporary disruption; and
(iv) any specifically approved offshore dredged-material disposal area, if such area forms part of the final assessed project configuration.

For practical ESIA purposes, the zone of influence should be understood as the area where project-related indirect effects may occur, rather than as the entire municipality, city or region. The use of a broad administrative area may be appropriate for background socioeconomic description, but not as a substitute for the project's actual environmental and social zone of influence.

Note on Broader Contextual Areas
References elsewhere in this report to municipal, national or regional areas are intended to provide context on trade, logistics, economy, transport and wider environmental setting. They do **not** redefine the project footprint or the primary zone of influence for direct and indirect impact assessment.

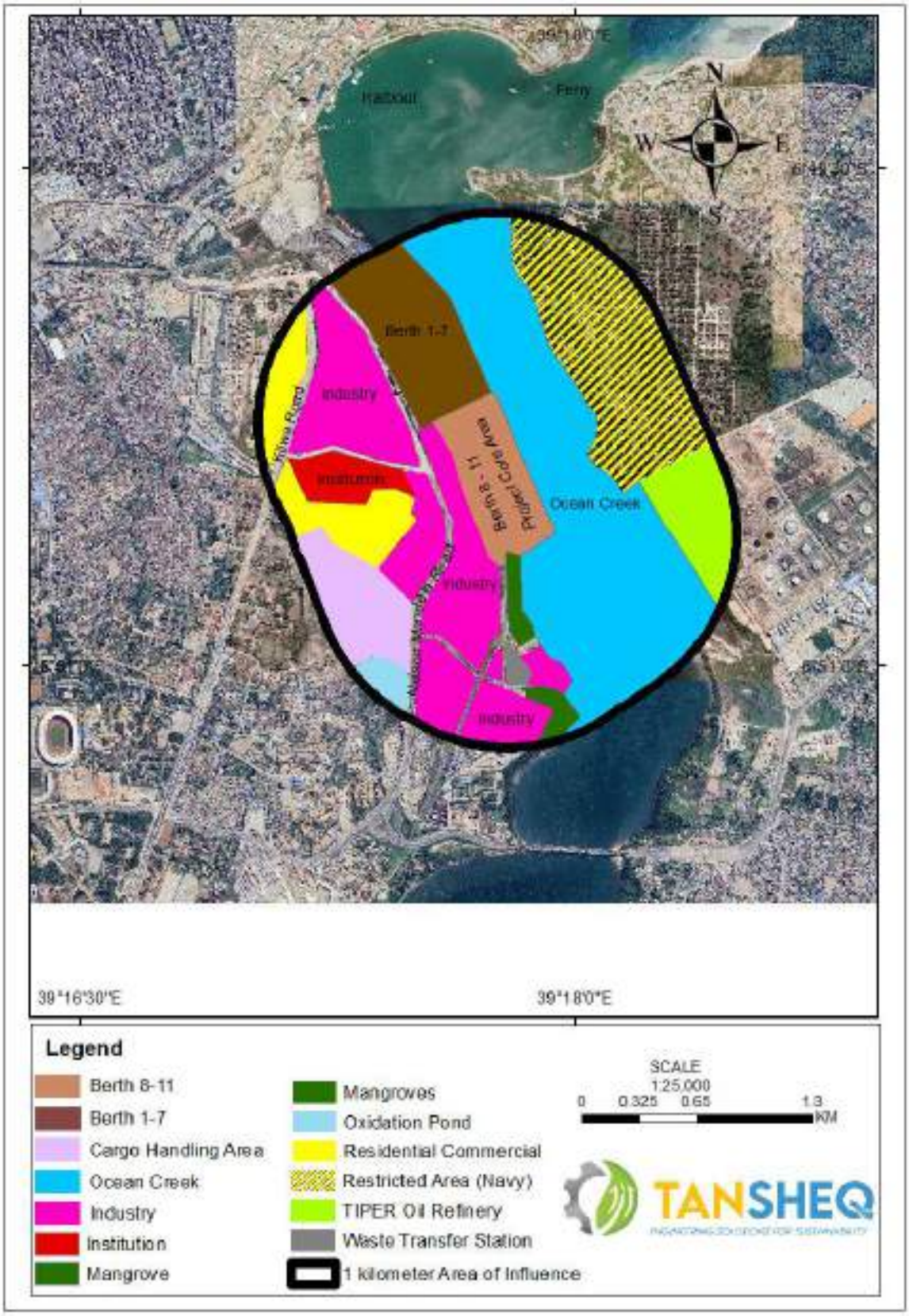


Figure 4-1: Project core area and area of influence. Sources: Tansheq, 2024.

Table 4-1: Spatial Boundaries for Baseline and Impact Assessment

Topic	Primary spatial boundary	Reason
Marine works / dredging	Project footprint at Berths 8–11 plus immediate surrounding marine zone	Direct dredging, piling, sediment disturbance and marine construction effects
Landside construction	Port-based footprint including substations, cable routes, trenches and work areas	Direct occupation and construction disturbance
Noise and dust	Footprint plus nearby port-edge and roadside receptors	Potential nuisance and health/safety interaction with surrounding receptors
Traffic and community safety	Port access roads and nearby community interfaces	Construction vehicles and port-access movement
Marine ecology and fisheries	Berths 8–11 marine area plus any credible sediment-plume / disposal influence area	Potential indirect aquatic effects
Socioeconomic receptors	Communities and businesses nearest to the port and access routes	Most likely receptors of direct and indirect project impacts

These clearly delineated impact areas provide an essential framework for targeted mitigation strategies and effective stakeholder engagement throughout project implementation.

4.3 Background of Dar es Salaam Port

Tanzania Ports Authority (TPA) was established in April 2005 replacing the former Tanzania Harbours Authority. TPA's core business is providing cargo handling operations. TPA operates a system in coasts and lakes. Costal ports include:

- Main gateway – Dar es Salaam
- Major ports – Tanga, Mtwara
- Small ports – Kilwa, Lindi, Mafia, Pangani, Bagamoyo
- Other minor ports – 10

Lake ports are at Lake Victoria – Mwanza, Bukoba, Kemondo Bay, Nansio, Musoma plus 25 minor ports, Lake Tanganyika – Kigoma, Kasanga plus 23 minor ports, Lake Nyasa – Itungi, Mbamba Bay plus 13 minor ports



Figure 4-2: Map of Dar es Salaam Port (Source: Accessed via TPA website, 2022)

Dar es salaam Main Gateway port specifically serves the hinterland of Tanzania and the neighbouring land linked countries of Malawi, Zimbabwe, Zambia, Democratic Republic of Congo, Burundi, Rwanda and Uganda.

The port is strategically placed to serve as a convenient freight linkage not only to and from East and Central Africa countries but also to middle and Far East, Europe, Australia and America. Dar es Salaam port handles about 95% of the Tanzania international trade.



Figure 4-3: Satellite Photograph of the Project Core Area (Source: Tansheq, 2022)

4.3.1 Capacity

Dar es Salaam port is the Tanzania principal port with a rated capacity of 4.1 million (dwt) dry cargo and 6.0 million (dwt) bulk liquid cargo. The Port has a total quay length of about 2,600 metres with eleven deep-water berths. Dar es Salaam port handles about 95% of the Tanzania international trade. The port serves the landlocked countries of Malawi, Zambia, Democratic Republic of Congo, Burundi, Rwanda and Uganda.

The port is strategically placed to serve as a convenient freight linkage not only to and from East and Central Africa countries but also to middle and Far East, Europe, Australia and America. Facilities available to support operations of Dar es Salaam port are:

- General cargo Berth (1-7) from break bulk, PORO and dry bulk.
- Container Terminal Berths (Berth 8-11), previously leased to Tanzania International Container Terminal services Ltd (TICTS). Now under TPA.
- Grain Terminal facility (silos with storage capacity of 30,000 tons). Inland Container Deposits (ICDs) facilities with the capacity of (14,500 TEUs) and CFs with the capacity of holding 6,000 vehicles at once).
- A 150,000 MT Single Point Mooring (SPM) – for handling refined and crude oil.
- Kurasini oil Jetty (KOJ) for handling refined products (tanker size 45,000MT for KOJ1 and 5,000 tons for KOJ2).

Generally, the intrinsic capacity of the port of Dar es salaam is to handle more than 10 million tons of cargo as follows:

- General cargo 3.1 million tons.

- Container 9,619,876 TEUs) 1.0 million tonnes; and
- Liquid bulk 6.0 million tons.

4.3.2 Port Features

With the quay length of 2,600 meters, it is divided into several features as detailed in Table 4-2.

Table 4-2: Port Features

Feature	Description
General Cargo Terminal	This is a break-bulk section of a port with a quay of 1,478 meters comprising of 7 main quays, transit sheds with 64,463.5 of total floor sq. meters and open storage of 201,613.
Container Terminal	This terminal was operated by a private company, the Tanzania International Container Terminal Services (TICTS). TICTS managed the container handling activities at berth Number 8-11. Now the container terminal is operated by TPAS after TICTS contract expired. The terminal has a total quay length of 540 meters. Back up facilities of container terminal includes the container depot located about 2 kilometres away at Kurasini (KICD) and Ubungo container Depot.
Grain Terminal	Dar es salaam Port has fully automated grain handling facility with silos with the capacity of 30,000 metric tons. Grains can be discharged and bagged along the quay at an average of more than 2000 tons in 24 hours or transferred to silo using dump trucks. The grain terminal has concrete silos, fumigation, aeration and temperature control facilities.
Oil Terminal	There are two oil terminals, the single point Mooring (SPM) and Kurasini Oil Jetty (KOJ). The SPM is an offshore tanker berth for handling exclusively crude and refined oil. It has capacity to accommodate tankers of up to 150,000 deadweight tons with fast discharge speed (flow rate of 2,500 cubic meters per hour for crude oil). SPM is connected to refineries in Dar es salaam and Ndola, Zambia through floating hoses and submarines pipes. KOJ is the tanker jetty for handling refined oil products with pumping capacity of 750 tons per hour. It can handle tankers up to 45,000 dead weights.
Storage Areas	The port provides both open and covered storage; it has silos for grains at any time of need and maintains storage yards for containers, motors vehicles and general cargo.
Marine crafts or navigation Aids	The port is served with berthing tugs, pilots' boats mooring boats and surveillance / patrol boat, water barge, and floating cranes. Moreover, there are navigation aids to facilitate movement of vessels in the port. These include buoys, beacons, leading marks and light house.
Container Handling Equipment	Port terminals operates with Panamax Ship to Shore Gantry cranes (SSGs), Rubber Tyred Gantry cranes (RTGs) and Rail Mounted Gentry Crane (RMG), Gottwalds, highway trucks, folk lift trucks, Highway trailers, Terminal tractors and Trailers.
General Cargo Handling Equipment	The major equipment for handling general cargo are portal cranes, forklifts, tractors, trailers, grabs, hoppers, Bigging units, dump trucks, weighbridges, and conveyor belts



Figure 4-4: Port Features (Artist's prospective view of Berths 1-7, RoRo and Container Terminal: CHEC, 2022)



Figure 4-5: Showing Birth 1-7 and Main Entrance Chanel (Source: Tansheq, 2022)

4.3.3 Railway Linkage

4.3.3.1 Central Line

The Central Line is currently the most important railway line in Tanzania. It runs west from Dar es Salaam port to Kigoma on the port in Lake Tanganyika via Dodoma. A branch leads to Mwanza on Lake Victoria. The railway is operated by Tanzania Railways Corporation (TRC) who has the core mandate of providing an efficient and effective rail transport service, manage and develop rail infrastructure and ensuring rail infrastructure safety and security in Tanzania Mainland.

It crosses central Tanzania completely with a length of 1,254 kilometres the railway has been unable to cope with modern levels of traffic. Only one percent of inbound cargo arriving in the Port of Dar es Salaam and destined for hinterland destinations is transported by rail.

4.3.3.2 TAZARA

Another key rail link is to undergo a major upgrade. This is the 3 ft 6 in gauge TAZARA line, which was built in the 1970s to provide land locked Zambia with an alternative outlet for its exports of copper. The 1,860 km line connects Dar es Salaam with New Kapiri Mposhi in Zambia's Central Province.

4.3.3.3 Standard Gauge Railway (under construction)

In 2017, Tanzania began the Tanzania Standard Gauge Railway project, which will construct a standard gauge (1435 mm) line parallel to the meter-gauge (1000 mm) Central Line between Dar es Salaam and Mwanza, with a new route branching northwest at Isaka to Kigali in Rwanda

A new standard gauge rail system, 2,560 km in length, is designed to improve the flow of cargo between Dar es Salaam and Rwanda, Burundi, the DRC and Uganda while also providing better and faster domestic links.

Additional freight-only rail capacity is to be constructed between the Port of Dar es Salaam and mining areas such as Liganga where Tanzania's largest iron ore reserves are held.

4.3.4 Employment

4.3.4.1 Permanent and Casual Employees and Welfare

Dar es Salaam Port has a strength for permanent staff of 3,630 staff and 122 contract staff, summing up to a total of 3,752 staff.

Additional employment opportunities exist in the cleaning and dockworkers, where an estimated 2,000 personnel are engaged, and these are recruited by labour agencies. Greater numbers of labourers are needed with loose cargo that needs to be physically handled, such as bagged goods, compared to containerised or bulk cargo.

These are casual labourers mostly, engaged through employment agencies. Conditions of employment is based on health and skills set. The daily wages meet the legal minimum wage, though benefits such as pension funds and health insurance are not provided to casual labourers.

In case of injury to workers, laws related to workers' compensations and insurance packages exclude casual labourers, and they are not entitled to any form of compensation (pension, insurance etc.).

Unless TPA has, set requirements, which need to be incorporated in contractual agreement with third parties that all workers contracted with third parties regardless of their contractual status, was entitled to medical treatment/pension funds etc.

Section 9. (1) of National Health Insurance Fund (NHIF) Act states that; each employer shall make a monthly contribution to the Fund of an equivalency of 3% of his employee's salary. This applies to workers with contracts and not casual labourers

The Act also states that any private company wanting to register its employees with the National Health Insurance Fund should consider the following:

- Minimum salary for the lowest paid employee should not be less than the minimum wage set by the Government.
- Only permanently employed workers were able to be registered. Employees on contract was registered if they have a contract lasting a period of one or more years.

Any employer registered by the National Health Insurance Fund is required to implement all rules, regulations, and laws of the National Health Insurance Fund.

4.3.4.2 Food Vendors (Mamalishe)

There are about 100-200 food vendors grouped in side streets off Bandari Road that provide mostly food services, serving 30-50 customers per day. Potential customers are the long-distance truck drivers, oil tank drivers and their assistants, of all nationalities. Countries of destinations are Rwanda, Zambia, Burundi, Democratic Republic of Congo, Malawi and Zimbabwe.

4.3.4.3 Shipping Agents

There are at least twenty agencies responsible for assisting vessels with port procedures. Notable ones for general cargo are SEAFORTH (wheat in bulk) and WOSAC (vehicles). Other shipping agents assist in with container shipping and handling valuable items. One ship can load maximum 20,000-40,000 t of wheat and has a length of 210 m. There are draft restrictions for some of the berths such as Berth 7 where draft restrictions are 10.5 m.

Therefore, most unloading of wheat is restricted to vessels using Berth 7. Berth 7 is also prioritized for container vessels because unloading/loading a container can take a maximum of two days unlike wheat in bulk, which may take seven days or more to unload. Berthing delays is one of the factors, which causes inefficiency in the Port.

4.3.5 Health Facilities

The TPA provides medical services to the employees and families. TPA has one medical facility, a health centre at Dar es Salaam Port. The Health Centre is located along Bandari Street/road at TPA Gate No. 3 nearby former NHIF Temeke Office within Dar es Salaam Port.

The centre has six sections: clinical i.e. outpatient and inpatient (observation), laboratory, theatre, reproductive children health, x-ray and special clinics (TB and leprosy, diabetic clinic, hypertensive clinic and care and treatment centre).

The facility has 44 rooms that are being used for different purposes. Information sourced from the Principal Medical Officer at the Port confirms that the facility has 12 beds for observation, consultation rooms, injection rooms, stores etc. The dispensary has a total of 50 staff, divided as follows: eight clinicians (comprising 1 medical specialist, 1 anaesthesia, 2 general practitioners, 4 clinical officers, 14

nursing, 1 senior nurse officer, 3 nurse officers, 6 nurse midwives and 4 nurse assistants). The laboratory comprises one Laboratory technician and an Assistant Laboratory Technician, while the Pharmacy includes two Pharmaceutical Technicians.

The most common diseases treated or attended to are malaria, diarrhoea, ear/eye infections, urinary tract infection, upper respiratory tract infection, HIV and trauma. The Dispensary is attending about 1,500 to 1,555 patients per month. Almost all drugs are available, including different types of antibiotics and analgesia. All drugs are being bought from suppliers through tender procedures, following Public Procurement Regulations.

As the dispensary is meant for staff and their families only, all payments are covered by TPA. As the need for referral arises, the dispensary refers patients directly to either Muhimbili National Hospital or Muhimbili Orthopaedics Institute, or if only special investigation is required e.g. CT scan or MRI then the patients are being referred to either Aga Khan or Regency Hospital. All members in the project area including residents of Kurasini Ward and public can access medical services offered at the Port.

All waste generated from the health centre is handled by the contractor who is certified for handling hazardous and non-hazardous waste. However, the operation of this centre is not a part of this study.

The health facilities described above are relevant to the proposed Berths 8–11 and associated electrical works because they provide the existing medical response framework for project workers and for any emergency affecting port users during construction and operation. During the construction phase, the Contractor shall establish on-site first aid arrangements, trained first aiders, emergency communication procedures and rapid transport arrangements for injured or ill workers. Cases requiring higher-level treatment shall be referred through the existing port medical system and, where necessary, to designated referral hospitals, including Muhimbili National Hospital, Muhimbili Orthopaedic Institute or other appropriate specialist facilities. For marine works, emergency response arrangements shall also cover incidents involving dredging crews, barge personnel and other workers operating over water, including rescue, stabilization and transfer procedures. These arrangements shall be detailed in the Contractor's Health and Safety Plan and Emergency Medical Response Procedures prior to commencement of works.

4.3.6 Water Supply

The Port requires water for different purposes mainly used for supply to the ships and tugs, fire hydrants and fire tender, equipment and machinery cleaning, domestic purposes (drinking, cooking, sanitary), cleaning of compounds, watering of gardens, construction activities etc.

The major source of water supply to the project study area is Dar es Salaam Water and Sewerage Authority (DAWASA). Some of the wards i.e., Kurasini, Vijibweni and Mtoni depend on ground water source.

The average monthly water consumption at the Port is estimated to be 23,369.1 m³. This amount is insufficient for Port activities since the estimated quantity needed for full operation is twice as much, amounting to 46,738.2 m³. The expected water demand after project implementation is estimated to be 50,000 m3 per month.

The project's water demand will arise from both construction-phase activities and operation-phase berth services**.** During construction, water will be required mainly for worker domestic use, concrete works, equipment and deck cleaning, limited dust suppression where necessary, and general construction support activities. During operation, the main project-related potable water demand will arise from ship supply at berth through the port water distribution system. According to the feasibility design basis, the potable water demand for one ship is estimated at 450 m³ per ship per day, and for two simultaneous ships the design supply rate is approximately 72 m³/h. The feasibility report also states that the project water supply will be drawn from the existing port water systems (including Berth 7 and other existing sources) and specifically recommends multiplying water sources to avoid interruption of supply.

For ESIA purposes, the project water supply strategy should therefore be understood as follows:

(i) construction-phase demand should be met primarily through the existing port supply system and, where required, supplementary tanker supply or other approved temporary sources, so that construction does not place undue pressure on surrounding community water services;
(ii) operation-phase ship-supply demand should be met through the upgraded port potable-water network designed for berth service;
(iii) rainwater harvesting and stormwater management measures should be used as supplementary resource-efficiency measures where practicable, but not as the sole supply source for core operational demand; and
(iv) the final engineering and operational planning should include a water balance and contingency arrangement for dry periods or temporary supply interruption, including source diversification, metering and demand management.

To improve clarity, the indicative project water demand and supply arrangements are summarized in Table 4-3 below.

Table 4-3: **Indicative Project Water Demand and Supply Balance**

Project Phase or Use	Indicative Demand Basis	Proposed Supply Source	Key Management Approach
Construction workforce domestic use and sanitation	To be confirmed by contractor workforce plan	Existing port water supply; supplementary tanker supply if required	Use site water management plan, metering where practicable, and avoid abstraction that affects nearby community users
Construction support uses (concrete works, cleaning, limited dust suppression)	Intermittent / activity-based demand	Existing port water system and approved temporary supply arrangements	Prioritize efficient use, avoid unnecessary water spraying, and schedule demand to reduce pressure on supply system
Ship potable water supply during operation	**450 m³/ship/day**	Existing and upgraded port potable water system	Supply through quayside network and hydrants; maintain continuity through multiple source connections
Two simultaneous ship supplies	**72 m³/h** design basis	Upgraded port potable water distribution system	Water network to be sized and managed to maintain service reliability
Supplementary non-potable / resilience support	Site-specific, opportunistic	Rainwater harvesting and managed stormwater reuse where technically appropriate	Use as supplementary measure only, not as sole source for core supply

In summary, the project should not rely on a single water source alone. The feasibility design already recognizes the need to multiply water sources to avoid interruption, and the ESIA should therefore state clearly that construction and operation water demand will be managed through the existing port supply system, upgraded berth-service water infrastructure, supplementary supply arrangements where required, and demand-management measures designed to avoid adverse effects on surrounding users.

4.3.7 Solid Waste

The Civil Engineering Department handles solid waste management at the Port. Data recorded at Pugu Kinyamwezi surface dumping site, for the random months sampled, shows that the daily average solid waste generation from the Port per was 8.9 t ((Tanzania Ports Authority, 2016).

The Operations Department is the major waste generator. Wastes from construction and demolition activities represent approximately 10 % of the total waste, but this is not transported to the city's landfill; instead, it is retained and stored for general use as back-fill for miscellaneous repairs to roads and the like.

The proposed works for the DSMGP will generate very little waste, mainly small quantities of waste concrete. Re-cycling or re-use will dictate the disposal of such metal wastes. The generation of hazardous waste is not likely, other than small quantities of oil residues, handled through the port's normal procedures.

The types of solid wastes normally generated and handled at the Port include:

- Expired waste cargo such as maize, rice, cans, food etc. These wastes are destroyed under supervision and disposed at the dumping site;
- Office wastes such as newspapers, papers, boxes, empty bottles, empty food package;
- Bulk cargo such as wheat, toxin materials, fertilizers, clinker, copper lobe;
- General wastes such as broken tarpaulins, broken pallets, irons, packing materials (e.g. Wire, ropes, boxes, empty bottles), garbage, plastic bags, grass, leftovers, garden wastes etc.;
- Medical and infectious wastes: mainly generated by the Port's health centre is managed by the private Contractor. The wastes are collected and transported to Muhimbili national hospital (MNH) for incineration. Medical waste records are non-existent; and
- Wastes brought ashore by visiting vessels and handled by private Contractors coordinated by the shipping agents engaging the vessel (though no data were found on volumes) (Tanzania Ports Authority, 2016).

The domestic and general wastes are collected from the source and temporarily stored at the transfer stations located adjacent to the Equipment Yard towards Gate No. 3 and at Kitopeni nearby KOJ (Figure 4-9). These two designated transfer stations aide collection of the solid wastes before the final disposal. From the transfer station, wastes are transported daily by using the Port's waste trucks to Pugu Kinyamwezi surface dumping site. The Port owns seven trucks and a wheel loader for waste management. Out of all trucks, only one is a compactor truck. Collection and transportation are done daily and TPA is charged 15,000TZS/tonne disposal fee at the landfill.

The Kitopeni transfer station is located away from public gathering offices and it is mainly used to store wastes for a slightly longer time when the Port's trucks have mechanical problems.

An informal waste sorting is performed at the transfer stations, not at the source, whereby recyclables such as metals and plastics are sorted; and materials such as wooden pallets are re-used for storing bagged fertilizers at the fertilizer godown. This is an effort towards reducing the amounts of wastes disposed at the landfill and an additional income-generating activity for the workers.

Further, it is common to find fertilizer and grains spillage at the fertilizer warehouse and grain terminal respectively. This is due to unloading/loading and bagging operations. Normally, the spilled fertilizer is re-collected and re-bagged by using bagging machines available at the Port.

In case of hazardous consignments, the Port has a direct delivery arrangement whereby the Port does not keep any hazardous consignment; it must be delivered to the intended client/destination immediately. The consignment's paperwork is prepared ahead of time and haulage trucks are prepared before vessel arrival. Upon docking, cargo is unloaded from vessel and loaded directly to trucks ready for transportation.

The liquid and solid wastes that comes with the ships are handled by ship agents who provide various services to the ships. Different waste dealers are commissioned by the agent to collect and dispose wastes as directed by authorities. TPA monitors the agents and conducts capacity building to the agents annually on the best industry practices for managing wastes.

Project Waste Quantities and Disposal Capacity

For the purposes of this ESIA, solid waste from the proposed works shall be managed by separating routine operational port waste from project-generated construction and demolition waste. General domestic and office-type wastes generated during project implementation shall continue to be managed through the existing port collection and disposal system. Construction and demolition wastes, including waste concrete, scrap metal, timber, packaging, cable offcuts and other inert materials, shall be estimated separately by the Contractor before works commence and shall be managed in accordance with the waste hierarchy of avoidance, reuse, recycling and controlled disposal.

Where waste is proposed for disposal at Pugu Kinyamwezi or any other approved facility, the Contractor and TPA shall confirm in advance that the receiving facility is licensed and has adequate capacity to accept the projected waste volumes from the project. Disposal shall not be based on assumption alone. Waste tracking records, including waste type, estimated volume or tonnage, transporter, destination and date of disposal, shall be maintained throughout the construction phase. Inert demolition materials suitable for reuse within the port, such as selected crushed concrete for backfilling or temporary works, shall be reused where technically appropriate and legally permissible to reduce the quantity requiring off-site disposal.

4.3.8 Liquid Waste

There are two forms of liquid waste handled at the Port: that generated through usage of supplied water, resulting in liquid waste "brown" water entering sewage connections and cesspits around the Port, and the wastewater created during deck wash and from rain "grey water" that enters deck drains and in most cases are emptied into the sea.

4.3.8.1 Brown Wastewater

Some parts of the Port are connected directly to the main sewer located along Bandari Road. These areas are civil engineering department, baggage room, marine police, harbour master, motor vehicle, Port Manager, container terminal, operation manager, Sheds no. 5, 6, 7; ex-TANESCO, TAZARA office, TPA headquarter, Kurasini Oil Jetty (KOJ) and dockyard.

The main sewer discharges wastewater directly to the sea, from septic tanks, from where the liquid waste runs off directly to the harbour without any treatment. When septic tanks are full of sludge, they are emptied by TPA own vehicle. The existing network of stormwater drains at the Port discharges wastewater to the sea as well. However, the stormwater drain located at the Central Workshop is fitted with an underground oil-water separation chamber for skimming oil from water to avoid surface and groundwater contamination. The skimmed oil is re-tanked and either re-used or stored.

The remaining areas of the Port are served by cesspits, located at the Port's Human Resource Manager Office, port supply depot, lighter quay wharf, Shed no. 5, NASACO, grain terminal, finance office, Port health centre, fire department, security department, and TPA headquarters. However, the cesspit at the TPA headquarter is connected to the main public sewer that discharges to the sea. Wastewaters from the cesspits around the Port are emptied by using trucks and disposed at Kurasini oxidation ponds located at Shimo la Udongo (. The 5-set ponds are owned and operated by DAWASA and used by both public and private institutions, commercial and residential establishments from around the city. DAWASA charges disposal fee for each truck disposing off waste at the ponds.

On average during dry season, the Port collects three to four trips of 9,000 litres of liquid waste per day; and 5 to 6 trips during rainy season mainly due to rainwater discharge. Thus, on average there are 4.5 trips/day. Average daily liquid waste generation is 4.5 x 9,000 = 40,500 litres that is being disposed at the oxidation ponds. From this existing situation the proposed project activities will trigger more liquid waste generation. Therefore, the existing waste handling system will need to be upgraded and expanded to cope with the increased waste quantities.

4.3.8.2 Storm Water Drainage and Deck Wash

Storm waters drain directly into the Port at several culvert and drain openings along the berths and within Gerezani Creek.

The Port has developed and implements a Local Marine Oil Spill Contingency Plan. The objectives include to establish prompt response to either prevent pollution or restrict the spread of contaminants", implying both on land and in the sea. The plan outlines procedures that were initiated by the TPA in the event of an oil spill within harbour limits.

The plan also ensures the existence of an appropriate system for rapid detection and reporting of spillage or other noxious substances or of incidences related to the operation of shipping that may result in a spillage.

4.3.8.3 Implementation Arrangements for Liquid Waste Management

During project implementation, liquid waste management shall be the joint responsibility of the Contractor and TPA, with day-to-day operational responsibility resting with the Contractor during mobilization and construction. Sanitary wastewater generated from temporary workforce facilities shall be collected through portable chemical toilets or other approved contained systems and shall be emptied only by a licensed service provider at a frequency sufficient to prevent overflow, odour nuisance or leakage. Wastewater from equipment washing, concrete works, oily runoff or workshop areas shall be contained, collected and disposed of in accordance with approved site procedures and shall not be discharged directly to drains, soil or harbour waters.

Prior to the start of works, the Contractor shall submit a site-specific Wastewater and Sanitation Management Procedure showing the type and number of facilities, servicing intervals, collection arrangements, disposal route, emergency response in case of spillage, and responsible personnel. Compliance shall be monitored through routine inspection by the supervising engineer and TPA environmental staff, supported by service logs and waste transfer records.

4.3.9 Energy

The Port utilizes two major sources of energy in its daily operations, TANESCO's national grid and back-up generators. From July 2014 to June 2015, the Port's electricity consumption was 5,068,371 KWH (23,648 KVA) (Tanzania Ports Authority, 2016). With increased automated delivery of bulk goods proposed, the consumption and reliability of electricity supplied to the Port will need to be increased.

4.4 Climate

4.4.1 General Weather Over Dar Es Salaam City

According to Tanzania Meteorology Agency Climatologically, Dar es Salaam experienced the monthly highest average rainfall amount of about 263.6 mm in April and the lowest amount of about 15.8 mm in July (Table 4-4).

The long-term highest monthly maximum temperature of 32.8 °C is experienced in February while the lowest maximum temperature of about 29.7 °C occurs in July. Long-term average highest monthly minimum temperature around 24.9 °C is experienced in January, while the lowest minimum value of about 19.1 °C is observed in August (Figure 4-6).

.

Table 4-4: Monthly and Annual Climatology for Dar Es Salaam City (TMA 2022)

Parameter \ Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (mm)	54.2	70.8	169.6	263.6	172.2	31.3	15.8	17.8	20.2	77.3	114.4	110.2	1117.4
Tmax (°C)	32.4	32.8	32.4	31.1	30.4	30.0	29.7	30.0	30.8	31.5	31.6	32.0	31.2
Tmin (°C)	24.9	24.6	24.0	23.2	22	20.2	19.2	19.1	19.5	20.8	22.6	24.2	22.0

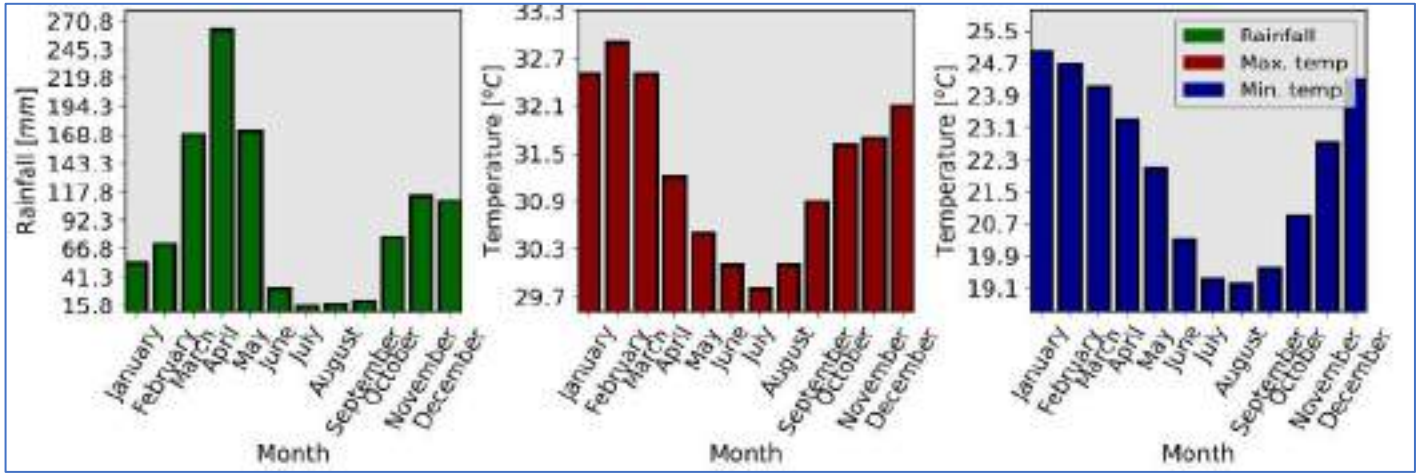


Figure 4-6: Time series and an annual cycle (bar graph) from 1991 to 2020. Whereby, rainfall is in green, maximum temperature is in dark red, and minimum temperature is in blue colour. The dotted line is the trend line, and the black line is the average line (TMA 2022)

The area experiences a bimodal rainfall regime which are March-May (MAM) season, and October-December (OND) season (Figure **4-6**).
The dominant wind direction in Dar es Salaam is southerly with the highest speed between (0.5-10.0) knot and the lowest speed is between (0.0-5.0) knot. The dominant wind direction is southerly by 10.5% frequency (Figure **4-7**)

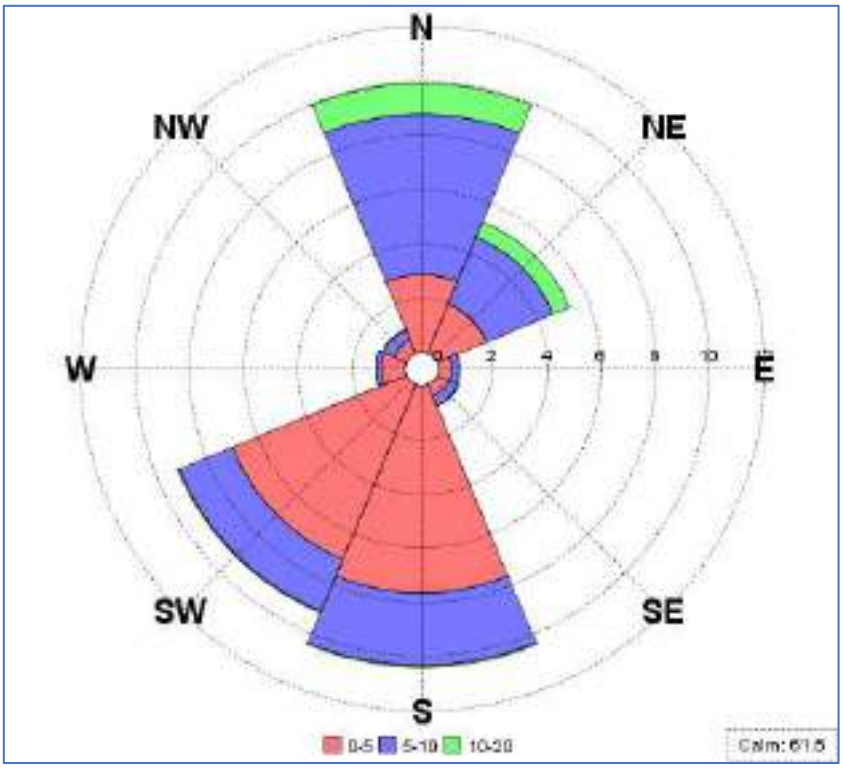


Figure 4-7: A wind rose for Dar es Salaam city covers a time interval of 30 years (1991-2020). The wind speed is illustrated in colour and the frequency of occurrence in a specific direction (TMA 2022)

4.4.2 Results for Trend Test Analysis

Annual data series of rainfall, maximum and minimum temperatures were tested by the Mann-Kendall method, at a 95% confidence level (Table 4-5) which depicts the following:

- Rainfall result depicts no trend with P-value of around 0.77753 which is greater than 0.05.
- Maximum temperature result depicts significantly increase of trend line with a P-value of around 6.9865e-06 which is less than 0.05.
- Minimum temperature result depicts significantly increase of trend line with a P-value of around 7.4905e-09 which is less than 0.05.

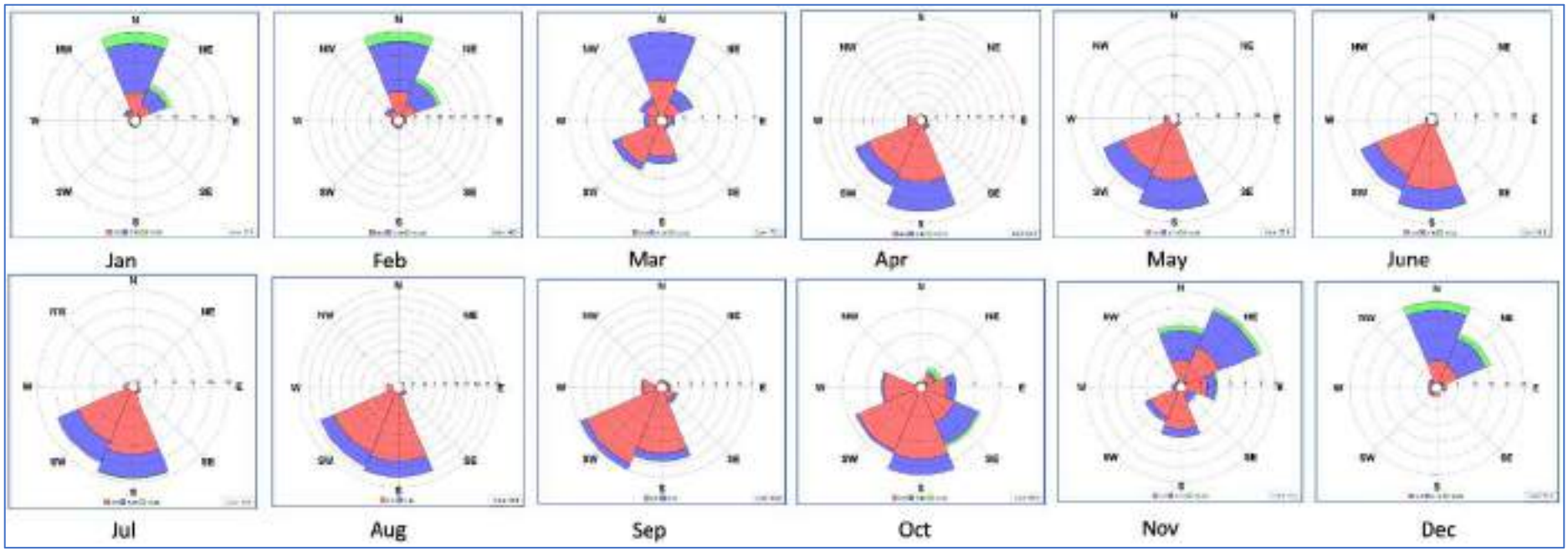


Figure 4-8: Monthly Wind Rose, 1991 – 2020 (TMA 2022)

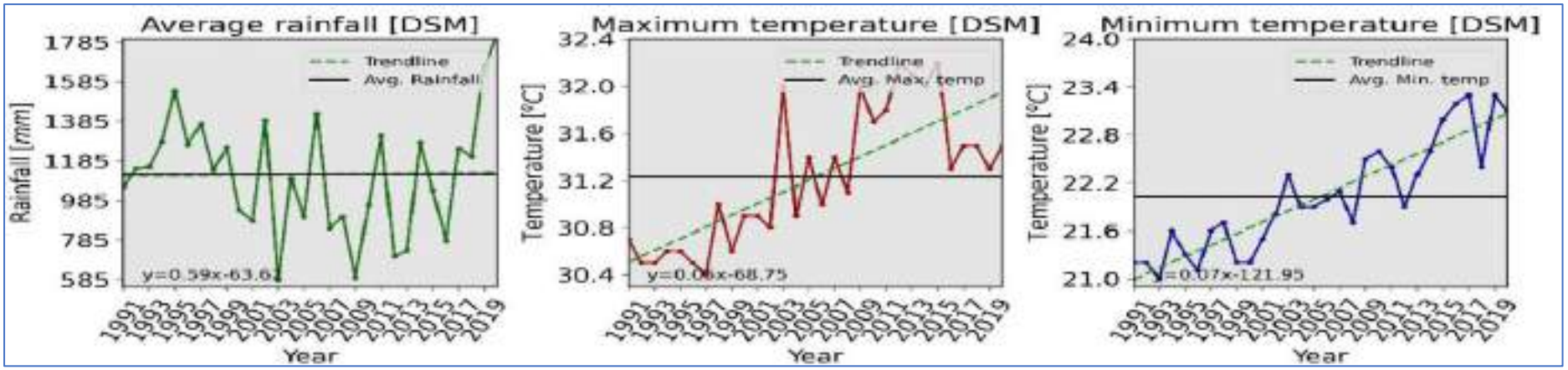


Figure 4-9: Rainfall and Max and Min Temperature Trends from 1991 to 2019 (TMA 2022)

4.5 Climate Change

4.5.1 Observed Climate Trends

Port and terminal facilities are vulnerable to the direct and indirect impacts of climate change. For example, in addition to potential changes in water levels and inundation risks resulting from alterations to coastal processes and seabed/coastal geomorphology caused by port infrastructure development, a port operation may in future be exposed to more damaging storms or a higher mean sea level than has historically been the case because of climate change, which may impact the viability of port operations (World Bank Group, 2017).

Critical port and vessel related activities (ship movement and mooring, loading and uploading, and dredging activities) and the port's supply chain infrastructure (road and rail movement, intermodal hubs) may be vulnerable to risks related to climate variability such as increased intensity of rainfall, flash floods, heatwaves, storms and storms surge, and high wind speeds (World Bank Group, 2017).

In terms of climate change, there is no significant trend increase or decrease in rainfall amount in Dar es Salaam however the only thing observed is rainfall variability (inter-annual (Figure **4-10**) Aside from that, a considerable increase in maximum and minimum temperatures has been observed with a positive z-score (Figure **4-12**).

Table 4-5 Mann Kendall Trend Test Results

No.	Variable	Trend	P-value	Z-score	Tau
1	Rainfall	No trend	0.7753	-0.2854	-0.039
2	Maximum temperature	Increasing	6.9865e-06	4.4941	0.579
3	Minimum temperature	Increasing	7.4905e-09	5.7795	0.744

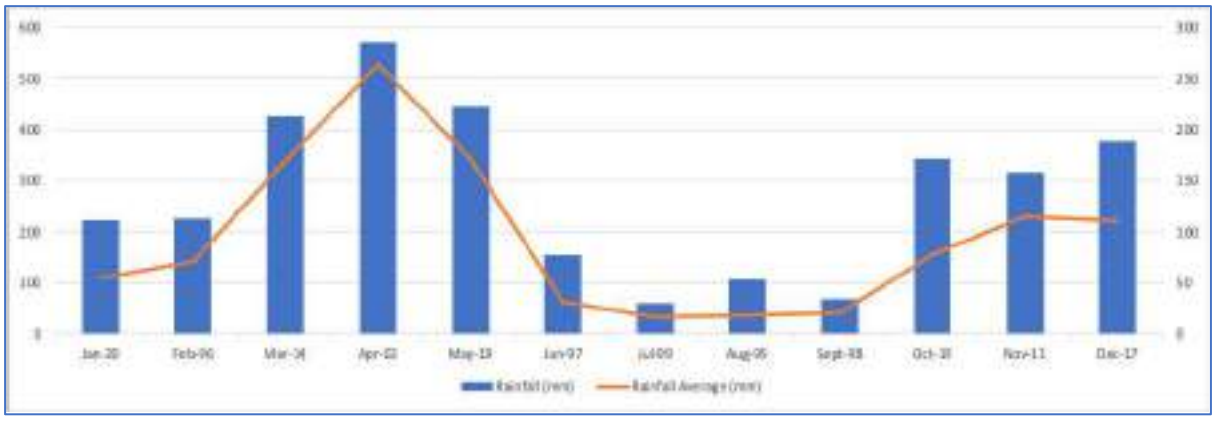


Figure 4-10: Extreme Monthly Rainfall Values vs Average (Source: TMA, 2022)

4.5.2 Water Temperature

The water temperature in Dar es Salaam (Indian Ocean) is on an annual average at about 27.40°C/81.32°F. In March, the highest water temperature is reached with a monthly average of 29.30°C/84.74°F. Whereas in July the lowest average water temperatures are expected with about

25.50°C/77.90°F. The lowest water temperatures are seen around the year around July 31 at 25.50°C/77.90°F. The average highest water temperatures are around 29.30°C | 84.74°F and are measured around March 21. The closest water of Dar es Salaam is Indian Ocean.



Figure 4-11 Extreme Monthly Maximum Temperature Values vs Average (Source: TMA, 2022)

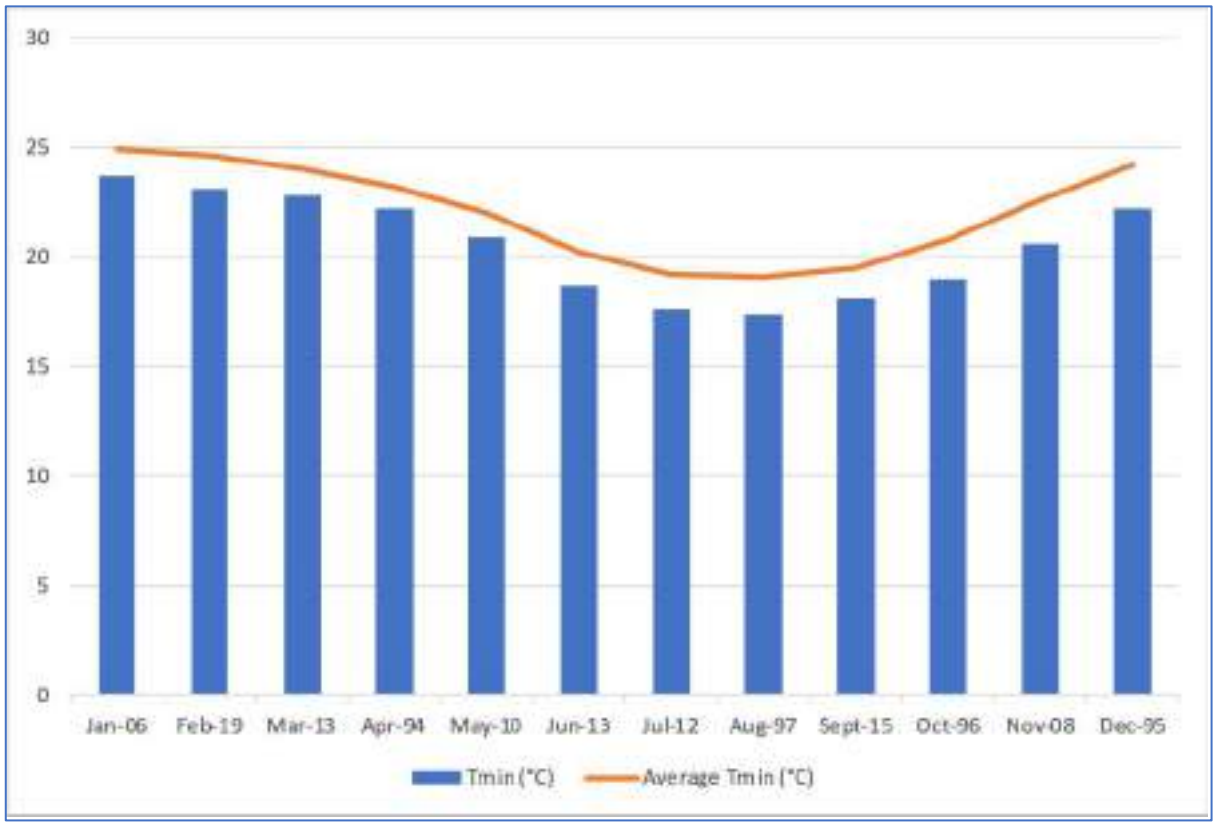


Figure 4-12: Extreme Monthly Minimum Temperature Values Against Average (Source: TMA, 2022)

4.5.3 Signs of Rising Sea Level due to Climate Change

Global Mean Sea Level is the average height of the entire ocean surface. Global mean sea level rise is caused primarily by two factors related to global warming: the added water from melting land-based ice sheets and glaciers and the expansion of seawater as it warms. Global mean sea level is an important climate indicator, providing information on how the ocean is warming and how much land ice is melting. Global sea levels have been rising for decades in response to a warming climate. The annual rate of rise – or how quickly sea level rise is happening – has also increased from 0.08 inches/year (0.20 centimeters/year) in 1993 to the current yearly rate of 0.17 inches/year (0.44 centimeters/year). Data on this increase in the rate of global sea level rise is critical to planners understanding the trajectory of future sea level rise (Willis, Hamlington, Fournier, 2023).



Figure 4-13: Erosion induced probably by increasing sea level (Source: Tansheq, 2022)

Based observation of the shoreline there are manifestation of erosion or tendency to erosion which can be attributed to climate change at various position within the vicinity of the Dar es Salaam port. Areas which recently were designed for long-term terrestrial activities are now threatened to be inundated by the rising sea level. Increase of sea levels is one of the key impacts of climate change.

Typical cases of erosions are visible at the old signal tower where surging sea has uprooted ancient trees and invading the nearby bus terminal (Figure 4-13). TPA should be aware of the above potential threat from climate changes and ensure all plans in this project take precautions to mitigate impacts from climate change.

However, TPA has Emergency Response Plan (ERP) which relates to flooding or the danger of flooding during periods of heavy rain, and more particularly when a combination of high tides and severely adverse weather conditions occur.

In this document monitoring of tide and weather conditions conducive to flood should be performed by the port hydrographer and Control Tower Duty Senior VTS Operator as detailed in appendix IV

4.6 Ambient Air Quality

Ambient air quality monitoring was carried out for assessing the existing status of background air quality in the project influence area. This was useful for constantly monitoring and assessing the conformity of the ambient air quality to the given standards even after commencement of the proposed project.

Twelve (12) sampling locations were selected within the project area for air quality, noise level and vibration level monitoring. Monitoring location details are provided in Table 4-6.

Table 4-6: Ambient Air Quality, Vibration and Noise levels Monitoring Stations

Location	Latitude	Longitude	Reason for Selection
Minazi Mikinda	-6.819652	39.306953	Topography of the project area of influence
Former Signal Tower Ferry	-6.821025	39.302673	Topography of the project area of influence and wind direction
Port-Gate 8	-6.844583	39.296349	Avoidance of construction activity or any other activity which may be temporary in nature
Berth 8	-6.836560	39.294627	Major components of the proposed project
Berth 11	-6.842555	39.297339	Major components of the proposed project
Former TICTS-Engineering Department	-6.843365	39.295003	Major components of the proposed project
Mivinjeni Primary School	-6.843990	39.293215	Avoidance of construction activity or any other activity which may be temporary in nature
Harbors Quarter	-6.840782	39.289647	Avoidance of construction activity or any other activity which may be temporary in nature
Harbors Club	-6.684745	39.288788	Avoidance of construction activity or any other activity which may be temporary in nature
North Star Medical Centre	-6.845192	39.292942	Avoidance of construction activity or any other activity which may be temporary in nature
Camel Oil/Gate 5	-6.842493	39.293782	Topography of the project influence area
Ferry Market Magogoni	-6.818933	39.3000616	Avoidance of construction activity or any other activity which may be temporary in nature and Topography of the project influence area
Dredged Disposal Site	-7.004	39.585	Area for disposal of dredged material

The sampling locations have been selected considering the following points:

- Topography of the project influence area
- Major components of the proposed project
- Wind Direction
- Avoidance of construction activity or any other activity which may be temporary in nature



Figure 4-14: Sampling Locations (Source: Tansheq, 2022)

4.6.1 Frequency and Parameters for Sampling

The ambient air quality baseline presented in this ESIA is based on the **March 2026 pre-construction monitoring campaign only**, as this campaign provides the most relevant immediate baseline for the proposed deepening and strengthening of Berths 8–11 and associated electrical works. Monitoring was undertaken at twelve receptor locations distributed across the project footprint and surrounding zone of influence, including berth-side locations, ferry-interface locations, port operational areas, roadside receptors and nearby community-facing receptors. The monitoring locations were selected with due regard to the physical setting of the project area, the major project components, prevailing wind direction, accessibility, and the need to represent the main receptors likely to be influenced by project activities.

Ambient Air Quality Monitoring was carried out for twelve locations within the project influence area for the parameters $PM_{2.5}$, PM_{10}, CO_2, CO, NO_2, SO_2, VOC, CH_4, H_2S and O_3. Samples were collected on a maximum 24-hour basis or as per the requirement of standard limit used.

The air quality with respect to PM_{10} & $PM_{2.5}$ was assessed using Aeroqual series 500 portable fixed sensor with range 0.001 – 1.000 mg/m^3 and minimum detection limit of 0.001 mg/m^3.

The factory calibration for the instrument was done before the sampling. In the EPA 2014 Air Sensor Guidebook featuring low-cost air sensors, Aeroqual's Series 500 was highlighted for our ozone, nitrogen dioxide, and carbon monoxide sensors.



Figure 4-15: Monitoring Location for Air Quality (Source: Tansheq, 2022)

For the gaseous pollutant, MultiRAE Lite wireless portable multi gas monitor was used for the parameters which include SO_2 (range - 0 to 20 ppm), NOx (range - 0 to 20 ppm), CO (range - 0 to 500 ppm) and H_2S (range - 0 to 100 ppm) with the resolution of 0.1 ppm, 0.1 ppm, 1 ppm and 0.1 ppm respectively. A factory calibration was done for the instrument before the sampling. Whenever the gas detector is switched ON, it undergoes automatic calibration by pumping in fresh air into the sensors to allow toxic sensors to be set to zero and the Oxygen sensor to be set to 20.9 %.

The particulate parameters assessed were $PM_{2.5}$ and PM_{10}. These are the most relevant indicators for construction-related dust, traffic-related particulate emissions, and receptor exposure within and around the port environment. The results are interpreted against both the Tanzania Air Quality Specification (TBS, 2021) and the WHO ambient air quality guideline values. The Tanzanian standards are used as the primary national regulatory reference, while the WHO values are used as a health-based reference point to support interpretation of receptor sensitivity.

4.6.2 Ambient Air Quality Results

Table below presents the March 2026 air quality baseline by monitoring location, expressed as 24-hour average concentrations.

Table 4-7: March 2026 Ambient Air Quality by Sampling Location as 24-Hour Average Concentrations

Sampling location	$PM_{2.5}$	PM_{10}	CO_2	CO	NO_2	SO_2	VOC	CH_4	H_2S	O_3
Minazi Mikinda	4.8	25.8	25.0	16.7	1.7	5.0	3.3	933.3	0.007	1.7
Former Signal Tower Ferry	8.0	20.3	20.0	16.7	1.7	5.0	3.3	533.3	0.007	1.7

Sampling location	$PM_{2.5}$	PM_{10}	CO_2	CO	NO_2	SO_2	VOC	CH_4	H_2S	O_3
Port-Gate 8	4.3	9.2	13.3	1333.3	1.7	35.0	3.3	400.0	0.007	1.7
Berth 8	4.0	6.8	6.7	16.7	1.7	35.0	33.3	983.3	0.007	1.7
Berth 11	3.8	6.8	9.3	16.7	9.3	61.7	60.0	1333.3	0.007	1.7
Former TICTS-Engineering Department	4.7	9.0	1.7	16.7	1.7	61.7	42.7	233.3	0.007	1.7
Mivinjeni Primary School	3.0	30.0	1.7	16.7	1.7	5.0	3.3	16.7	0.007	1.7
Harbours Quarter	3.0	9.7	1.7	16.7	1.7	35.0	103.3	2333.3	0.007	1.7
Harbours Club	1.7	6.5	1.7	16.7	1.7	35.0	103.3	3250.0	0.007	1.7
North Star Medical Centre	3.7	11.2	1.7	16.7	1.7	61.7	71.7	3500.0	0.007	1.7
Camel Oil/Gate 5	3.0	9.3	1.7	75.0	1.7	183.3	90.0	3250.0	0.033	1.7
Ferry Market Magogoni	3.3	4.5	6.0	283.3	1.7	5.0	3.3	433.3	0.007	1.7
Tanzania standard	**25**	**60**	**N.M.**	**2000**	**190**	**500**	**6000**	**N.M.**	**0.0**	**240**
WHO reference	**25**	**50**	**N.M.**	**5000**	**200**	**125**	**100**	**N.M.**	**150**	**100**

Note: The Tanzania standards and WHO reference values are those cited in the revised ESIA tables. "N.M." means no matching benchmark value for that parameter.

4.6.3 Discussion

The March 2026 ambient air data indicate that the project area and its surroundings already experience the air-quality conditions typical of an active port, ferry-interface and urban transport environment. All monitored particulate and gaseous parameters presented in Table 4-6 remain below the corresponding Tanzania and/or WHO values cited in the ESIA, with the exception that CO_2 and CH_4 are treated primarily as supporting ambient descriptors because no corresponding benchmark values are identified for them. The most important parameters for interpretation of project relevance are PM_{10} and $PM_{2.5}$, because they are the parameters most likely to respond directly to project activities such as site clearing, demolition, materials handling, truck movement, surface disturbance, and general construction dust generation.

PM_{10} is the most important coarse particulate indicator in the baseline because it reflects dust re-suspension and surface disturbance, which are particularly relevant to construction in port environments. In the March 2026 campaign, the highest 24-hour average PM_{10} concentrations occur at Mivinjeni Primary School (30.0 µg/m³), Minazi Mikinda (25.8 µg/m³) and Former Signal Tower Ferry (20.3 µg/m³). This pattern suggests that the coarse particulate baseline is influenced mainly by roadside disturbance, ferry and market activity, pedestrian movement, exposed surfaces and vehicle-generated dust, rather than by the berth line itself. The relatively lower PM_{10} values at Berth 8, Berth 11, Harbours Club and Ferry Market Magogoni indicate that the immediate berth frontage is not the principal hotspot for coarse particulate matter under pre-construction conditions. This is significant because it means that

during project implementation, any increase in PM_{10} at community-facing or traffic-facing receptors will be an important indicator of construction-related dust and vehicle disturbance requiring active management.

$PM_{2.5}$ is the most important fine particulate indicator because it is more closely associated with combustion-related emissions, traffic exhaust, fuel use, and smaller airborne particles capable of penetrating deeper into the respiratory system. In the March 2026 baseline, the highest $PM_{2.5}$ concentration occurs at Former Signal Tower Ferry (8.0 µg/m³), followed by Minazi Mikinda (4.8 µg/m³) and former TICTS-Engineering Department (4.7 µg/m³). The berth-side receptors, namely Berth 8 and Berth 11, show relatively low $PM_{2.5}$ concentrations. This indicates that under current pre-construction conditions, the finer particulate fraction is influenced more by mixed transport and operational activity around ferry and port-interface areas than by the berth-front marine works area itself. $PM_{2.5}$ is therefore a particularly important parameter for distinguishing between combustion-driven air-quality impacts and dust-driven coarse particulate impacts during the construction phase.

Taken together, PM_{10} and $PM_{2.5}$ provide the strongest and most practical basis for air-quality management under this project. PM_{10} will be the primary indicator for dust control effectiveness, especially in relation to haulage, uncovered materials, demolition debris, exposed soil and yard-surface disturbance. $PM_{2.5}$ will be the primary indicator for combustion-related effects, including emissions from trucks, generators, construction machinery and other fuel-burning equipment. These two particulate indicators should therefore be treated as the priority monitoring parameters during construction, with the March 2026 results serving as the direct pre-construction benchmark against which changes can be assessed.

The gaseous pollutants remain important as supporting diagnostic parameters**.** Carbon monoxide (CO) is a useful indicator of incomplete combustion and localized traffic or equipment exhaust influence. In the March 2026 baseline, the highest CO concentrations occur at Port-Gate 8 and Ferry Market Magogoni, suggesting that localized traffic or fuel-combustion activity contributes to baseline CO levels at those receptors. Nitrogen dioxide (NO_2) is relevant as an indicator of fuel-combustion emissions, particularly from vehicles and diesel-powered equipment. The highest NO_2 baseline value appears at Berth 11, although even there it remains well below the cited reference values. Sulphur dioxide (SO_2) is useful for indicating contributions from sulphur-bearing fuel combustion or industrial emissions. The highest SO_2 baseline occurs at Camel Oil/Gate 5, followed by Berth 11**,** former TICTS-Engineering Department and North Star Medical Centre, which suggests some influence from localized industrial or fuel-handling activities in those areas.

Volatile Organic Compounds (VOC) are important because they indicate the influence of fuel handling, evaporative emissions, solvents and industrial processes. The highest VOC concentrations are recorded at Harbours Quarter**,** Harbours Club**,** Camel Oil/Gate 5 and North Star Medical Centre, which suggests that VOCs in the baseline are shaped more by existing port-industrial and storage-related conditions than by any single receptor type. Hydrogen sulphide (H_2S) is particularly relevant from an odor and nuisance perspective and may also indicate contributions from degraded organic matter, wastewater conditions or certain fuel/storage environments. The highest H_2S value occurs at Camel Oil/Gate 5, though it remains low in absolute terms. Ozone (O_3) is included as a secondary photochemical pollutant and background air-quality indicator; in the March 2026 baseline it is uniform and low across all monitored receptors.

Carbon dioxide (CO_2) and methane (CH_4) are also useful descriptors of the ambient setting, although they are not the main regulatory focus of this section. CO_2 serves as a broad indicator of anthropogenic activity and fuel combustion, while CH_4 is more relevant as a background descriptor associated with waste, fuel systems, decomposition sources and broader atmospheric conditions. In this ESIA they should be interpreted primarily as supporting baseline parameters rather than as decisive compliance indicators, especially since no matching Tanzania or WHO benchmark values are presented for them in the ESIA table. Their inclusion nonetheless helps characterize the wider operational and urban background within which the project will be implemented.

Overall, the March 2026 ambient air baseline shows that the project area is already affected by the normal conditions of an established port and urban logistics environment, but that the most sensitive particulate hotspots are associated more with community-facing, roadside and ferry-related receptors than with the berth frontage itself. This is a useful finding for impact management, because it shows

where construction-phase dust and combustion controls will matter most. The March 2026 results therefore provide a practical and updated pre-construction baseline against which future changes in particulate and gaseous pollutant concentrations can be assessed during project implementation, with PM_{10} and $PM_{2.5}$ treated as the principal indicators of construction-related air-quality impact.

4.7 Noise Levels

Ambient noise monitoring was done to observe the ambient noise level within the vicinity of the area of influence. The aim of this noise monitoring was to record the noise level within the study area especially near the human settlement for future reference.

The monitoring was done at twelve (12) locations in on a 24-hour basis. Results of the same are given in **Table 4-6** and the monitoring locations are shown in Figure **4-14**. The major sources of noise were observed mainly from vehicles and road traffic.

4.7.1 Noise Monitoring Methodology

Ambient noise level or sound pressure levels (SPL) were measured by a portable sound level meter having built -in facilities to read noise level directly in dB (A). A-weighted equivalent continuous sound pressure level (Leq) values were computed from the values of A-weighted SPL measured with the help of noise meter. At each location, noise monitoring was conducted continuously over a period of 24 hours to obtain Leq values at regular time intervals of 1 hour

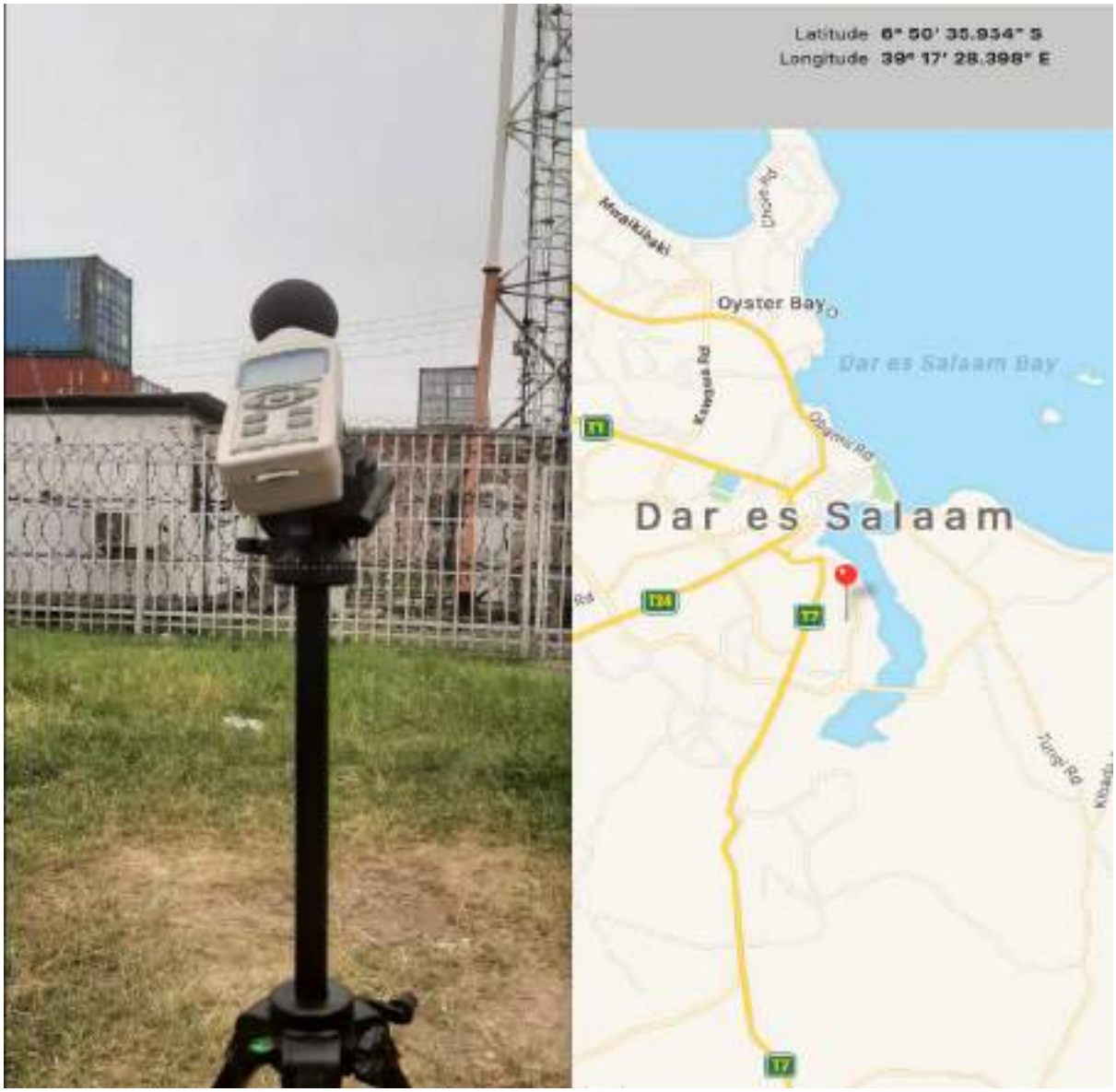


Figure 4-16: Noise Monitoring Within the Port Area (Source: Tansheq, 2022)

Daytime Leq has been computed from the hourly Leq values between **07:00–22:00**. and night-time Leq from the hourly Leq values between **22:00–07:00**. using the following formula:

$$L_{eq\,night} = 10\log\frac{1}{9}\sum_{i=1}^{9}10^{\frac{L_i}{10}} \qquad L_{eq\,day} = 10\log\frac{1}{15}\sum_{i=1}^{15}10^{\frac{L_i}{10}}$$

Where, Li = Leq value of the ith hourly time interval

For clarity, where ranges are shown in the revised Table 4-8 should be interpreted as the minimum and maximum representative Leq values used for that receptor and dataset in the revised consolidated table. To make the table easier to interpret, an average value is shown, calculated as the arithmetic mean of the minimum and maximum values. This is especially useful where the revised ESIA is comparing several noise datasets from different years as well as guidelines and standards in one consolidated baseline table.

Noise results should be interpreted primarily against the Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2011 as the applicable Tanzanian legal benchmark. The Tanzanian regulation provides receptor-specific Leq limits by land-use category, including 50 dB(A) day / 35 dB(A) night for residential areas**,** 55/45 dB(A) for mixed residential/commercial areas, and 70/60 dB(A) for industrial areas. As a supplementary good-practice and health-based reference, the World Bank Group General EHS Guidelines recommend outdoor one-hour LAeq values of 55 dB(A) day / 45 dB(A) night for residential, institutional and educational receptors, and 70/70 dB(A) for industrial/commercial receptors; they also state that project noise should not increase background noise at the nearest off-site receptor by more than 3 dB(A). WHO guidance is also relevant, especially for sensitive receptors, because it indicates that night noise outside bedrooms should ideally be kept below 40 dB Lnight, outside, with 55 dB treated as an interim upper level where the target cannot be met immediately, and that indoor classroom noise should ideally remain around 35 dB(A) for teaching and learning.

4.7.2 Noise Monitoring Results

Table below to shows the **minimum**, **maximum**, and **average** values for each dataset and receptor, together with the applicable reference values.

Table 4-8: Monitored Noise Values

Monitoring Location	June 2019 Day Leq dB(A)	Avg	June 2019 Night Leq dB(A)	Avg	Aug 2021/22 Feasibility Study Day Leq dB(A)	Avg	Aug 2021/22 Feasibility Study Night Leq dB(A)	Avg	March 2026 Day Leq dB(A)	Avg	March 2026 Night Leq dB(A)	Avg	Basis / interpretation
Minazi Mikinda Area	54–57	55.5	49–53	51.0	—	—	—	—	58–62	60.0	53–57	55.0	Community-edge receptor; likely above lower 2019 background but below core berth/ferry hotspots.
Former Signal Tower Ferry	55–58	56.5	50–55	52.5	—	—	—	—	63–67	65.0	58–63	60.5	Ferry/traffic hotspot; later datasets show ferry-related receptors remain among the noisiest.
Port-Gate 8	55–57	56.0	52–58	55.0	—	—	—	—	66–69	67.5	61–65	63.0	Gate and truck-influenced receptor; expected to remain elevated at night due to vehicle movement.
Berth 8	56–57	56.5	54–60	57.0	68.2–68.5	68.3	64.5–64.9	64.7	68–69	68.5	64–65	64.5	Best-supported core project receptor because feasibility study gives direct berth values.
Berth 11	56–57	56.5	54–60	57.0	68.2–68.5	68.3	64.5–64.9	64.7	68–69	68.5	64–65	64.5	Same direct berth-area logic as Berth 8.
Former TICTS Engineering Department	55–57	56.0	52–58	55.0	—	—	—	—	67–70	68.5	63–66	64.5	Active terminal/operations area; expected to track berth-side operational noise.
Mivinjeni Primary School	49–52	50.5	42–47	44.5	—	—	—	—	55–60	57.5	50–55	52.5	Kept lower than port-core receptors, but not as low as the reported 9.0 dB(A) outlier.
Harbours Quarter	55–58	56.5	53–60	56.5	—	—	—	—	69–71	70.0	65–67	66.0	Later ESIA identifies it as one of the higher-noise receptors.
Harbours Club	53–56	54.5	49–54	51.5	—	—	—	—	55–60	57.5	50–55	52.5	Moderately exposed receptor within wider port setting.
North Star Medical Centre	55–58	56.5	53–60	56.5	—	—	—	—	70–72	71.0	66–68	67.0	Later ESIA identifies this as one of the highest-average receptors.
Camel Oil / Gate 5	55–58	56.5	54–62	58.0	—	—	—	—	66–69	67.5	62–65	63.5	High roadside / industrial-gate receptor with likely elevated night-time noise.
Ferry Market Magogoni	56–58	57.0	55–63	59.0	—	—	—	—	71–73	72.0	67–69	68.0	Highest-noise receptor in later ESIA discussion; strongly affected by ferry, traffic and port activity.

Note: Where two values are shown as a range, the **first value represents the minimum representative Leq** and the **second value represents the maximum representative Leq** for that receptor and dataset. The **average** shown in the adjacent column is the arithmetic mean of the two values. Where a dash (—) is shown, no directly comparable dataset was carried forward into the revised consolidated table.

4.7.3 Discussion

The revised noise baseline indicates that the project area already experiences a moderate to elevated operational noise environment typical of a functioning port, ferry interface and urban logistics setting. The revised ESIA notes that the major existing sources of ambient noise are vehicles and road traffic, and the consolidated table confirms that the noisiest receptors are those associated with ferry operations, community-edge traffic exposure, and port access routes, rather than quieter internal or sheltered locations.

The use of ranges in the revised table is important because it shows that the baseline is not a single fixed number for every receptor, but a band within which the receptor has been characterized using different monitoring routines. For example, for Minazi Mikinda Area, the June 2019 night-time range of 49–53 dB(A) means that the revised table is representing the night-time baseline for that receptor as lying between a lower bound of 49 dB(A) and an upper bound of 53 dB(A), with an average of 51 dB(A). This interpretation is more transparent than showing the range alone, because it tells the reader both the spread and the central tendency of the receptor baseline. The same logic should be used across all receptors in the revised table.

When interpreted against the Tanzanian standards, the significance of a given noise level depends on the receptor category applied. Mixed-use and port-edge community receptors such as Minazi Mikinda and Former Signal Tower Ferry are likely to be compared against either the mixed residential/commercial category or the residential plus small-scale industry/commercial category, depending on the final receptor classification adopted in the ESIA. If such receptors are interpreted conservatively as community-sensitive receptors, the night-time values in the range of 49–53 dB(A) or 50–55 dB(A) indicate that the baseline is already at or above the stricter 45 dB(A) night reference used for mixed environments and above the 45 dB(A) IFC/WBG night guideline for residential, institutional and educational receptors. This confirms that some receptors are already subject to existing port- and traffic-related night-time noise pressure before any project works begin.

From a WHO health perspective, this is also important. WHO's night noise guidance indicates that 40 dB Lnight, outside should be the target for protection of public health and sleep quality, while 55 dB is only an interim target where lower levels are not achievable in the short term. This means that night-time receptor ranges already above 40 dB(A) should be treated as potentially sensitive, especially where the receptor is residential, institutional, educational, or health related. For schools, WHO also notes that indoor teaching conditions are best protected when noise is around 35 dB(A) in classrooms, which means that receptors such as Mivinjeni Primary School deserve careful interpretation and, where needed, confirmation against original field sheets or more focused follow-up monitoring.

The revised table also shows that the March 2026 Day and night values remain broadly similar in pattern to the earlier datasets, indicating continuation of the same general operational noise environment rather than project-induced change. However, the revised ESIA itself flags the value reported for Mivinjeni Primary School as unusually low and recommends checking it against the original field sheets before using it in strong comparative interpretation. That caution is appropriate and should remain in the discussion, because it demonstrates good baseline discipline and avoids overconfidence in an outlying value.

Overall, the baseline conclusion is that the project area already contains noise hotspots linked to ferry and traffic activity, while other receptors represent a more moderate but still urban-port acoustic environment. The purpose of the baseline is therefore not to suggest that the environment is quiet, but to establish the pre-construction acoustic reference condition against which future changes can be measured. During construction and operation, the key question will be whether project activities cause a material increase over this established baseline, especially at community, school, health and ferry-interface receptors. For this reason, the Tanzanian standards should remain the primary regulatory benchmark, while the IFC/WBG and WHO values should be used to support interpretation of sensitive receptors**,** night-time disturbance, and the need for mitigation where existing background conditions are already elevated.

4.8 Vibration Levels

4.8.1 Specification

Vibration measurement was done by standard method for vibration levels determination using vibration meter known as LUTRON BVB-8207SD - 4-channel vibration meter datalogger. It is certified by the ISO-9001, CE, IEC1010 with measurement range of 0.1 to 199.9mm/s (0.02 to 7.87inch/s) and the frequency range is 10Hz to 1 kHz, sensitivity relative meet ISO 2954.

The accuracy of the vibration meter is ± (5 % + 5 d) reading @ 160 Hz, 80 Hz, 23 ± 5 ℃. The meter is calibrated using electrical calibration with calibration point of 50mm/s (160Hz).

4.8.2 Methodology

On taking measurement the meter is set to millimeter per second (VEL mm/s) scale which enables to respond in velocity in the same manner as peak particle velocity (PPV).



Figure 4-17: Vibration Meter Used for the Study

4.8.3 Vibration Results

Vibration monitoring was undertaken at the same project influence area to record baseline vibration conditions for future reference. Vibration was measured using a standard method with a calibrated 4-channel vibration meter and the results are presented in terms of channel readings and average peak particle velocity in mm/s. The measured 2022 baseline values are shown in Table 4 14, while the March 2026 pre-construction baseline values are shown in Table 4 15. Since no rehabilitation or dredging works had commenced by March 2026, the 2026 values represent continuation of normal operational baseline conditions associated mainly with vehicle movement and routine loading/unloading activities.

Table 4-9: Monitored Vibration Values (Tansheq, 2022)

Monitoring Location	Vibration Levels (mm/s) Reading Value				
	CH1	CH2	CH3	CH4	Average
Minazi Mikinda Area	0.40	0.50	0.70	0.50	0.53
Former Signal Tower Ferry	0.20	0.20	0.30	0.20	0.21
Port-Gate 8	1.50	1.60	2.65	1.70	1.86
Berth 8	2.60	2.20	2.20	1.60	2.15
Berth 11	1.60	1.50	2.10	2.10	1.83
Former TICTS-Engineering Department	2.30	1.60	1.40	1.60	1.73
Mivinjeni Primary School	0.00	0.00	0.10	0.00	0.03
Harbours Quarter	0.45	0.40	0.45	0.40	0.43
Harbours Club	2.45	1.90	1.18	1.70	1.79
North Star Medical Centre	1.70	1.20	1.50	2.00	1.60
Camel Oil/Gate 5	2.20	2.20	3.70	4.30	3.10
Ferry Market Magogoni	1.40	1.50	2.10	0.80	1.45
Local: TZS [1471:2011]	5.0	5.0	5.0	5.0	5.0
International: BS ISO [4866:2010]	5.0	5.0	5.0	5.0	5.0

Table 4-10: Vibration Values for March 2026 (Pre-Construction Baseline) (Tansheq, 2026)

Monitoring Location	Vibration Levels (mm/s) Reading Value				
	CH1	CH2	CH3	CH4	Average
Minazi Mikinda Area	0.50	0.50	0.60	0.60	0.55
Former Signal Tower Ferry	0.20	0.20	0.30	0.30	0.25
Port-Gate 8	1.70	1.80	1.90	1.80	1.80
Berth 8	2.10	2.20	2.10	2.00	2.10
Berth 11	1.80	1.80	1.80	1.80	1.80
Former TICTS-Engineering Department	1.70	1.70	1.70	1.70	1.70
Mivinjeni Primary School	0.00	0.00	0.10	0.10	0.05
Harbours Quarter	0.40	0.40	0.40	0.40	0.40

Monitoring Location	Vibration Levels (mm/s) Reading Value				
	CH1	CH2	CH3	CH4	Average
Harbours Club	1.70	1.70	1.70	1.70	1.70
North Star Medical Centre	1.60	1.60	1.60	1.60	1.60
Camel Oil/Gate 5	3.00	3.00	3.10	3.10	3.05
Ferry Market Magogoni	1.40	1.40	1.40	1.40	1.40
Local: TZS [1471:2011]	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
International: BS ISO [4866:2010]	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**

4.8.4 Discussion

During the study, the average value of ambient noise was observed between 9.0 and 71.1 dB(A). The highest average noise level was recorded at Ferry Market Magogoni (71.1 dB(A)), followed by North Star Medical Centre (70.1 dB(A)), Harbours Quarter (69.3 dB(A)), Berth 8 (67.3 dB(A)) and Berth 11 (67.2 dB(A)). These values indicate that some locations are already exposed to relatively high baseline noise levels associated mainly with vehicles, road traffic, ferry activity, and port operations. The value reported for Mivinjeni Primary School (9.0 dB(A)) is unusually low compared with surrounding receptors and should therefore be checked against the original field sheets before being used in strong comparative interpretation. The March 2026 values remain broadly similar to the 2022 baseline, confirming continuation of the existing operational noise environment rather than project-induced changes.

With respect to vibration, the 2022 average values ranged from 0.03 mm/s at Mivinjeni Primary School to 3.10 mm/s at Camel Oil/Gate 5, with all results remaining below the cited local TZS [1471:2011] and BS ISO [4866:2010] value of 5 mm/s. Relatively higher baseline vibration was recorded at Camel Oil/Gate 5, Berth 8, Port-Gate 8, Berth 11, Former TICTS Engineering Department, Harbours Club, and North Star Medical Centre, indicating that normal port operations and vehicle movement already generate measurable but compliant vibration conditions in the project area. The March 2026 values remain close to the 2022 measured values and should therefore be interpreted as continuation of the same baseline operational environment.

Since no dredging or rehabilitation works had taken place by March 2026, the 2026 noise and vibration values should be interpreted as pre-construction baseline conditions only. These values therefore establish the reference framework against which future construction-phase and operation-phase changes in ambient noise and vibration should be assessed.

4.9 Marine Water Quality, Marine Sediments and Oceanographic Conditions

The marine baseline for the Berths 8–11 project should be presented as a harbour and nearshore baseline, because that is the environment directly relevant to berth deepening, strengthening works, ferry-interface interactions, and near-field sediment disturbance. The section should therefore combine marine water quality, marine sediment quality and oceanographic conditions into one coherent baseline narrative for the project footprint and immediate zone of influence, while cross-referring all disposal-site baseline material to Section 4.11.

The evidence base for this section comes from four complementary datasets:

(i) the 2019 ESIA baseline as reproduced in the Underwater Investigations report;
(ii) the 18 May 2022 harbour baseline collected at the five berth / ferry / nearshore stations;

(iii) the 2023 Underwater Investigations covering both influence and non-influence marine receptors; and
(iv) the March 2026 harbour baseline, which the ESIA correctly treats as an updated pre-construction seasonal baseline because no dredging had commenced in the present project area by that date.

4.9.1 Baseline Datasets and Scope

For clarity, the harbour / nearshore marine baseline should not be presented as if it comes from one single survey only. The section should state plainly that the 2019 ESIA baseline is the original reference case, the 2022 and March 2026 Tansheq datasets are the most relevant direct harbour baseline datasets for the present ESIA, and the 2023 Underwater Investigations report provides wider receptor-screening and trend-comparison data across harbour, channel, marine reserve and far-field receptor locations.

Table 4-11: Marine baseline datasets used in Section 4.9[2]

Dataset	Spatial focus	Main purpose in Section 4.9
2019 ESIA baseline	Marine baseline reference case	Long-term comparison baseline
18 May 2022 Tansheq harbour sampling	Berth / ferry / nearshore stations	Direct pre-project harbour baseline
2023 Underwater Investigations	Harbour, channel, marine reserve and far-field stations	Trend comparison and sensitive-receptor screening
27 March 2026 Tansheq sampling	Same harbour station network as 2022	Updated seasonal pre-construction baseline
July 2023 bathymetric / navigation appendices	Berths 8–11 and adjacent harbour waters	Harbour bathymetry, datum, tides and current context

4.9.2 Ambient Marine Water Quality

Ambient marine water quality within the harbour should be described first through the direct harbour **baseline**, then through the broader comparison datasets. The most relevant direct baseline for impact assessment is the five-station harbour network comprising Berth 8, Berth 10, Ferry Magogoni, Ferry Kigamboni and Minazi Mikinda, sampled in May 2022 and repeated in March 2026. The ESIA already explains that the March 2026 campaign falls within the Northeast monsoon period, when eddies are present and current speeds are lower, making it a useful seasonal pre-construction comparator for future dredging-phase monitoring.

The 2023 Underwater Investigations dataset should then be presented not as a replacement for the harbour baseline, but as a supplementary comparison set covering both influence and non-influence locations, including Near Berth 11, the Kigamboni–Magogoni ferry interface, the oceanward side of the approach channel**,** Makatumbe**,** Masaki, the offshore disposal point, and the southern part of Zanzibar. That distinction is important because it explains why some tables show values that are not directly comparable station by station.

[2] *2019 and 2023 ranges are taken from the Underwater Investigations comparison table; 2022 and March 2026 harbour baselines are taken from the ESIA marine baseline tables and narrative; harbour bathymetry / datum context is taken from the 2023 bathymetric survey appendix and navigation appendix.*



Figure 4-18: In-situ Analysis of Water (Source: Tansheq, 2022)[3]

Table 4-12: Consolidated Ambient Marine Water Quality Framework[4]

Parameter	Unit	2019 ESIA Baseline	2022 Harbour Baseline	2023 Underwater Study	March 2026 Harbour Baseline	Interpretation
pH	pH units	8.08–8.16	9.57–10.86	8.29–8.46	9.4–10.8	Use as baseline chemistry indicator and interpret with ORP and sediments
Conductivity	mS/cm	—	52.0–54.5	—	51.5–55.0	Salinity / mixing indicator for harbour waters

[3] A Multi parameter Benchtop Photometer measurement indicated that the waters within the study areas have a normal sea salinity that is 35 parts per thousand with a pH ranging from 9.57 to 10. 86. The surface temperatures ranged from a minimum of 27.2°C to a maximum of 30.2°C. Redox potential (eH) ranged from -174.8 to -140.8 mV. The equipment used for analysis include Hach 2100Q: Meets EPA Method 180.1 and HQ40D Digital multi meter as well as Hach DR 890 Colorimeter as shown in Figure 4-18

[4] 2019 and 2023 values below are the min–max ranges reported in the Underwater Investigations comparison table. The 2022 harbour ranges are derived from the five-station Tansheq harbour baseline table. The March 2026 ranges are the revised harbour baseline ranges reported in the ESIA. Where a parameter was not reported in a given dataset extract, it is shown as "—".

Parameter	Unit	2019 ESIA Baseline	2022 Harbour Baseline	2023 Underwater Study	March 2026 Harbour Baseline	Interpretation
ORP	mV	—	-174.8 to -140.8	—	-180 to -155	Redox-support parameter, not a stand-alone compliance limit
Dissolved Oxygen	mg/L	7–8	—	6.25–6.78	—	Ecological-condition indicator
TSS	mg/L	10–23	221.8–327.1	88.50–98.70	210–340	Main suspended-sediment and dredging-plume baseline parameter
Turbidity	NTU	2.9–6	16.7–22.1	6.55–7.65	15–25	Main cloudiness / plume control parameter
Nitrate	mg/L	<0.2	—	3.05–3.84	—	Nutrient enrichment indicator
Oil & Grease	mg/L	<0.01	—	0.001–0.002	—	Spill / oily discharge indicator
Zinc	mg/L	<0.2	—	<0.001	—	Metal trend parameter
Arsenic	mg/L	0.025	—	0.0001–0.0002	—	Metal trend parameter
Cadmium	mg/L	0.0005–0.005	—	0.0001–0.0002	—	Metal trend parameter
Chromium 6+	mg/L	0.015	—	0.0001–0.0001	—	Metal trend parameter
Mercury	mg/L	0.01	—	NIL	—	High-sensitivity metal parameter
Lead	mg/L	0.05	—	0.001–0.002	—	Metal trend parameter

The feasibility study also reports a berth-proximate sea-water comparison between 2022 and 2019 near Berth 11, showing pH of 7.84 vs 8.16, TSS of 354 mg/L vs 23 mg/L, nitrate of 14.86 mg/L vs 0.20 mg/L, and oil and grease of 0.082 mg/L vs 0.010 mg/L. This confirms that the 2019 ESIA baseline should remain explicitly visible in the report as the historical reference case, rather than being implied only indirectly.

4.9.3 Marine Sediment Quality

Marine sediment quality should be treated as part of the same harbour baseline story, because sediment disturbance is the direct pathway linking dredging to marine water quality, turbidity, redox behaviour, trace metals and potential H_2S release. The text should therefore explain that the harbour sediment baseline is used to understand the likely composition and contaminant behaviour of disturbed berth sediments, while any offshore disposal-site sediment baseline remains in Section 4.11**.**

The Underwater Investigations report provides the clearest clean comparison between Present Assessment (2023) and ESIA Report (2019) for sediment heavy metals and results was compared with Sediment Quality Assessment Guidelines (SQAG's for Florida Coastal Waters) and Tanzania Bureau of Standards (TBS). It also explains that some increases may reflect sediment perturbation from dredging, but that the reported values remain within safe limits.

Table 4-13: **Consolidated Marine Sediment Quality Comparison for Harbour Interpretation**[5]

Parameter	Unit	2019 ESIA baseline	2023 underwater study	SQGAs		TBS	Interpretation for Section 4.9
				TEL[6]	PEL[7]		
Zinc	mg/kg	0.18–0.80	NIL–10	124	271	150	Trend parameter for sediment disturbance and contamination screening
Arsenic	mg/kg	0.02–0.06	<1–<2	7.24	41.6	1	Trend parameter; confirm if elevated in dredged spoil
Cadmium	mg/kg	0.002–0.014	NIL–0.1	0.676	4.21	1	Sensitive trace metal screening parameter
Mercury	mg/kg	0.00007–0.00087	NIL–0.1	0.13	0.696	2	High-consequence metal screening parameter
Lead	mg/kg	0.03–0.24	NIL–1	30.2	112	200	Useful indicator for contaminated urban / port sediments
Copper	mg/kg	—	NIL–10	18.7	108	200	Keep as monitoring parameter even

[5] *Values below are from the Underwater Investigations sediment comparison table. The 2023 values are "Present Assessment (2023)", and the 2019 values are the reproduced ESIA baseline values*

[6]**TEL** is the Threshold Effect Level - it represents the upper limit of the range of sediment contaminant concentrations dominated by no effect data entries. It is a minimal effect range within which the concentrations of contaminants are not considered to represent significant hazards to aquatic organisms.

[7]**PEL** is the Probable Effect Level which define the lower limit of the range of contaminant concentrations that are usually associated with adverse biological effects. Within the probable effect range, concentrations of contaminants are considered to represent significant and immediate hazards to aquatic organisms.

							where historic comparator is incomplete
Chromium	mg/kg	0.042–2.98	NIL–1	52.3	160	-	Useful indicator for industrial / port sediment influence

The results presented in Table 4-13 suggest that the quality of sediment is in compliance with the national standards (Tanzania Bureau of Statistics, TBS) and international guidelines (SQAGs) for all critical parameters.

The sediment results should be interpreted conservatively. They do not prove widespread contamination of harbour sediments, but they do justify retaining sediment metals, TSS, turbidity, ORP and H_2S awareness within the construction monitoring logic. The ESIA already notes that elevated H_2S was reported during previous harbour dredging in 2022–2023, whereas such conditions were not expected to characterize the March 2026 pre-construction baseline because dredging had not yet commenced in the present project area.

4.9.4 Oceanographic Setting

The oceanography subsection should be tightened so that it refers only to the harbour/nearshore setting relevant to Berths 8–11, not to the disposal-site setting covered in Section 4.11. The core points already supported by the ESIA and the feasibility appendices are:

- the harbour experiences semi-diurnal tides;
- spring tidal range is about 3.2 m and neap tidal range about 1.2 m;
- currents near the port mouth are strongly constrained by the channel, with roughly 20 cm/s flood and 50–60 cm/s ebb velocities;
- and the Northeast monsoon period is associated with eddies and relatively lower current speeds than the Southeast monsoon.

That narrative should then be tied directly to the technical appendices. The July 2023 bathymetric survey confirms that the survey area covered Berths 8–11 and adjacent relevant areas, with bathymetry extending 250 m from the quay wall, all referenced to Chart Datum/LAT, and processed into a combined land–water surface. The navigation appendix then states that the same bathymetric basis was used for the operational / final dredged scenario, with target dredging levels of -15.50 m CD in the outer section and turning circle and -14.50 m CD in the inner section.

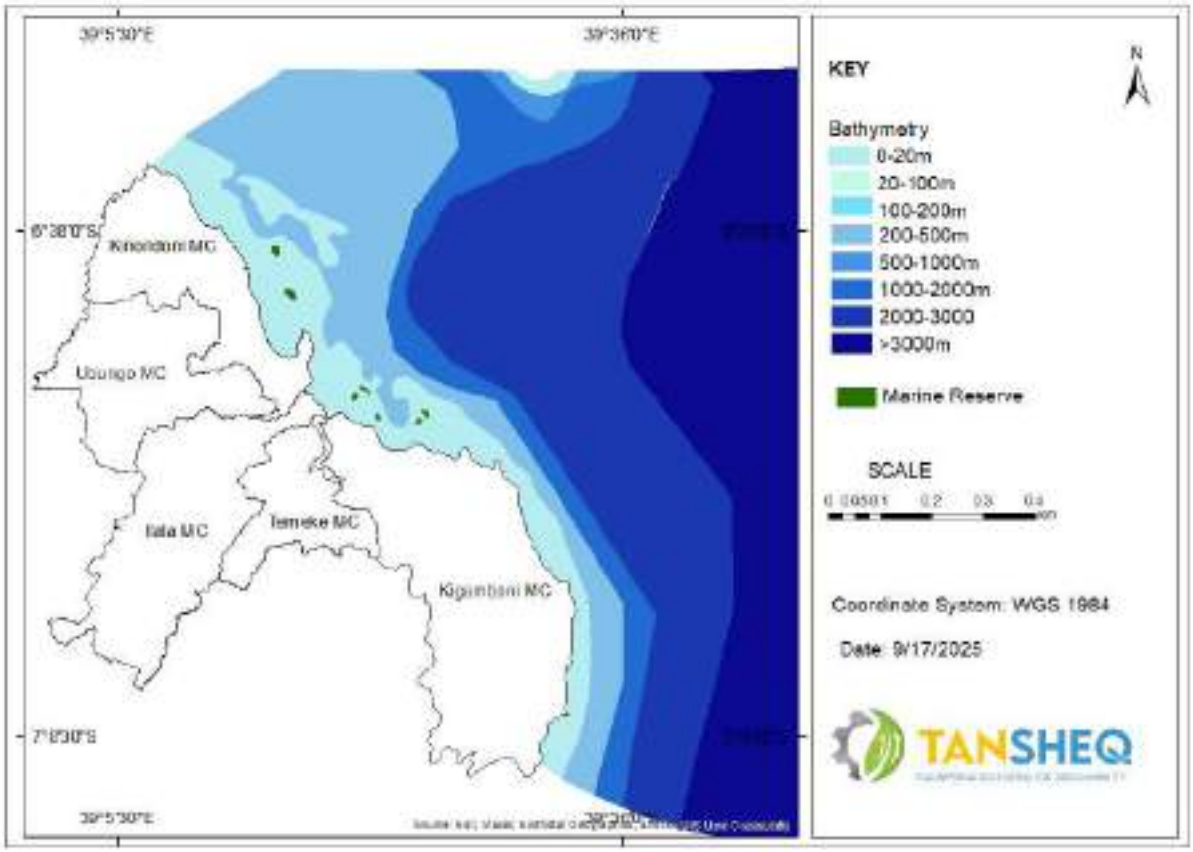


Figure 4-19: The Bathymetry of the Project Site.

Oceanographic Interpretation for the Harbour Baseline

For the purposes of this ESIA, the relevant oceanographic setting is the sheltered harbour basin, berth frontage, approach channel and ferry-interface waters around Berths 8–11. This setting is influenced by semi-diurnal tides, channel-constrained current reversals, Northeast monsoon eddies, and routine vessel movement. These conditions explain why ferry-side stations show higher suspended solids and turbidity than berth-side stations and why the March 2026 campaign is a useful seasonal pre-construction comparator. The detailed disposal-site oceanography is not repeated here and remains addressed separately in Section 4.11.

4.9.5 Standards and Interpretation Note

Ambient marine water quality in this section should be interpreted primarily as a baseline and trend-comparison framework for the harbour environment. The current ESIA correctly notes that pH, conductivity/salinity, ORP, TSS and turbidity are important marine monitoring parameters, but also notes that some commonly cited values are treated wastewater/discharge benchmarks and should not be used as direct harbour ambient standards. The section should therefore state that the applicable Tanzania receiving-water class must govern formal compliance interpretation, while the tables in Section 4.9 are used primarily for baseline characterization, trend comparison, and dredging-phase monitoring.

4.10 Marine Ecology Baseline

4.10.1 Introduction

This section presents the marine ecology baseline relevant to the Deepening and Strengthening of Berths 8–11 at Dar es Salaam Port. Its purpose is to identify the ecological receptors that may be affected by the proposed works, including dredging, berth strengthening, piling, seabed disturbance, temporary increases in turbidity and suspended solids, underwater noise, accidental spills, and increased vessel activity. The section is structured to distinguish clearly between the direct harbour works area, where project activities will take place, and the wider coastal and marine environment, where sensitive receptors may only be relevant through indirect pathways. This distinction is important because the project is a port refurbishment / partial expansion project inside an existing industrial harbour, not a greenfield coastal development extending across the wider shoreline.

The direct marine footprint is limited to the waters and seabed immediately associated with Berths 8–11, including the berth frontage, dredging prism, immediate berth-side waters, and adjacent disturbed seabed. The current ESIA already states that the seabed in the immediate marine footprint is composed mainly of silty sand with some finer sediments in depressions, that benthic organisms are present but of relatively low diversity, and that no coral reefs or seagrass beds occur directly under or adjacent to the dredging and quay improvement areas.

At the same time, the wider Dar es Salaam marine environment includes coral reefs, seagrass beds, mangroves, intertidal flats, and protected marine habitats that are ecologically much more sensitive than the berth footprint. Those habitats remain relevant to the ESIA, but only insofar as they may be exposed through credible indirect pathways, such as sediment plume transport, water-quality deterioration, marine pollution, cumulative marine traffic disturbance, or associated changes in fishing patterns. In this section they are treated as indirect or wider-area receptors, not as direct footprint habitats.

4.10.2 Methodology

The marine ecology baseline was established through a combination of field surveys, targeted marine investigations, review of earlier baseline studies, and supporting ecological literature. The ESIA cited field surveys undertaken in 2022, 2023 and 2025.

Justification of Surveyed Habitats

While the immediate port harbor (Direct Impact Area) is heavily modified and lacks sensitive habitats such as coral reefs and mangroves, the baseline intentionally extends into the Regional Influence Zone. The inclusion of these outer areas is critical for the following reasons:

- **Coral Reefs and Seagrasses:** Capital dredging at the berths and the subsequent transport and disposal of dredged materials at offshore marine deposit sites have the potential to generate significant sediment plumes. Therefore, baseline data was collected on coral reefs and seagrass beds located outside the harbor (including those near Bongoyo, Mbudya, Fungu Yasini, and Sinda Islands) to assess potential far-field risks from increased turbidity and sedimentation.
- **Mangrove Ecosystems:** Although mangrove forests are absent from the immediate berth refurbishment footprint, they are present within the broader creek and estuarine system. They were assessed to establish a baseline in the event of secondary project impacts, such as accidental fuel spills or indirect hydrological changes resulting from port channel modifications.
- **Dar es Salaam Marine Reserves:** Data regarding the Marine Reserve System is incorporated because enhanced port operations, vessel traffic, and offshore dredged material disposal could indirectly pose risks to the Reserve's ecological integrity. Characterizing these areas allows for the differentiation between project-related changes and broader natural variations in the future.

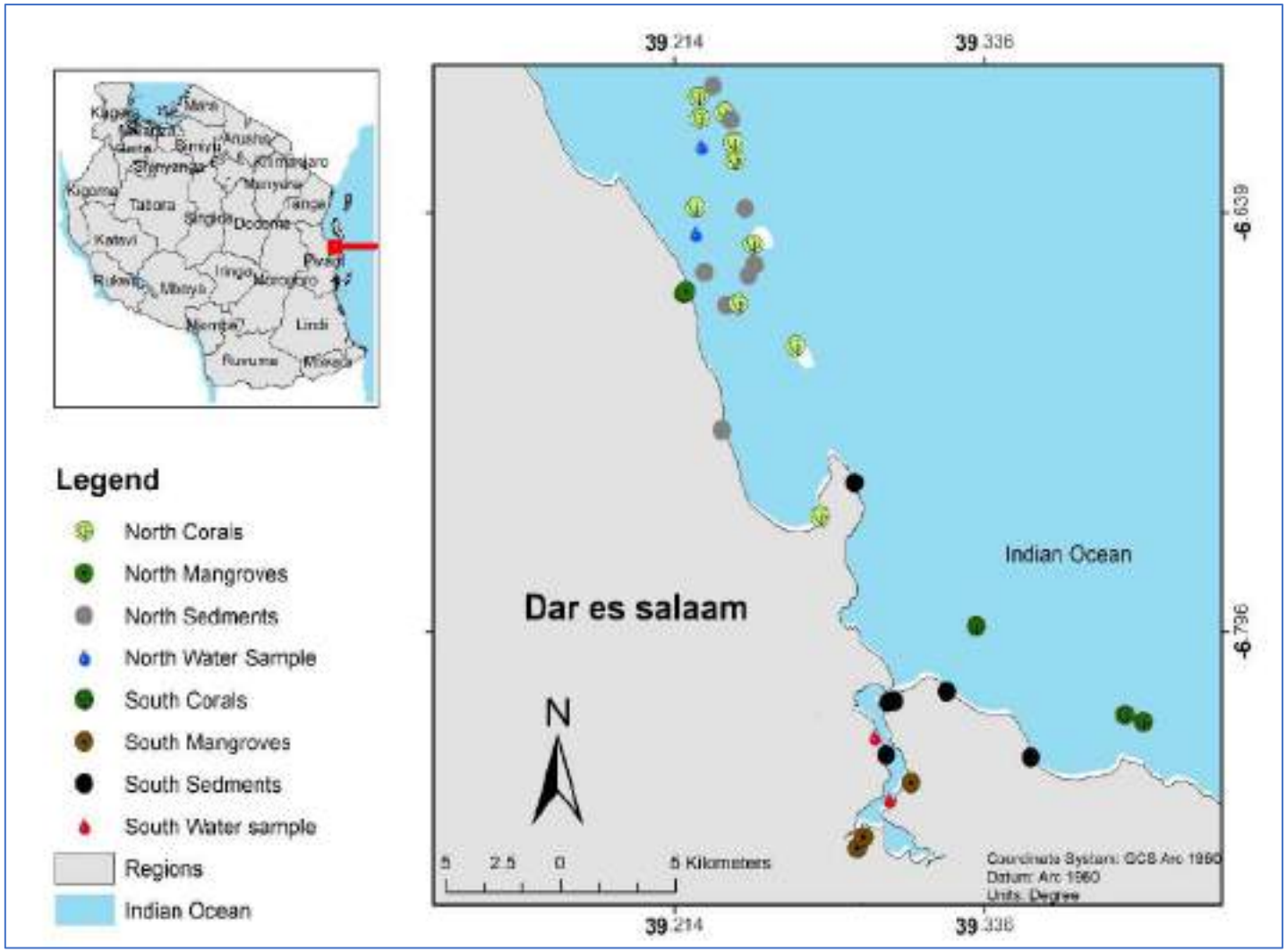


Figure 4-20: Map of Dar es Salaam Area Showing Sampling Points. (Source: Field Survey 2022)

The field programme combined several techniques. Coral reef and benthic habitat surveys were undertaken through underwater transect-based observations, using measured transects to document habitat type, benthic cover and condition at representative sites. Figure 4-31 showing transect tape setup and underwater fieldwork confirm that reef and subtidal habitat observations were organized systematically in the field. These transects were not used because reefs occur within the berth footprint, but because reefs are among the most sensitive wider-area receptors and were therefore assessed as part of indirect-impact screening.



Figure 4-21: Setting up a tape for coral reef study (a, b) preparing the transect setup, (b, c) data collection

For fish community surveys, the methodology used Underwater Visual Census (UVC) techniques. In the broader marine ecology methods material, divers swam along subtidal transects and recorded fish observed within a fixed belt width, usually aligned with the same 50 m transect line used for benthic habitat observation. Supplementary stationary point counts were also used in some cases to improve detection of schooling or wide-ranging fish, and for pelagic or channel environments the methods could be supplemented by snorkeling observations or remote video approaches, including baited camera systems where appropriate. This combination improves species detection because it captures fish with different behaviours and habitat use patterns.



Figure 4-22: Fish Observation at Sinda Island (Source: Tansheq, 2022)

For plankton sampling, the field programme used plankton net tows, as shown in the existing ESIA figures. This method was used to characterize the water-column biological community and to support the broader interpretation of marine productivity and trophic condition. Although plankton data are not the main basis for impact assessment in a berth-refurbishment ESIA, they are useful in describing the general ecological productivity of the marine environment and in strengthening the baseline record.



Figure 4-23: Towing a Plankton Net (Source: Tansheq Field Survey 2022)

The 2023 Underwater Investigations added a more targeted marine field programme that is especially important for strengthening the baseline. That work included marine water-quality assessment at approximately seven stations, categorized as onshore and offshore points, using both in-situ measurements and laboratory analysis. In-situ measurements were undertaken with a portable Horiba multiparameter water-quality checker three times a day to capture different tidal and current conditions, while water samples were collected in one-litre clear plastic bottles and sent to the University of Dar es Salaam laboratory for analysis of pH, conductivity, salinity, turbidity, temperature, dissolved oxygen, nitrate, TSS, oil and grease, and heavy metals. The same study also included marine sediment sampling using a 5 kg open-jaw steel grab sampler, with samples transferred to labelled bags, stored in a cooler box, and sent to the University of Dar es Salaam for chemical analysis. These methods are important for marine ecology because they provide direct evidence on water quality, sediment quality, and potential contaminant pathways affecting benthic habitats and marine fauna.

For intertidal macro-benthic organisms, the Underwater Investigations report gives additional useful methodological detail. Surveys were undertaken in intertidal areas around Ocean Road, Kigamboni, Makatumbe Island, Mjimwema and Kendwa Island. These surveys were carried out during low spring tide, when large areas of shoreline were exposed. Transects spaced about 20 m apart were laid from the upper to lower littoral zone, and observers walked along each transect while examining a belt approximately 10 m wide in total, recording visible seagrasses, seaweeds, macro-invertebrates and the degree of silt cover. Geo-referenced photographs were taken, and taxa were identified using field guides. This method is useful because it documents visible habitat condition over broad intertidal gradients, including sediment accumulation and habitat stress that may not be apparent from underwater point surveys alone.

For underwater coral and seagrass surveys, the same report states that two divers with a camera surveyed sites suspected to contain coral habitats, including around Makatumbe and Kendwa Islands**,** offshore east of Masaki. The purpose of these surveys was to document the presence and condition of coral reefs and seagrass beds at sites considered potentially sensitive to sedimentation, turbidity or other indirect effects. This is an appropriate role for these surveys in the present ESIA, because it

supports indirect receptor screening without implying that those habitats are part of the Berths 8–11 footprint.

Where benthic macrofauna sampling was undertaken in the broader study material, triplicate grab samples were taken to account for patchiness in organism distribution. Samples were washed through a 1.0 mm mesh sieve, and retained material was preserved in 10% buffered formalin with Rose Bengal stain for sorting and later identification. Notes on sediment type, colour, odour, grain size and the presence of oil or hydrogen sulphide smell were also recorded. This level of field and sample processing detail is useful in the ESIA because it demonstrates that the ecological baseline was not limited to broad visual observation only but also included methods capable of detecting benthic condition and sediment stress.

In addition to ecological and physicochemical field surveys, the broader marine investigations also included stakeholder consultations with fishers, marine transport operators, tour guides, community leaders and officials in Dar es Salaam and southern Zanzibar. These consultations were used to collect local observations on turbidity, fish catches, navigation safety and ecological change. Although such consultations are not a substitute for field measurements, they provide useful contextual information on marine-resource use and perceived ecological change and therefore strengthen interpretation of receptor sensitivity.

Overall, the field methodology should therefore be understood as a layered, habitat-based and receptor-based baseline approach. The direct harbour baseline relied on berth and nearshore observations relevant to the project footprint, while the broader programme used reef, intertidal, creek, and wider marine receptor sites to screen indirect effects and cumulative ecological risk.

4.10.3 Direct Marine Ecological Baseline in the Harbour Works Area

The direct marine ecological baseline for Berths 8–11 is that of a modified harbour ecosystem. The project footprint lies entirely within the existing Dar es Salaam Port harbour basin, which the ESIA describes as a long-established industrial setting. The seabed around the container berths consists mainly of silty sand with finer sediments in depressions, and benthic organisms are present, but their communities are relatively low in diversity and composed of species adapted to routine disturbance. This is the fundamental ecological character of the direct project area and should remain the primary baseline description for impact assessment.

The ESIA states explicitly that there are no coral reefs or seagrass beds directly under or adjacent to the dredging and quay improvement areas. This is a critical finding because it means that the main direct ecological effects of the project are not expected to involve direct reef breakage, seagrass removal or mangrove clearance within the footprint. Rather, the direct ecological receptors are the harbour water column**,** disturbed seabed**,** port-adapted benthic communities, and mobile fish and invertebrate communities using the harbour and ferry/channel environment.

The direct harbour ecosystem should therefore be described as moderately biodiverse but operationally disturbed. The ESIA notes that biodiversity in the immediate marine footprint is influenced strongly by long-standing port activity. In practical terms, this means that the harbour already supports communities tolerant of variable water quality, routine vessel movement, historical dredging and industrial disturbance. Fish populations inside the port are described as modest, and the Executive Summary also states that no critical spawning or breeding grounds were identified within the project footprint. This is an important baseline point because it indicates that the principal direct ecological risk of the project is likely to be temporary disturbance and stress, rather than loss of known critical breeding habitat in the immediate footprint.

The most relevant direct baseline concerns are therefore:

- temporary increases in turbidity and suspended solids,
- disturbance of harbour-bottom sediments and benthic fauna,
- short-term deterioration of water quality if dredging is poorly controlled,
- temporary displacement of mobile fish and invertebrates, and
- accidental pollution associated with fuel, oil or construction materials.

4.10.4 Wider Marine Ecological Baseline: Intertidal and Subtidal Habitats

Outside the direct harbour footprint, the Dar es Salaam coastal system includes a much wider and more diverse set of habitats. The broader ESIA baseline and associated ecology material describe intertidal flats, creek-edge wetlands, mangrove patches, seagrass meadows, and coral reefs in the wider bay and island system. These habitats are ecologically more sensitive than the berth footprint and are relevant because they represent indirect receptors if sedimentation, turbidity, marine pollution or increased vessel disturbance extend beyond the harbour.

The intertidal environment is particularly important in the wider Dar es Salaam coastal setting. The existing marine ecology text describes sandy beaches, rocky shores and mudflats supporting distinct biological communities. It notes that some of the most ecologically significant intertidal flats occur in sheltered creek environments, such as the Msimbazi/Gerezani estuary, where mixed sand and mud flats support birds and benthic organisms and connect landward mangroves with adjacent shallow-water habitats. Similar muddy intertidal settings are noted in southern creek systems. These habitats are productive because they support nutrient cycling, benthic invertebrates, shorebird foraging and ecological links between mangroves, seagrass and subtidal waters.



Figure 4-24: Tidal Flats and Salt Pans (Jangwani Mangrove Area) In Dar Es Salaam at Low Tide, Providing Habitat for Crustaceans and Feeding Grounds for Waterbirds

The 2023 Underwater Investigations provide useful field-based detail on actual wider-area habitat condition. The rocky shore around Makatumbe Island was reported to have relatively high algal cover, particularly green algae such as *Ulva spp., Codium sp.* and *Halimeda sp*., together with brown algae including *Sargassum spp., Turbinaria sp.* and *Padina spp***.** The intertidal zone between Mjimwema and Kendwa Island was reported to have the highest diversity of marine plant life among the surveyed intertidal sites, including seagrasses such as *Thalassia hemprichii***,** *Cymodocea spp., Thalassodendron sp.* and *Halophila ovalis*, together with sparse seaweeds. The Ocean Road shore had washed up Ulva and other seaweed species. These observations are valuable baseline findings because they show that habitat condition and diversity vary considerably across the wider receptor environment.

For the present ESIA, the key point is not that these habitats lie inside the project footprint — they do not — but that they provide a real ecological receptor gradient from disturbed harbour conditions to more natural coastal habitats. That gradient is important when screening the possible reach of indirect impacts. If dredging-related sediments, water-quality deterioration or other marine disturbances were

to extend beyond the berth area, these intertidal habitats would be among the first wider receptor types likely to show change.

4.10.5 Wider Marine Ecological Baseline: Coral Reefs, Seagrass and Mangroves

The broader marine ecology baseline also describes ecologically important coral reefs, seagrass meadows and mangrove stands around Dar es Salaam and nearby islands. It was noted that the wider marine ecosystem as containing diverse coral reefs**,** extensive seagrass meadows with up to 12 species**,** and fragmented yet vital mangrove stands covering tens of hectares, together with productive intertidal flats and associated fauna. These statements are useful as wider baseline context and they should remain, but the chapter must now be explicit that these habitats are regional or indirect receptors, not direct Berths 8–11 footprint habitats.

The reef baseline is particularly important because it is one of the most sensitive elements of the wider coastal ecosystem. The current ESIA text states that live coral cover averages about 54%, with signs of recovery in protected areas, and that the wider system still retains considerable ecological value despite historical disturbance. The Underwater Investigations report adds further qualitative detail: the area east of Masaki was found to have relatively few corals, mostly massive corals forming crevices used by octopus, while the areas around Makatumbe and Kendwa Islands support both massive and branching corals, though many show scars from past bleaching events.

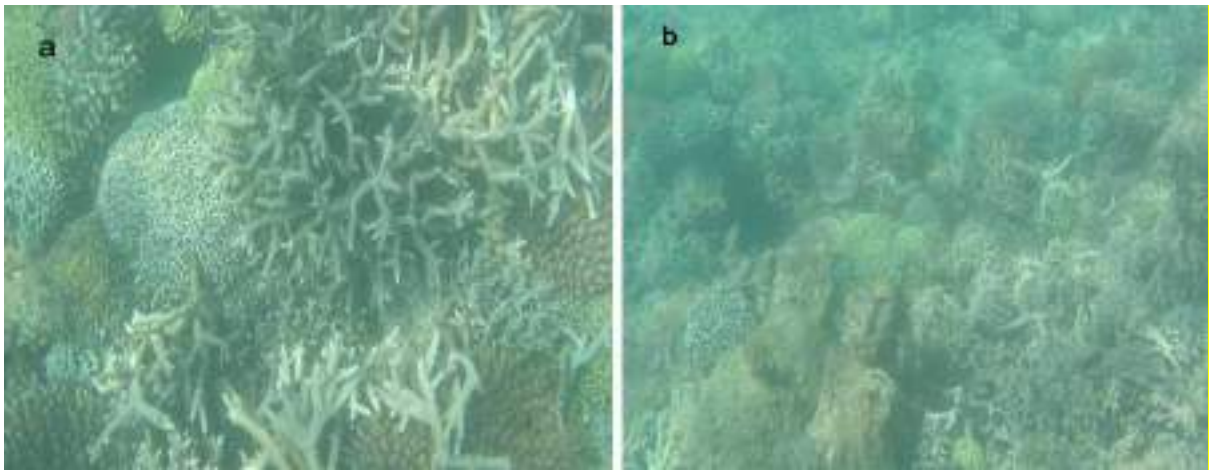


Figure 4-25: Some of coral species observed during this assessment; (a.) A mixture of Acropora sp and Porites sp; (b) a mosaic of other coral species on the southwestern side of the Mbudya Island

It should be noted that the reefs are clearly not part of the berth footprint, but they are real and ecologically significant features of the wider receptor environment. They are relevant to the project because they are particularly sensitive to sedimentation, reduced water clarity, and pollutant loading.

The seagrass baseline is equally important. The wider coastal environment contains extensive seagrass meadows, including up to 12 species, though Dar es Salaam's share of national seagrass cover is relatively small. The Underwater Investigations observations at Mjimwema–Kendwa and other intertidal/subtidal sites confirm the presence of species such as *Thalassia hemprichii, Cymodocea spp., Thalassodendron sp. and Halophila ovalis*. Seagrass beds are ecologically significant because they support juvenile fish and invertebrates, trap sediments, stabilize the seabed and help maintain water clarity. In the context of this project, however, they should be described as wider-area receptors outside the direct berth footprint.

Wider Dar es Salaam coastal systems include mangrove stands covering tens of hectares, and that these habitats are important for nursery functions and shoreline protection. The reef/mangrove distribution mapping is useful because it shows these habitats spatially. However, mangroves are not part of the direct berth works area. They are relevant only as broader coastal context and as indirect

receptors, especially where sediment-laden runoff, spills or wider shoreline disturbance could affect creek systems.

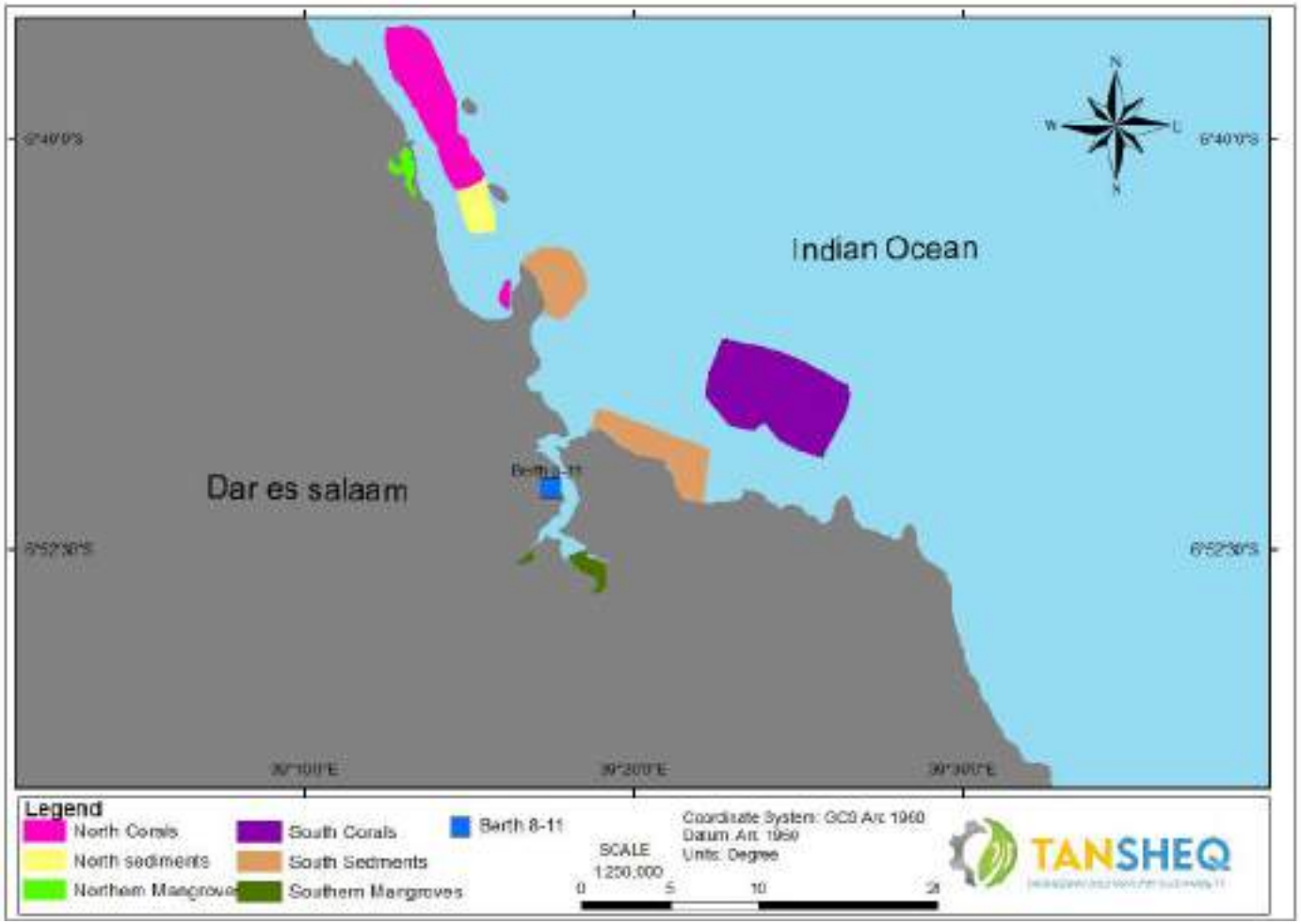


Figure 4-26: Showing Location of Mangroves and Coral Reefs (Source: Tansheq, 2022)



Figure 4-27: Mangrove Forest in A Dar Es Salaam Creek – Note the Dense Green Canopy of Avicennia Marina and Protruding Aerial Roots Along the Water's Edge. These Habitats Will Need to Be Carefully Considered During Port Development, As Even Indirect Impacts (Like Changes in Tidal Flow or Increased Sedimentation) Could Affect Them

4.10.6 Biological Communities, Species and Ecological Condition

The biological communities relevant to the proposed project occur at two distinct ecological levels. The first is the direct project footprint at Berths 8–11, which is located within the existing and highly modified Dar es Salaam Port harbour basin. The second is the wider marine area comprising the harbour entrance, coastal intertidal and subtidal habitats, offshore islands, coral reefs, seagrass beds, mangrove creeks and marine protected areas around Dar es Salaam.

The distinction between the direct project footprint and the wider marine receptor area is important because species recorded during the different surveys were not all recorded at Berths 8–11. Some were observed within the harbour and entrance-channel environment, while others were recorded at wider coastal sites including Ocean Road, Kigamboni, Mjimwema, Makatumbe Island, Kendwa Island, Fungu Yasini, Mbudya Island, Bongoyo Island and Sinda Island.

The consolidated species information presented in this section is based on the 2021 Marine Ecology Survey for Berths 8–11, the 2023 underwater and intertidal investigations, the 2016 ESIA for the improvement of Berths 1–7 and the current ESIA baseline. Species names have been standardised where the intended taxon could be reliably determined. Records that were identified only to genus or higher taxonomic level have been retained as *sp.* or *spp.* The complete source-by-source species inventory, including survey location, habitat and record type, is provided in Appendix VIII.

4.10.6.1 Species and Communities within the Direct Harbour Works Area

The direct marine works area at Berths 8–11 is a modified industrial harbour environment that has been subjected to long-term vessel movement, cargo handling, maintenance dredging, quay construction, accidental discharges, urban runoff and other port-related disturbances. The seabed around the berths is mainly composed of silty sand, fine sediments and locally exposed harder substrate. Its ecological communities are therefore expected to be dominated by organisms that can tolerate disturbed seabed conditions, variable water quality and repeated physical disturbance.

No coral reef, seagrass meadow or mangrove stand was recorded within or immediately adjacent to the proposed dredging, piling and berth-strengthening footprint. The project will consequently not cause the direct clearance of coral reefs, seagrass beds or mangrove vegetation. The direct ecological receptors consist mainly of the harbour water column, plankton, disturbed seabed communities, mobile fish and invertebrates temporarily using the harbour, and any opportunistically occurring marine fauna.

The 2023 underwater investigation included sediment and marine environmental sampling at Berth 11 and other harbour and approach-channel stations. Sieving of the collected sediment samples did not recover macrobenthic fauna. The investigation attributed this result to the presence of hard coralline or rocky bottom at the sampled locations following earlier dredging. This finding indicates low recoverable macrobenthic abundance at the sampled stations, although it does not mean that the harbour seabed is entirely devoid of biological life. Microbenthic organisms, burrowing fauna occurring in unsampled sediment patches and mobile organisms may still occur within the wider berth environment.

Plankton was recorded within the project-area waters during the 2021 marine ecological survey. The phytoplankton community was dominated by diatoms, with cyanobacteria and dinoflagellates also present. Recorded taxa included *Strombidium* sp., *Gyrodinium* sp., *Trichodesmium* spp., *Chaetoceros* spp., *Thalassiothrix* spp., *Bacteriastrum* spp., *Rhizosolenia* spp., *Pseudo-nitzschia* spp. and *Leptocylindrus* spp. The zooplankton community was dominated by copepods, including *Acrocalanus gibber*, *Eucalanus* spp., *Temora stylifera*, *Temora turbida*, *Centropages furcatus*, *Acartia* spp., *Microsetella* spp., *Macrosetella* spp. and *Euterpina* spp., together with appendicularians. These organisms form part of the pelagic food web and support fish and other marine fauna using the harbour and adjoining waters.

Fish within the direct port environment are expected to be mobile and to move between the harbour, entrance channel and wider coastal habitats. The available surveys did not identify the berth area as a critical fish spawning, nursery or breeding habitat. Reef-associated fish recorded at offshore and island survey locations should therefore not be described as species occurring directly at Berths 8–11 unless supported by a berth-specific observation.

The 2021 survey and consultation with the Marine Parks and Reserves Unit and coastal communities did not record sea turtles in the harbour reefs or waters. A historical sighting of a common bottlenose dolphin, *Tursiops truncatus*, was reported north of Sinda Island approximately seven years before the 2021 survey. This was a wider-area historical report and not a direct observation within the berth works area. Marine mammals and turtles are consequently considered occasional or potential wider-area receptors rather than resident species within the direct project footprint.

The earlier 2016 ESIA also reported that screening of the port improvement area did not identify rare, threatened or endangered species endemic to the immediate project location. The combined available evidence therefore indicates that no threatened or endangered species was confirmed within the direct Berths 8–11 footprint. This conclusion is limited to the available survey periods and does not exclude the occasional passage of mobile species through the harbour.

The ecological sensitivity of the direct footprint is therefore considered lower than that of the wider coral reef, seagrass and mangrove environments. However, the direct harbour environment still supports aquatic life and provides a pathway through which suspended sediments, contaminants, noise or accidental pollution could be transported towards more sensitive receptors. The direct ecological

baseline consequently requires effective dredging controls, water-quality monitoring, spill prevention and recording of any sensitive fauna observed during construction.

4.10.6.2 Species Recorded in the Harbour Entrance and Wider Coastal Area

The wider marine ecological survey area contains substantially more diverse habitats and biological communities than the direct berth footprint. The 2021 survey assessed coral reefs, fish, reef invertebrates, plankton, seagrasses, seaweeds, mangroves, birds, reptiles and marine mammals at northern and southern survey locations situated along or near the route of entry to Dar es Salaam Port. The methods included visual coral and fish transects, benthic surveys, plankton sampling, opportunistic observations and interviews with fishers and relevant authorities.

The 2021 survey reported a total of 43 hard-coral species. The full list of 43 species was not reproduced in the main survey report, but the taxa specifically identified in the report included species and genera of *Acropora*, *Porites*, *Pocillopora*, *Montipora*, *Seriatopora*, *Favia*, *Favites*, *Fungia*, *Galaxea*, *Echinopora*, *Platygyra*, *Merulina* and *Oxypora*. Coral communities were recorded principally at Fungu Yasini, Mbudya Island and Bongoyo Island. *Acropora* and *Porites* were reported to be among the dominant coral genera, particularly around Mbudya, Bongoyo, Sinda and Nyakatumbe Islands.

At Fungu Yasini, the reef environment consisted of extensive seagrass habitat dominated by *Thalassodendron ciliatum*, interspersed with reef heads of *Porites cylindrica* and *Porites rus*. Damaged or dead colonies of *Acropora*, *Pocillopora*, *Seriatopora*, *Favia* and *Favites* were also reported, with damage attributed mainly to historical destructive fishing and coral bleaching.

The northern part of Mbudya Island was dominated by seagrass, with scattered massive and branching coral colonies. Recorded taxa included *Acropora* spp., *Pocillopora* spp., *Montipora* spp., *Pocillopora damicornis*, *Fungia* sp., *Seriatopora* spp., *Galaxea* sp., *Echinopora lamellosa*, *Platygyra* spp., *Favia* spp. and *Favites* spp. Historical damage from destructive fishing and bleaching was visible in parts of the reef.

At Bongoyo Island, the reef consisted of patch reefs, seagrass and isolated coral heads. The identified coral taxa included *Porites lutea*, *Porites cylindrica*, *Porites rus*, *Acropora* spp., *Montipora* spp., *Pocillopora verrucosa*, *Merulina* sp. and *Oxypora* sp. Soft-coral cover was reported to be relatively low, while coral rubble provided evidence of earlier physical disturbance.

The 2021 fish survey visually recorded 36 fish species. When survey observations were combined with information from fishers, 51 fish species were reported as known to occur in the wider survey area. The fish assemblage was dominated by common Western Indian Ocean reef-associated families, particularly Pomacentridae, Labridae, Acanthuridae and Holocentridae. Damselfish, butterflyfish, wrasses, sweetlips, rabbitfish, goatfish and snappers were commonly observed. Large predatory fish were relatively uncommon, and no sharks belonging to the family Carcharhinidae were recorded during the survey. This fish-community structure is consistent with a reef system affected by fishing pressure and historical disturbance.

The 2021 reef-invertebrate survey was dominated by echinoderms. The most conspicuous sea urchins were *Diadema setosum*, *Diadema savignyi*, *Echinothrix diadema* and *Stomopneustes variolaris*. The crown-of-thorns starfish, *Acanthaster planci*, and several sea cucumbers were also recorded. The relatively high abundance of *Diadema* was interpreted as potentially indicating reduced abundance of their natural predators.

The 2023 intertidal investigations provided additional species information for Ocean Road, Kigamboni, Makatumbe Island and the Mjimwema–Kendwa area. The Mjimwema–Kendwa intertidal area contained the highest diversity of macrobenthic plants and animals among the surveyed Dar es Salaam intertidal locations. Makatumbe Island supported dense algal communities, seagrass patches, oysters, gastropods and crustaceans associated with rocky and coralline substrate. Ocean Road supported

sparse seagrasses, seaweeds, sea cucumbers, sea urchins, gastropods and bivalves, while Kigamboni supported mixed rocky and sandy-shore communities.

Table 4-14 provides the consolidated inventory of species and taxa recorded or reported from the harbour entrance and wider Dar es Salaam coastal area. Records from Kizimkazi are excluded from the Dar es Salaam list except where explicitly identified as regional comparative information.

The inventory demonstrates that the direct harbour footprint is biologically less diverse than the wider coastal and island environment. Coral reefs, seagrass beds, mangrove stands and diverse intertidal communities are concentrated outside the proposed berth works. The principal relevance of the wider species inventory is therefore to identify ecological receptors that could be affected indirectly if sediment plumes, contaminants, noise or other disturbances extend beyond the harbour.

The reported species counts should be interpreted in the context of survey limitations. The 2021 survey was a rapid survey undertaken during a limited seasonal window. The report acknowledges that additional surveys covering both northeast and southeast monsoon periods could record more species. In addition, some taxa were identified only to genus or family level and several records were based on interviews rather than direct observation. The inventory should therefore be treated as a consolidated record of species known, observed or reported during the available studies rather than a complete list of every species occurring along the Dar es Salaam coast.

Table 4-14: Consolidated Species Inventory for the Harbour Entrance and Wider Dar es Salaam Marine Area

Biological Group	Species Or Taxa Recorded/Reported	Main Survey Locations and Baseline Interpretation
Phytoplankton	*Strombidium* sp.; *Gyrodinium* sp.; *Trichodesmium* spp.; *Chaetoceros* spp.; *Thalassiothrix* spp.; *Bacteriastrum* spp.; *Rhizosolenia* spp.; *Pseudo-nitzschia* spp.; *Leptocylindrus* spp.	Recorded from project-area plankton samples. The community was dominated by diatoms, with cyanobacteria and dinoflagellates also present.
Zooplankton	*Acrocalanus gibber*; *Eucalanus* spp.; *Temora stylifera*; *Temora turbida*; *Centropages furcatus*; *Acartia* spp.; *Microsetella* spp.; *Macrosetella* spp.; *Euterpina* spp.; Appendicularia	Recorded from project-area plankton samples. Copepods were the dominant group.
Reef and coastal fish	*Acanthurus triostegus*; *Mulloidichthys vanicolensis*; *Parupeneus barberinus*; *Siganus sutor*; *Lethrinus harak*; *Thalassoma hebraicum*; *Chaetodon auriga*; *Pomacanthus maculosus*; *Heniochus acuminatus*; *Abudefduf sexfasciatus*; *Pomacentrus sulfureus*; *Stegastes nigricans*; *Amphiprion allardi*; *Dascyllus trimaculatus*; *Chrysiptera unimaculata*; *Gymnothorax* sp.; *Ostracion cubicus*; *Chromis dimidiata*; *Plectropomus laevis*; *Apogon aureus*; *Myripristis murdjan*	Primarily recorded or reported from wider reef and coastal locations including Sinda, Nyakatumbe, Fungu Yasini, Mbudya and Bongoyo. They should not all be interpreted as direct Berths 8–11 records.
Hard corals	*Porites lutea*; *Porites cylindrica*; *Porites rus*; *Pocillopora damicornis*; *Pocillopora verrucosa*; *Echinopora lamellosa*; and species of *Acropora*, *Montipora*, *Pocillopora*, *Seriatopora*, *Fungia*, *Galaxea*, *Platygyra*, *Favia*, *Favites*, *Merulina*, *Oxypora* and *Goniastrea*	Recorded principally at Fungu Yasini, Mbudya and Bongoyo, with additional observations around Makatumbe and Kendwa. No coral reef was recorded in the direct berth footprint.
Seagrasses	*Halodule uninervis*; *Syringodium isoetifolium*; *Cymodocea rotundata*; *Cymodocea serrulata*; *Thalassodendron ciliatum*; *Thalassia hemprichii*; *Enhalus acoroides*; *Halophila ovalis*; *Zostera capensis*	Recorded from Fungu Yasini and wider intertidal and shallow subtidal areas, including Ocean Road, Kigamboni, Makatumbe and Mjimwema–Kendwa. The reported identification of *Zostera capensis* should be confirmed during future monitoring because of its conservation importance.
Mangroves	*Avicennia marina*; *Rhizophora mucronata*; *Ceriops tagal*	Recorded in wider creek and coastal areas, particularly Kunduchi, Gerezani/Mtoni Kijichi and Msimbazi.

Biological Group	Species Or Taxa Recorded/Reported	Main Survey Locations and Baseline Interpretation
		Avicennia marina was generally dominant. Mangroves do not occur in the direct berth footprint.
Green and brown seaweeds	*Ulva fasciata*; *Ulva reticulata*; *Ulva pertusa*; *Ulva pulchra*; *Ulva clathrata*; *Codium geppiorum*; *Cladophora* sp.; *Chaetomorpha* sp.; *Halimeda macroloba*; *Caulerpa sertularioides*; *Chlorodesmis fastigiata*; *Sargassum cristaefolium*; *Sargassum oligocystum*; *Sargassum decurrens*; *Turbinaria decurrens*; *Padina boergesenii*; *Padina boryana*; *Dictyota humifusa*; *Hydroclathrus clathratus*	Recorded from wider rocky, sandy and mixed intertidal environments, including Ocean Road, Kigamboni, Makatumbe and Mjimwema–Kendwa.
Red and encrusting algae	*Gracilaria canaliculata*; *Bostrychia tenella*; *Galaxaura marginata*; *Liagora* spp.; *Predaea* spp.; *Titanoderma* spp.; *Peyssonnelia* spp.; *Halymenia* spp.; *Kappaphycus* spp.	Most records are from rocky intertidal and coral-associated habitats. Some genera were recorded at the Kizimkazi regional comparison site and require independent confirmation before being treated as Dar es Salaam records.
Sea urchins and crown-of-thorns starfish	*Diadema setosum*; *Diadema savignyi*; *Echinothrix diadema*; *Stomopneustes variolaris*; *Acanthaster planci*	Recorded on wider reef and intertidal habitats. They were among the most conspicuous reef invertebrates.
Sea cucumbers	*Holothuria scabra*; *Holothuria leucospilota*; *Holothuria edulis*; *Actinopyga miliaris*; *Synapta maculata*	Recorded mainly from Ocean Road and the Mjimwema–Kendwa intertidal area. *Holothuria scabra* is of particular conservation and commercial importance.
Starfish and brittle stars	*Protoreaster lincki*; *Pentaceraster mammillatus*; *Pentaceraster horridus*; *Stellaster childreni*; *Ophiocentrus dilatatus*; *Ophiocoma valenciennesi*; *Ophionereis dubia*; *Ophiolepis superba*	Recorded particularly within the Mjimwema–Kendwa intertidal area.
Gastropods	*Terebralia palustris*; *Charonia tritonis*; *Littoraria glabrata*; *Murex brevispina*; *Volema pyrum*; *Oliva bulbosa*; *Conus lividus*; *Conus rattus*; *Conus miles*; *Terebra nebulosa*; *Cantharus fumosus*; *Cerithium nodulosum*; *Polinices mammilla*; *Tonna perdix*; *Bulla ampulla*	Recorded in rocky, sandy-muddy and mixed intertidal areas at Ocean Road, Kigamboni and Mjimwema–Kendwa.

Biological Group	Species Or Taxa Recorded/Reported	Main Survey Locations and Baseline Interpretation
Bivalves and oysters	*Saccostrea cucullata*; *Mactra ovalina*; *Anadara antiquata*; *Anadara erythraeonensis*; *Glycymeris queketti*; *Glycymeris pectunculus*; *Pinna muricata*; *Atrina vexillum*; *Isognomon ephippium*; *Meropesta nicobarica*; *Semele radiata*	Recorded from wider intertidal areas. Dense oyster occurrence was observed on rocky surfaces at Makatumbe Island.
Crustaceans and other invertebrates	*Geograpsus* sp.; hermit crabs; rock crabs; sipunculid worms	Recorded from rocky and mixed intertidal habitats. Some taxa were not identified to species level.
Sponges	*Neopetrosia* sp.; *Haliclona* sp.; *Lendenfeldia dendyi*; *Theonella* sp.	Recorded mainly from the Mjimwema–Kendwa area and other wider reef-associated habitats.
Waterbirds and shorebirds	Sacred ibis, *Threskiornis aethiopicus*; lesser black-backed gull, *Larus fuscus*; common tern, *Sterna hirundo*; grey plover, *Pluvialis squatarola*; crab plover, *Dromas ardeola*; and unidentified small waders	Reported from wider mangrove and intertidal habitats, particularly around Kunduchi, Pangavini and Gerezani/Mtoni Kijichi.
Marine mammals	Common bottlenose dolphin, *Tursiops truncatus*	Historical occurrence was reported north of Sinda Island. It was not observed during the 2021 survey and was not recorded in the direct berth footprint.
Terrestrial mammal associated with mangroves	Vervet monkey, *Chlorocebus pygerythrus*	Reported as an occasional visitor to Gerezani and Kunduchi mangrove areas. It is not a marine species and is outside the direct marine works footprint.

Source: Tansheq Marine Ecology Survey, 2021; STEM Consult Underwater Investigations, 2023; WAPCOS ESIA, 2016.

4.10.6.3 Threatened, Endangered and Conservation-Sensitive Species

The conservation-status screening distinguishes between species directly recorded during the surveys, species reported through stakeholder or historical information and species that may potentially occur within the wider marine environment based on known distribution and suitable habitat.

The 2021 marine ecology report concluded, using the conservation information available at the time, that no Endangered, Critically Endangered, threatened, endemic or range-restricted species had been recorded during that survey. However, the later 2023 wider-area intertidal investigation reported *Holothuria scabra* and *Zostera capensis*. Both taxa have elevated global conservation status. The consolidated assessment has therefore updated the earlier conclusion by taking account of the later survey records and current IUCN information.

Current IUCN information continues to classify hawksbill turtle as Critically Endangered, olive ridley turtle and dugong as Vulnerable, Indian Ocean humpback dolphin and *Holothuria scabra* as Endangered, and *Zostera capensis* as globally Vulnerable. The global green-turtle category was revised from Endangered to Least Concern in the 2025 IUCN update; it nevertheless remains legally protected and ecologically sensitive.

Several coral records were identified only to genus level. Species-specific IUCN categories cannot reliably be assigned to records described only as *Acropora* spp., *Porites* spp., *Pocillopora* spp. or other broad genera. These coral communities should instead be treated as sensitive habitats because of their ecological function and susceptibility to turbidity, sediment deposition, physical damage and climate-related bleaching.

Based on the consolidated baseline, **no threatened or endangered species was confirmed within the direct Berths 8–11 dredging and construction footprint**. However, the Endangered sandfish, *Holothuria scabra*, and the reported Vulnerable seagrass, *Zostera capensis*, were recorded at wider intertidal survey locations. Other threatened marine fauna, including hawksbill turtle, olive ridley turtle and Indian Ocean humpback dolphin, may occur within the wider Western Indian Ocean coastal environment but were not observed during the project surveys.

The presence or potential occurrence of conservation-sensitive species in the wider area does not indicate that the project footprint constitutes critical habitat. It nevertheless requires application of the mitigation hierarchy and precautionary management. Relevant measures include control and monitoring of sediment plumes, protection of coral and seagrass receptors, marine-fauna observation during high-noise works, soft-start procedures for piling, cessation of works where threatened fauna enter the designated exclusion zone, prevention of spills and maintenance of a register of sensitive-species sightings.

The ecological conclusion for the ESIA is therefore that the direct harbour footprint is a modified habitat of comparatively lower sensitivity, while the wider Dar es Salaam coastal and island environment contains natural habitats and threatened or conservation-sensitive species that must be protected from indirect and cumulative impacts. The complete species inventory and record basis are provided in Appendix VIII.

Table 4-15: Threatened and Conservation-Sensitive Species Relevant to the Project

Species	Current Global Conservation Status	Basis of Occurrence in the Baseline	Project Relevance
Sandfish, *Holothuria scabra*	**Endangered**	Directly recorded during the 2023 intertidal investigation at wider coastal locations, including Ocean Road and the Mjimwema–Kendwa area. It was not recorded within the Berths 8–11 footprint.	A confirmed threatened species within the wider receptor area. It is vulnerable to habitat disturbance, sedimentation, water-quality deterioration and harvesting.
Cape eelgrass, *Zostera capensis*	**Vulnerable**	Reported from the Ocean Road and Kigamboni intertidal surveys. The record is outside the berth footprint and should be taxonomically confirmed during follow-up surveys.	A potentially important threatened seagrass record. Its presence increases the sensitivity of the relevant wider intertidal habitat but does not indicate occurrence at Berths 8–11.
Hawksbill turtle, *Eretmochelys imbricata*	**Critically Endangered**	Known from the broader Western Indian Ocean and Tanzanian marine environment. It was not directly observed during the 2021 harbour survey.	A potential wider-area receptor associated mainly with coral reefs and coastal habitats. Precautionary measures are required if an individual is observed near the works or disposal route.
Olive ridley turtle, *Lepidochelys olivacea*	**Vulnerable**	Potentially occurs within Tanzanian coastal waters but was not recorded during the project surveys or within the berth footprint.	A mobile potential receptor that may pass through the wider marine area. It is not considered a resident species within the harbour.
Green turtle, *Chelonia mydas*	**Least Concern globally under the current IUCN assessment**, but legally protected and conservation-sensitive	Known from the wider Tanzanian coast and associated with seagrass and reef habitats. It was not recorded in the direct project surveys.	Although no longer globally classified as threatened, the species remains protected and should be treated as a sensitive receptor where present.
Indian Ocean humpback dolphin, *Sousa plumbea*	**Endangered**	Known from shallow coastal waters of the Western Indian Ocean. The underwater investigation referred to humpback dolphins at the Kizimkazi regional comparison site, but the species was not confirmed in the Dar es Salaam harbour survey.	A potential regional receptor rather than a confirmed project-area record. Any occurrence during construction would require implementation of marine-fauna observation and work-stoppage procedures.

Species	Current Global Conservation Status	Basis of Occurrence in the Baseline	Project Relevance
Dugong, *Dugong dugon*	**Vulnerable**	Included in the ecological screening because suitable seagrass habitat can support dugongs. No dugong was observed or reported as a recent record within the project survey area.	A potential regional species only. It should not be presented as survey-confirmed within the harbour or Dar es Salaam project footprint.
Common bottlenose dolphin, *Tursiops truncatus*	**Least Concern**	A historical sighting was reported north of Sinda Island. The species was not directly observed during the 2021 survey.	Conservation-sensitive marine mammal and potential occasional visitor to the wider area, but not a resident direct-footprint species.

Source: Tansheq Marine Ecology Survey, 2021; STEM Consult Underwater Investigations, 2023; IUCN Red List of Threatened Species, accessed July 2026.

4.11 Baseline Information of the Selected Sediment Disposal Site

For avoidance of doubt, the term “Disposal Site” in this section refers only to the offshore dredged-material placement area and does not mean the harbor works area at Berths 8–11. This section presents the existing environmental and socio-economic conditions at the selected offshore dredged-material disposal site, identified as **Option 4**. It establishes the baseline against which potential impacts from transportation and disposal of dredged material are assessed in Chapter 7.

The section is limited to the disposal site’s location, physical setting, water and sediment quality, existing ecological conditions, sensitive receptors, navigation and other marine uses. Predictions of sediment-plume dispersion, seabed deposition and impact significance are presented in Chapter 7, while the detailed modelling basis and calculations are provided in Appendix IX.

4.11.1 Geographic Location and Context

Option 4 is the offshore dredged-material disposal site selected for assessment in this ESIA. It is located approximately 32 km southeast of the Dar es Salaam Port entrance channel, in water reported to be deeper than 400 m.

Table 4-16: Key Location Parameters for Option 4

Parameter	Description
Disposal-site name	Option 4
Approximate centre coordinate	6.810137° S, 39.604260° E
UTM coordinate	Approximately 566,769 m E and 9,247,198 m N
Coordinate reference system	WGS 84 / UTM Zone 37S
Approximate distance from port entrance	32 km southeast
Approximate site dimensions	2 km × 2 km
Approximate site area	4 km²
Reported water depth	Greater than 400 m
Approximate distance to Sinda Island	22.76 km
Approximate distance to Makatumbe Island	28.07 km



Figure 4-28: Location of Option 4 in relation to Dar es Salaam Port, Sinda Island, Makatumbe Island and the Dar es Salaam Marine Reserves

4.11.2 Previous Disposal History and Existing Disturbance

Available project records indicate that offshore disposal sites in the wider area have previously received dredged material associated with Dar es Salaam Port improvement and channel-dredging works. Option 4 should therefore be regarded as a potentially disturbed offshore seabed rather than an entirely undisturbed natural site.
Previous disposal may have caused:

- localised seabed mounding;
- changes in sediment texture;
- burial or displacement of benthic organisms;
- redistribution of fine sediment;
- changes in sediment organic content; and
- recolonisation by opportunistic soft-bottom species.

4.11.2.1 Historical Water Quality Baseline

The water column within the general offshore disposal area is more oceanic than the harbour environment because of its distance from the port, greater water depth and reduced exposure to urban runoff, port drainage, harbour sediment disturbance and routine nearshore activities. Historical monitoring nevertheless provides useful evidence of the environmental conditions that prevailed during and following the previous dredging and offshore disposal campaign.

The 2023 underwater investigation included marine-water sampling at an offshore disposal-site monitoring station located at approximately **6°44′40″ S and 39°23′23″ E**. This station is situated within the same general offshore disposal area considered in the present ESIA and is therefore considered relevant for characterising historical water-quality conditions, although it does not provide complete spatial or seasonal coverage of the entire Option 4 polygon. The offshore disposal station was sampled for water-quality parameters only.

Parameters relevant to the historical disposal-site water-quality baseline include:

- temperature;
- salinity;
- density and water-column stratification;
- pH;
- dissolved oxygen;
- turbidity;
- total suspended solids;
- nutrients;
- oil and grease;
- hydrocarbons; and
- dissolved and total metals.

The measured water-quality results at the offshore disposal-site station are summarised in Table 4-17.

Table 4-17: Historical Water-Quality Results at the Offshore Disposal-Site Monitoring Station

Parameter	2023 Measured Value
Turbidity	6.55 NTU
Ph	8.46
Dissolved oxygen	6.61 mg/L
Total suspended solids	95.80 mg/L
Nitrate	3.66 mg/L
Oil and grease	0.002 mg/L

The results indicate that pH, dissolved oxygen, oil and grease and the analysed heavy metals were generally low at the offshore monitoring station. Zinc was below 0.001 mg/L, arsenic and mercury were below detection, cadmium and chromium VI were each recorded at 0.0001 mg/L, and lead was recorded at 0.002 mg/L. These heavy-metal concentrations were below the marine-water guideline values reproduced in the underwater investigation report.

Turbidity at the offshore disposal station was 6.55 NTU, while total suspended solids were 95.80 mg/L. The TSS result was below the Class 3 value of 100 mg/L used in the investigation report but substantially higher than the 2019 ESIA baseline range of 10–23 mg/L reported for the wider monitoring dataset. The monitoring report attributed elevated suspended solids partly to dredging and other marine activities occurring within the project area and its vicinity.

The nitrate concentration at the offshore station was 3.66 mg/L. This value is higher than the Class 3 benchmark of 0.70 mg/L reproduced in the underwater investigation report and should therefore not be described as compliant without further verification of the applicable assessment criterion. Elevated nitrate may reflect wider influences such as offshore transport of nutrient-enriched water, surface runoff, sewage-related inputs, organic-matter decomposition or other regional sources rather than dredged-material disposal alone. The historical dataset does not provide sufficient evidence to attribute nitrate concentrations specifically to previous disposal activities.

Comparison with the 2019 ESIA baseline indicates that concentrations of zinc, arsenic, cadmium, chromium VI, mercury and lead were lower during the 2023 assessment. The results therefore do not indicate persistent enrichment of dissolved heavy metals in the monitored offshore water column following the previous dredging and disposal campaign. However, the available information represents discrete monitoring results rather than a complete seasonal baseline and does not fully describe vertical water-column variability or conditions across the entire Option 4 polygon.

For the present project, the historical results should therefore be used as a reference baseline and supplemented through pre-disposal monitoring at representative stations within and around Option 4. The supplementary survey should record station coordinates, sampling depth, tidal condition, season, analytical methods, laboratory detection limits and quality-assurance results. Monitoring stations should include at least one station inside the disposal polygon, stations along the predicted plume pathway and an appropriate upstream or background control station.

For impact assessment and monitoring, the total measured concentration of suspended solids shall be distinguished from the incremental concentration attributable to project activities:

$$C_{\text{total}} = C_{\text{background}} + C_{\text{incremental}}$$

where:

C_{total}
is the total measured suspended-solids concentration during disposal;

$C_{\text{background}}$
is the ambient suspended-solids concentration in the absence of project disposal activities; and

$C_{\text{incremental}}$
is the additional concentration attributable to the project.

4.11.2.2 Historical Heavy-Metal Monitoring Results in the Offshore Disposal Area

Post-dredging environmental monitoring undertaken under the *Assessment on the Impact of Dredging Activities on the Underwater Environment and Sensitive Marine Areas* included marine-water sampling at an offshore disposal-site monitoring station located at approximately 6°44′40″ S and 39°23′23″ E. The monitoring station is situated within the same general offshore disposal area considered in this ESIA and therefore provides relevant historical evidence of water quality following previous dredged-material disposal.

The monitoring programme analysed zinc, arsenic, cadmium, chromium VI, mercury and lead. The results recorded at the offshore disposal-site monitoring station are presented in Table 4-17.

Table 4-18: Heavy-Metal Concentrations in Marine Water at the Offshore Disposal-Site Monitoring Station

Parameter	Recorded Concentration	Applicable Class 3 Guideline
Zinc	<0.001 mg/L	0.10 mg/L
Arsenic	Below detection	0.003 mg/L
Cadmium	0.0001 mg/L	0.003 mg/L
Chromium VI	0.0001 mg/L	0.020 mg/L
Mercury	Below detection	0.00004 mg/L
Lead	0.002 mg/L	0.012 mg/L

All measured concentrations were below the applicable marine-water guideline values. The results indicate that previous dredging and offshore disposal did not result in significant or persistent heavy-metal contamination of the water column within the monitored offshore disposal area. The wider

monitoring dataset also showed that heavy-metal concentrations generally decreased and stabilised at low levels during the monitoring period.

The station-specific values and comparison standards are given in the Underwater Investigations Report's marine-water quality table.

4.11.2.3 Historical Sediment Heavy-Metal Monitoring Results

Marine-sediment monitoring was undertaken at six stations forming part of the associated port, approach-channel, offshore and sensitive-receptor monitoring network. Although the offshore disposal-site station itself was sampled for water only, the sediment stations provide useful evidence concerning the regional behaviour of heavy metals during and following the previous dredging and disposal campaign.

The measured sediment concentrations were as follows:

Table 4-19: **Heavy-Metal Concentrations in Marine Sediment within the Associated Monitoring Area**

Parameter	Recorded Concentration Range
Zinc	Below detection–10 mg/kg
Arsenic	<1–<2 mg/kg
Cadmium	Below detection–0.1 mg/kg
Mercury	Below detection–0.1 mg/kg
Lead	Below detection–1 mg/kg
Copper	Below detection–10 mg/kg
Chromium	Below detection–1 mg/kg

The recorded concentrations were below the sediment-quality reference values and pollution-signalling thresholds applied in the monitoring study. Time-series monitoring from August 2021 to August 2023 indicated that some sediment-metal concentrations increased temporarily during the early dredging period, particularly when fine muddy material was being disturbed. The concentrations subsequently declined and stabilised at low levels as dredging progressed into harder coralline material. The available evidence therefore does not indicate persistent heavy-metal enrichment of marine sediments associated with the previous dredging and offshore disposal activities.

The ranges, individual station results and applicable reference values are provided in the Underwater Investigations Report.

Before disposal, the site-specific sediment baseline shall include:

- particle-size distribution;
- moisture content;
- dry bulk density;
- total organic carbon;
- pH and redox conditions;
- petroleum hydrocarbons;
- polycyclic aromatic hydrocarbons;
- relevant heavy metals;
- nutrients and sulphides; and
- benthic sediment quality.

Dredged material shall also be tested before offshore disposal. Material that does not meet applicable acceptance criteria shall be excluded from Option 4 and managed through an approved alternative method.

4.11.3 Oceanographic Setting

The offshore waters of Dar es Salaam are influenced by:

- semi-diurnal tides;
- the East African Coastal Current;
- northeast and southeast monsoon winds;
- offshore waves;
- temperature and salinity stratification; and
- local bathymetric effects.

The available feasibility information indicates a semi-diurnal tidal regime, with a spring tidal range of approximately 3.2–3.3 m and a neap range of approximately 1.1–1.2 m. Currents at the harbour entrance may reach approximately 0.20 m/s during flood conditions and approximately 0.50–0.60 m/s during stronger ebb conditions.

The principal environmental conditions influencing suspended-sediment transport are:

1. southeast-monsoon conditions;
2. northeast-monsoon conditions;
3. calm or low-wind conditions;
4. spring-tide currents;
5. neap-tide currents; and
6. temporary current reversals.

The 2021 feasibility-study reports contain oceanographic and design information that supports the general description of the marine environment, while the 2019 ESIA provides earlier option-specific sediment-dispersion results.

4.11.4 Historical Hydrodynamic and Sediment-Dispersion Modelling for Option 4

The previous Dar es Salaam Port entrance-channel and turning-basin dredging project was supported by mathematical hydrodynamic and sediment-dispersion modelling undertaken by TECHNITAL and incorporated into the 2019 ESIA. The modelling was undertaken using Delft3D to simulate water levels, currents, waves, sediment transport and water-quality processes.

The model domain extended from the Tanga coastal area in the north to Kisiju in the south and included Pemba and Zanzibar. Model bathymetry was developed from nautical and bathymetric charts, satellite information and the project bathymetric survey undertaken in 2016. The principal boundary and forcing conditions included:

- spring–neap tidal cycles;
- water temperature;
- air temperature;
- solar radiation;
- humidity;
- cloud cover; and
- representative wind conditions.

Three meteorological scenarios were assessed:

1. no-wind conditions;
2. southeast wind at approximately 12 m/s; and
3. northeast wind at approximately 11 m/s.

The sediment-dispersion assessment considered sandy sediment with a representative particle diameter of approximately 150 µm and silty sediment with a representative diameter of approximately 10 µm. Six alternative disposal locations were assessed, including Option 4. The disposal simulations covered a 28-day period representing two spring–neap tidal cycles, and suspended-sediment concentrations were assessed at 16 observation points located at or near identified sensitive coastal receptors.

For Option 4, the historical model predicted the following maximum incremental suspended-sediment concentrations:

Observation area	Historical modelled maximum
Dar es Salaam coastal observation point, Cor-2	Approximately 0.08 g/m³, equivalent to 0.08 mg/L
Southern Zanzibar observation point, Cor-8	Approximately 0.08 g/m³, equivalent to 0.08 mg/L
Southern Zanzibar observation point, Cor-14	Approximately 0.12 g/m³, equivalent to 0.12 mg/L
Southern Zanzibar observation point, Cor-15	Approximately 0.07 g/m³, equivalent to 0.07 mg/L

The historical results indicate that, under the modelled disposal sequence and meteorological conditions, incremental suspended-sediment concentrations reaching the selected Dar es Salaam and southern Zanzibar coastal observation points were low. The model therefore provides relevant supporting evidence for the offshore separation and dispersal characteristics of Option 4.

The available documentation does not, however, demonstrate full hydrodynamic calibration and validation against measured water levels and current velocities. The 2019 ESIA specifically records that the modelling was not calibrated using observed or secondary tidal-level and current data. The full model report, model grid, input files, calibration records and complete Option 4 graphical outputs are also not included in the present ESIA document package.

The historical modelling shall therefore be treated as supporting evidence rather than conclusive proof of current project performance. Before disposal commences, TPA shall obtain the available TECHNITAL model report and model files and undertake an independent technical review. Where the historical model is recoverable and technically suitable, it shall be updated and re-run using:

- the final Berths 8–11 dredging volume;
- the confirmed Option 4 polygon;
- current multibeam bathymetry;
- the existing disposal-mound geometry;
- current sediment grain-size and settling characteristics;
- the selected hopper or barge capacity;
- the actual disposal-event frequency and release duration;
- updated sensitive-receptor locations; and
- representative northeast- and southeast-monsoon conditions.

A completely new hydrodynamic model shall only be developed where the historical model cannot be recovered or reproduced, where its domain or resolution is unsuitable, where current conditions differ materially from the historical model, or where a new model is required by the approving authority.

The historical model assessed plume dispersion and potential coastal exposure. It did not establish the remaining volumetric capacity of Option 4. Remaining capacity shall be determined separately through current multibeam bathymetry, historical disposal-record reconciliation, existing-mound delineation and cell-by-cell capacity calculations.

The model setup and Option 4 results are documented in the 2019 ESIA, while the current screening calculations and verification requirements are presented in Appendix IX.

The 2019 ESIA confirms the Delft3D platform, domain, inputs and scenarios, and reports the numerical Option 4 receptor results.

4.11.5 Marine Ecology and Sensitive Receptors

The marine ecological interpretation of Option 4 is provided in Appendix VIII. At depths greater than 400 m, mangroves, seagrass meadows and shallow-water photosynthetic coral reefs are not expected within the disposal footprint. Plankton will occur in the water column, while soft-sediment benthic fauna, demersal fish, sponges, sea pens, non-photosynthetic cnidarians and other deep-water organisms may occur on or near the seabed.
Pelagic fish, sharks, rays, marine turtles, cetaceans and seabirds may pass through the wider offshore area. These are potential-occurrence receptors and shall not be described as species confirmed at Option 4 unless recorded by the underwater investigation or a new site-specific survey.

Table 4-20: Ecological Baseline and Receptor Interpretation for Option 4

Receptor	Likely Presence	Project Relevance
Mangroves	Not expected within footprint	Deep offshore location; coastal receptors remain relevant to indirect pathways.
Seagrass	Not expected within footprint	Depth exceeds the photic-zone habitat of seagrass.
Shallow reef-building coral	Not expected within footprint	Nearest shallow reef receptors are associated with Sinda and Makatumbe.
Plankton	Expected	Potential exposure to the suspended fine fraction.
Soft-sediment benthos	Expected at group level	May be buried or altered by repeated placement.
Pelagic fish, sharks and rays	Possible transient occurrence	Potential temporary avoidance and plume exposure.
Marine turtles and cetaceans	Possible transient occurrence	Require observation, exclusion and stop-work procedures.
Seabirds	Occasional	Potential feeding or transit in the wider area.

Source: Appendix VIII: Consolidated Marine Species Inventory and the post-disposal underwater investigation.

The principal mapped shallow-water ecological receptors in the wider area include:

- Sinda Island coral and seagrass habitats;
- Makatumbe Island coral and seagrass habitats;
- Dar es Salaam Marine Reserves;
- coastal fisheries;
- nearshore reef systems; and
- coastal bird and turtle habitats.

The approximate separation distances adopted for screening are:

Receptor	Approximate Distance from Option 4
Sinda Island	22.76 km
Makatumbe Island	28.07 km
Dar es Salaam Port entrance	Approximately 32 km

These distances provide substantial separation but do not, by themselves, prove absence of impact. Potential exposure is assessed using historical and current plume modelling in Chapter 7.

4.11.6 Human Uses and Socio-Economic Receptors – Offshore Sediment Disposal Site

Human use of the Proposed disposal area area is minimal under baseline conditions. This lack of existing use is one of the reasons Proposed disposal area was favored: dumping there causes least disruption to livelihoods or marine traffic. By contrast, nearshore options could conflict with fishing or shipping. The baseline confirms that no important navigation routes or fishing zones exist at 32 km offshore, 400 m depth. The site has effectively been set aside for this industrial-environmental purpose (dredge material placement) with the blessing of regulators and no objection from stakeholders, given its remoteness. This forms a strong part of the impact mitigation strategy – concentrating impacts in an area of low human and ecological sensitivity.

The table below summarizes the baseline status of human uses and socio-economic receptors at the offshore disposal site (Proposed disposal area). The site's remoteness and depth make it largely unused by local communities, industries, or protected area systems.

Table 4-21: Baseline Status of Human Uses and Socio-economic Receptors

Aspect	Status	Key Observations
Fisheries	Absent/Very Sparse	Outside artisanal and commercial fishing range. No known fishing grounds or catch activities. Impact on fisheries deemed negligible.
Navigation and Shipping	Low Traffic Area	Outside port approach lanes and international corridors. Occasional ship transits. Previously used for dredged material disposal with no conflict.
Marine Protected Areas	None Present	No MPAs overlap the site. DMRs and other MPAs are 30+ km away. No observed ecological influence from past dumping.
Existing Dumping/Sea Uses	Designated Spoil Ground	Used for harbor dredging since the 2010s. No conflicts with oil/gas or tourism. Previously confirmed environmentally safe.
Socio-Economic Context	No Direct Use	No resident or local community usage. No fishing, tourism, or traditional use reported. Only dredging/research vessels operate occasionally.

4.11.7 Comparative Justification from Previous ESIAs (2016 vs 2020)

The choice of this offshore sediment disposal site and the understanding of its baseline environment are backed by findings from earlier Environmental and Social Impact Assessments in **2016** and **2020**. These studies evaluated multiple disposal alternatives and provided a comparative baseline rationale as detailed in subsequent subsections.

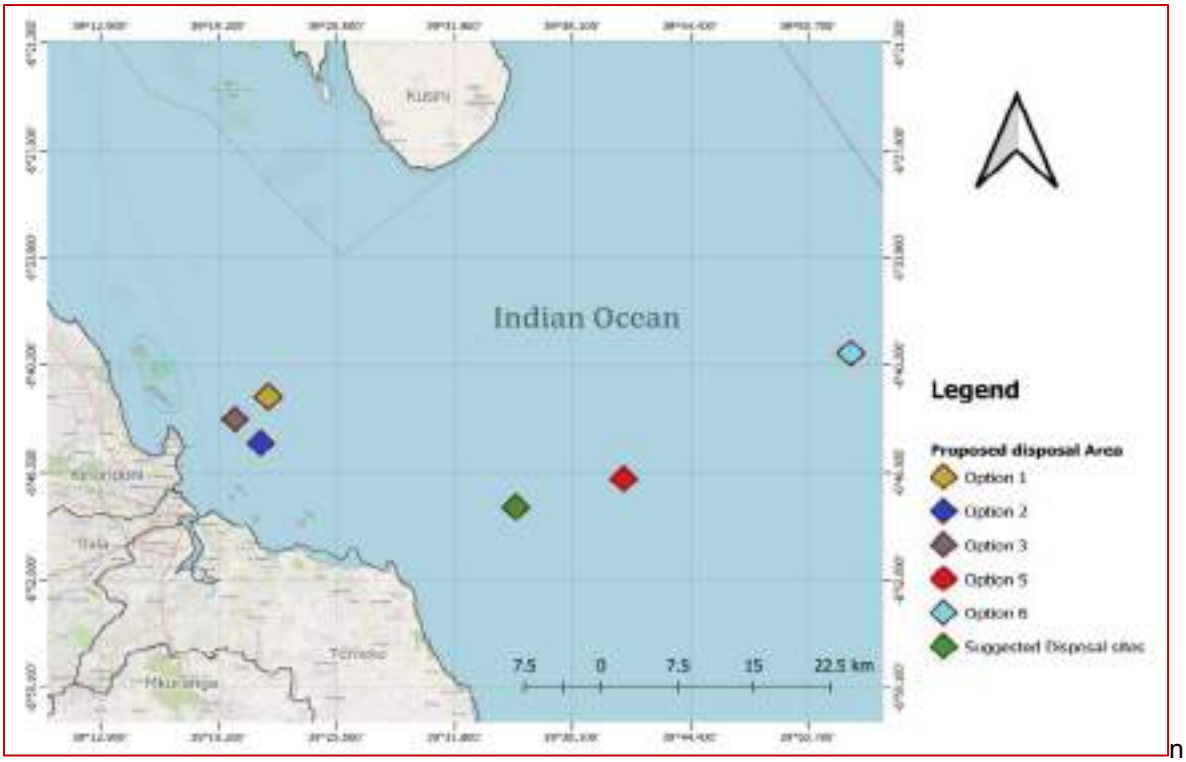


Figure 4-29: Locations of the proposed disposal points for the dredged materials (Tansheq Ecological Study, November 2021).

Both the 2016 and 2020 studies consistently highlighted deep offshore disposal as the environmentally preferred option. The evolution from 2016 to 2020 was essentially a shift from a 10 km site to a 32 km site, driven by a conservative, precautionary approach to absolutely minimize any impact. The baseline data from 2016 showed that even at 10 km offshore (200 m depth), there were no habitats and likely no issues, but by 2020, stakeholder input (e.g. from NEMC and consultants) suggested going even further offshore to be extra safe. The criteria of site selection remained the same: avoid shallow/sensitive areas, ensure strong dispersion, and avoid conflicting uses. The 2020 ESIA formally compared all options against these criteria and ranked Proposed disposal area top. One reason Proposed disposal area was chosen over Options 5 or 6 (even farther) was operational efficiency – 32 km was deemed sufficiently far to protect the environment, while still within reasonable distance for dredging logistics.

From a baseline perspective, Proposed disposal area had the advantage of: (a) very deep water (400 m) – no coral, no seagrass, low benthic biodiversity; (b) distance from coast (32 km) – ensuring any plume greatly diluted, no fishing or tourism; (c) favorable currents – carrying material away from important areas. The previous ESIAs provide the evidence that these baseline factors are met. For instance, WAPCOS (2016) explicitly notes that beyond the port limits and reefs, the likely seabed is just sand, and the main concern is only turbidity which can be managed. ACE/Technital (2020) confirms with data and modeling that Proposed disposal area's currents will not return sediment to the harbor or MPAs, and that marine life at risk is minimal (fishing grounds far away, etc.). The fact that NEMC quickly approved the offshore site suggests the baseline environmental acceptability was clear.

In summary, the comparative findings from 2016 and 2020 ESIAs reinforce the current baseline understanding: Proposed disposal area's environment is suitable and preferable for dredged material disposal because it is remote, deep, and relatively devoid of sensitive receptors. Both assessments concluded that offshore disposal (vs. nearshore or land disposal) yields the least environmental impact given Tanzanian context. The 2020 ESIA built on the 2016 baseline by incorporating updated local research (e.g. TAFIRI input on fisheries, UDSM labs on sediment chemistry) and confirmed that no new sensitivities had emerged at the site. Indeed, the baseline environmental data in 2020 showed even cleaner conditions (lower turbidity, higher DO) offshore than in 2016, indicating a stable or improving

marine environment. This gave additional confidence that using Proposed disposal area would not degrade water quality or harm ecosystems.

The justification for Proposed disposal area is thus strongly rooted in these baseline comparisons: it is a proven, low-impact site. The earlier, closer options were set aside because the baseline analysis suggested some risk of sediment transport or user conflict, whereas the 32 km site has virtually no pathway to impact coastal ecology or communities under baseline conditions. By documenting that dredge material is clean, site biota is sparse, and ocean conditions disperse inputs quickly, the ESIA process demonstrated that Proposed disposal area aligns with the precautionary and environmental optimization principle. Consequently, in the final ESIA, Proposed disposal area was selected and all baseline data (geography, water quality, oceanography, sediment, ecology, human use) as detailed above were used to support impact predictions and management plans.

Table 4-22: Comparative Context for Offshore Disposal Sites Considered in Earlier Studies

Candidate site	Approximate location / orientation	Approximate depth	Main comparative observation	Outcome in present ESIA
Option 1	~7.5 km NNE of harbour	30–70 m	Offshore, but relatively nearer to shore and shallower; greater need to confirm limited sediment return and separation from sensitive coastal receptors	Not selected
Option 2	~10 km NE of harbour	>200 m	Considered suitable in the 2016 study, but still closer to shore than later preferred deep-water options	Not selected
Option 3	Offshore candidate considered in later studies	Not stated here	Retained in historical screening, but not adopted as the preferred site	Not selected
Option 4	Offshore candidate considered in later studies	Not stated here	Retained in historical screening, but not adopted as the preferred site	Not selected
Option 5	~42 km SE of harbour	>500 m	Deep offshore option with strong separation from shore, but not preferred over the selected site	Not selected
Option 6	~62 km NE of harbour	>600 m	Very deep offshore option, but less preferred in the final comparative assessment than the selected site	Not selected
Preferred / selected offshore disposal site	**~46 km SE of harbour**	**>400 m**	**Considered the best balance of depth, distance, dispersion conditions and separation from sensitive coastal receptors**	**Selected site assessed in this ESIA and used in previous dredging campaign**

4.12 Baseline Data Limitations

The principal limitations are:

- absence of a complete seasonal Acoustic Doppler Current Profiler (ADCP) record at Option 4;
- incomplete historical disposal-volume records;
- uncertainty regarding existing disposal mound geometry; and
- limited direct measurement of density stratification and near-bed currents.

These uncertainties are addressed through conservative impact assessment, pre-disposal verification, monitoring and adaptive management.

4.13 Socioeconomic Environment

4.13.1 General Area of Influence of the Proposed Project

The wider area of influence of the proposed project is Dar es Salaam city and in particularly Temeke and Kigamboni municipalities, and Dar es Salaam City council from where most of the labour force, some building materials, food, and goods are likely to be obtained. The Municipalities and city council may also benefit from revenues and from businesses to be stimulated by the project

The Dar es Salaam Port is within the metropolitan area characterized by highly built-up environment. The Port is surrounded by the City Center on the north (Mchafukoge Ward), consisting of the central business district; in the west are residential areas (Keko and Kilwa Road areas) and small factory areas (especially garages and PUMA bulk oil storage areas). The south consists of Mtoni and Kijichi residential areas, public institutions, Bulk Oil Storage Tanks. In the east, there is Kigamboni commercial and residential areas, TIPER storage depot, and very limited undeveloped plots. The city centre has a central sewer system that discharges sewage in the harbour mouth through the Sea Outfall. Many of the areas surrounding the harbour are unsewered and sewage handling is largely by septic tank system.

4.14 Demography

4.14.1 Population

According to 2022 National Population and Housing Census, Dar es Salaam has the population of the 5383728 people with 2783710 Female and 2600018 Male. However, the census for 2022 did not provide the information on Municipality. Although, according to growth rate of 5.1% Temeke, Kigamboni municipalities and Dar es Salaam City Council with respective the wards which are directly influenced by the projects had total population of 992475, whereas 491,686 males and 500,789 females respectively with percentage ratio 49% male to 51% female

Table 4-23: Project Population, Source: Dar es Salaam City Council Projected Population 2022, National Bureau of Statistics 2022).

District/City	Ward	Population		
		Male (M)	Female (F)	Total
Kigamboni	Kigamboni	107,936	107,738	215,674
	Vijibweni	100,572	104,591	205,163
Dar es Salaam City	Kivukoni	20,242	18,253	38,495
	Mchafukoge	27,652	26,857	54,509
	Gerezani	21,007	21,216	42,223
Temeke	Mtoni	148,838	153,989	302,828
	Kurasini	65,438	68,146	133,584
Total		491,686	500,789	992,475

4.14.2 Economic Activities

Major economic activities in Temeke Municipality include industries, both at primary and secondary level, subsistence and commercial farming small-scale enterprises, formal employment, trade and commercial activities encompassing wholesale and retail trade, petty trade, fisheries, animal husbandry and building materials and mining activities.

4.14.2.1 Industry and Markets

Dar-es-Salaam city is a highly industrialized area. It has the largest concentration of manufacturing industries mainly comprising of light manufacturing industries. These industries produce a variety of goods both for domestic and export markets. The city has about 40 percent of the total industrial manufacturing units in the country and contributes about 45 per cent of Tanzania's gross industrial manufacturing output. The number of manufacturing industries and the type of activities are listed in Table below.

Table 4-24: Industrial Activities (Source: National Bureau of Statistics (NBS), 2016 and the Ministry of Industry, Trade, and Investment (MITI), 2016)

Industrial Activities	Quantity
Agriculture, forestry and fishing-based industries	6
Mining and quarrying	26
Manufacturing	8,759
Electricity, gas, steam and air-conditioning supply	12
Water supply, sewerage, waste management and remediation activities	100
Wholesale and retail trade, repair of motor vehicles and motorcycles	13, 744
Transportation and storage	456
Construction	136
Real estate activities 36	36
Professional, scientific and technical activities	705

It is estimated that the Temeke Municipality has about 40 medium scale industries, clustered in Chang'ombe industrial area situated in the Northern part of the Municipality. It is estimated that the municipal has more than 158 small-scale industries located in Mbagala, Kurasini and others are due to be established in the newly designated industrial area at Vijibweni (Temeke Socio-economic Profile).

While the industry sector is flourishing in the municipality, the market sector does not perform well. Currently, there are about 17 formal markets with the capacity of 4,500 small traders. However, it is only Temeke stereo market that is in good standard, the remaining markets need renovation to make them meet the set government standards.

4.14.2.2 Fishing and Small Ferries

Temeke Municipality has an estimated coastline of 70 km that stretches from Kigamboni to Tundwi (Pemba Mnazi). Upstream of the Port, the coastline supports fishing and ferry boat activities (south of Kigamboni bridge). In Temeke, there are 1,450 registered fishermen and about 2,000 unregistered.

There are 1,230 registered fishing vessels and about 800 unregistered. Common fish landing villages include Kigamboni, Magogoni, Vijibweni, Mjimwema, Kibugumo, Dege, Gezaulole, Amani Gomvu, Buyuni, Pembamnazi and Mtoni Kijichi. Fishing is carried out using drag nets and other nets, traps, long lines, and baskets. Catches include diverse crustaceans and fish.

4.14.2.3 Employment

There is currently (according to the 2012 National population and Housing Census) a total labour force of 666,075 people in Temeke Municipality (i.e., both employed and unemployed persons) of whom 284,358 persons (42.7 %) are employed.

In addition, out of the total labour force, the unemployed persons stand at 381,717 people or 57.3 % out of which, 24.8 % are fulltime students. The main contributor to employment is informal sector that accounts for about 49 %, agriculture 13 % with 18 % being other types of employment-otherwise known as elementary occupations.

4.14.2.4 Trade

Trade comprises both formal and informal forms that encompass wholesale and retail trade, hotels, guest houses and financial institutions. The sector employs about 49 % of Temeke residents and is very important to the municipal economy, providing job opportunities and facilitating generation of income and revenue.

Informal sector activities are present in several locations in the Municipality mainly along main roads, open spaces, around markets, public institutions such as schools, hospital, public and private offices. In short, petty traders seem to operate in areas that attract people or have traffic concentrations. Major activities associated with the informal sector include: second hand cloth (*Mitumba*) sellers, fishermen, miners, masonry, food vendors, vegetable growers, carpenters, car washers, street vendors, shoe shiners, etc.

4.14.2.5 Tourism and Recreation

Several tourist hotels are available in the municipality and most of these are situated along the Indian Ocean beach stretching from Kigamboni to Pemba Mnazi.

Southeast of Temeke is the Dar es Salaam Marine Reserves System, ranked as IUCN Category II, comprising four units (Inner and Outer Mwakatobe Islands, Kendwa Island and Inner and Outer Sinda Islands), gazetted in 2007. Though very unlikely to be impacted by the Phase 1 activities, the coral life is very sensitive to sediment. If dredged sediment is to be dumped at sea, monitoring of turbidity levels and sediment trapping at selected sites is recommended.

4.14.3 Road infrastructure

The Dar es Salaam Port is surrounded by tarmac roads connecting the Port to different areas of the country. The Bandari Road connects the Port to Mandela and Kilwa roads, which links the Port to the major exits roads from the main Port.

In general, the road network around the port is congested and subject to delays resulting from the truck volume and poor condition of the road, many of which are being upgraded as part of the wider DSMGP. Parking space for fuel tankers is a particular problem at present, notably around the southern approaches to the Port. Any activity that results in the addition of traffic to the Port area will worsen the already poor traffic slow situation. Kigamboni Bridge and interchange has relatively eased the congestion of the traffic towards Kilwa Road.

4.15 Environmental Performance of the Berths 1–7 Project (Lessons Learned)

As an extension of the Berths 1–7 rehabilitation, the Berths 8–11 improvement project has the benefit of lessons learned from that earlier phase. A due diligence review of the Berth 1–7 project's

environmental and social performance was conducted, covering the adequacy of its ESMPs, the effectiveness of mitigation and monitoring, any outstanding issues, and impacts on biodiversity. The findings indicate that environmental measures during the Berth 1–7 works were generally in line with good international practice, and the lessons from that experience are being applied to strengthen the Berths 8–11 environmental management.



Figure 4-30: Showing layout of Berth 1-7 and main entrance channel (Source: Tansheq, 2024)

4.15.1 Adequacy of Past ESMPs

The Environmental and Social Management Plans (ESMPs) for the rehabilitation of Berths 1–7 (and the associated main channel dredging) were reviewed as part of this due diligence. Overall, these plans were found to be comprehensive and largely adequate, aligning with national regulatory requirements and international best practices (including the IFC Environmental, Health, and Safety Guidelines for Ports). They addressed all key impact areas such as dredging-induced water quality issues, waste management, noise and air pollution control, habitat protection, and community health and safety. The mitigation measures and monitoring programs outlined in the ESMPs were appropriate for the project's scale and nature. In particular, the dredging ESMP incorporated strategies to limit sediment dispersal and prevent contamination (for example, requiring controlled overflow of hopper dredgers and proper selection of disposal sites). The plans also established clear roles for contractors and TPA in implementing environmental measures. In summary, the ESMPs of the Berth 1–7 project were deemed **adequate**, with no major gaps in coverage of environmental and social issues.

4.15.2 Implementation of Mitigation Measures and Monitoring

TPA and its contractors implemented the Berth 1–7 ESMP through detailed contractor Environmental Management Plans and oversight mechanisms. Mitigation measures from the ESMP were put into practice and, for the most part, effectively managed the project's impacts. For instance, a water quality monitoring program was carried out throughout the dredging works, measuring parameters like turbidity and sedimentation at regular intervals. Monitoring results showed that turbidity levels were generally kept within acceptable limits, aside from occasional short-lived increases during peak dredging, which were promptly mitigated (e.g. by slowing dredging rates). The contractor adhered to waste management protocols: dredged material was disposed at designated offshore sites, and construction debris or hazardous waste was handled and transported to approved facilities, preventing pollution of the harbor. Air and noise pollution controls were also enforced – equipment was well-maintained and low-sulfur fuel was used in machinery to minimize emissions, and noisy activities were scheduled to avoid sensitive times. Noise and air quality measurements remained within the standards set by the ESMP (no persistent exceedances were recorded). Importantly, monitoring and reporting were an integral part of implementation: the contractor submitted monthly environmental progress reports, and TPA's environmental team (with input from the supervision consultant) regularly inspected the site. These reports indicate a high rate of compliance with mitigation measures. Any minor non-compliances or incidents that did occurred (such as a minor oil spill from equipment or a turbidity spike above threshold) were addressed immediately through the project's corrective action process. In sum, the mitigation measures were implemented satisfactorily, and the monitoring requirements were met, demonstrating that the ESMP was not just a document but an active management tool during Berth 1–7 construction.

4.15.3 Outstanding Environmental & Social Issues

The due diligence did not find significant unresolved environmental or social issues left over from the Berths 1–7 works. By the end of that project, any short-term construction impacts had been managed or had naturally attenuated. For example, elevated noise and dust levels during construction were temporary and subsided once the works concluded, with no lasting nuisance to the port neighbors. Marine water quality, which had some increase in suspended sediment during dredging, recovered to baseline conditions after dredging was completed (as the sediments settled and dispersed). There were no long-term contamination problems or pollution legacies observed – soil and water tests post-project did not show residual effects of concern. All dredged material was placed in the approved offshore disposal site, which has remained stable; post-project bathymetric surveys confirmed that the material is not migrating in a way that would cause erosion or smothering of distant habitats. On the social side, any community or worker grievances that arose during the Berth 1–7 project were addressed through the project's grievance redress mechanism. For instance, a few complaints from fishermen regarding temporary access restrictions during dredging were resolved by providing timely information about dredging schedules and ensuring alternative access routes. Similarly, any construction-related damage (such as to port roads or infrastructure) was repaired. By project completion, no pending issues required further action – regulatory authorities (e.g. NEMC) conducted a final inspection/audit and granted clearance that all environmental commitments had been fulfilled. This clean bill of health from the previous project gives confidence that with proper management, significant lingering issues can be avoided, and it provides a solid foundation for the Berths 8–11 phase.

4.15.4 Biodiversity Impacts from Previous Dredging

The Berth 1–7 project, particularly the dredging of the main entrance channel, had the potential to affect marine biodiversity in and around the port area. Baseline studies identified sensitive habitats such as

coral reef patches and seagrass beds in the vicinity of the project (e.g., small coral communities along the coastline near the channel). The environmental management for Berth 1–7 placed strong emphasis on protecting these resources. Mitigation measures were implemented to minimize ecological disturbance. A Cutter Suction Dredger with precise controls was used to avoid physical damage to the seabed. Silt curtains were also deployed in strategic locations (such as around active work zones near the port mouth) to contain sediment. Additionally, the timing of certain activities was adjusted to avoid sensitive periods for marine life; for instance, dredging near the harbor entrance was scheduled outside of the peak coral spawning season and fish breeding periods, to the extent possible. During construction, marine ecologists monitored the condition of nearby coral patches and recorded any changes. The results from monitoring and a post-dredging ecological survey indicated that the impacts on marine life were manageable and mostly temporary. There was some short-term reduction in water clarity and a slight increase in sediment deposition on the nearby seabed while dredging was ongoing – these effects were anticipated and classified as moderate in significance, but they did not lead to lasting harm. The coral communities showed resilience: no measurable decrease in live coral cover was observed in the monitored patches, and no significant mortality of coral or seagrass was reported as a direct result of the project. Similarly, fish populations and other marine fauna in the area were not significantly affected beyond short-term disturbance (fish were observed to avoid the area during active dredging due to noise/turbidity but returned afterward). No protected areas or critical habitats were negatively impacted – for example, the closest marine reserve is outside the influence zone of the dredging plume. Overall, biodiversity impacts from Berth 1–7's dredging were effectively mitigated, and the experience underscored the importance of rigorous sediment control and habitat monitoring, which are being carried forward into the new project.

4.15.5 Integration of Lessons Learned into Berths 8–11

The environmental performance and lessons from Berths 1–7 have been directly integrated into the planning for Berths 8–11. In the current ESIA and ESMP, mitigation measures have been refined and strengthened considering the previous project's outcomes. For example, based on the success of water quality management in Berth 1–7 and recognizing areas for improvement, Berths 8–11 will implement even more stringent turbidity control: real-time turbidity monitoring stations will be used around the dredging site, enabling immediate action if levels approach the threshold. The trigger levels for halting or adjusting dredging have been calibrated using the data from Berth 1–7's monitoring (i.e. we now know the typical turbidity plume behavior, so we can set conservative limits).

The new ESMP also calls for additional biodiversity protection measures – prior to dredging for Berths 8–11, a fresh marine ecology survey will be done in the project footprint to update the understanding of coral, seagrass, or other sensitive fauna present. If any high-value species or habitats are found in areas to be dredged or reclaimed, the project will implement special measures (for instance, transplanting corals or establishing exclusion zones) building on methods proven elsewhere.

The institutional arrangements for environmental management have likewise been enhanced. During Berth 1–7, TPA's Environmental Management Unit and the contractor's EHS team coordinated to supervise mitigation implementation; this arrangement worked well, but some opportunities for improvement were noted – for example, ensuring even more frequent reporting and clearer communication channels. Thus, for Berths 8–11, TPA has assigned a dedicated on-site Environmental Officer and will hold weekly EHS meetings with the contractor (instead of bi-weekly) to review compliance, so that any issues are caught and resolved swiftly.

An independent environmental auditor will also be engaged at key milestones to objectively verify that all ESMP measures are being followed, a step that adds oversight beyond what was done in the previous phase. Furthermore, lessons on stakeholder engagement from Berth 1–7 have been applied:

the project will continue proactive community outreach (e.g. informing local fishermen of dredging schedules well in advance, even though fishing is conducted outside the port area, maintaining access to grievance channels), acknowledging that timely communication helped avoid conflicts in the earlier project.

Lastly, specific corrective actions arising from the Berth 1–7 experience have been incorporated – for instance, spill response drills will be conducted more frequently (learning from the minor spill incident previously, to ensure absolute preparedness), and noise mitigation will include providing nearby communities with advance notice of any particularly noisy activities. These enhancements demonstrate how the Berth 1–7 “lessons learned” are shaping a more robust environmental management approach for Berths 8–11.

In conclusion, the rehabilitation of Berths 1–7 and the associated channel dredging were managed in line with good environmental practice. The experience and lessons from that project – from what worked well (effective turbidity controls, waste handling, stakeholder communication) to what could be improved (more rigorous monitoring and reporting) – have been explicitly integrated into the Berths 8–11 ESIA and project design. This ensures continuous improvement in environmental performance: the Berths 8–11 project builds on the solid foundation of the past while addressing its shortcomings, thereby committing to an even higher standard of environmental and social management for the new phase of port improvements.

CHAPTER FIVE

5 STAKEHOLDER IDENTIFICATION AND ANALYSIS

5.1 Introduction

This Chapter presents all the stakeholders identified and consulted and elaborates on the main issues and concerns raised by these stakeholders during the scoping exercise and the detailed EIA. Stakeholders were identified during the scoping stage and throughout the EIA study. Views from the public, local leaders, surrounding institutions, communities and development partners who are interested in and/or would be potentially affected by the proposed project were consulted through interviews and public meetings as mandated by the Environment Management Act, Cap 191.

The stakeholder consultations were held to ensure that interested and affected parties were informed of the project. The consultations allowed stakeholders to present their views concerning the proposed project. Recording stakeholders' views and preferences was essential to inform the identification of impacts and drawing effective mitigation measures that are presented in this report.

The main objectives of the stakeholder engagement process are to:

- Inform the stakeholders about the proposed project and provide opportunities for influencing/amending the plans;
- Collect stakeholders' views on the proposed project including potential positive/negative impacts the stakeholders may associate with the project
- Get an idea of Stakeholders' preferred approaches to implementation of the project;
- Get local knowledge on any sensitive areas within the project area of influence (physical, environmental, cultural or proposed facilities); and
- Get expert advice on land use/ area zoning, water availability and supply, power and road infrastructure

Stakeholder consultation is initiated mainly during the scoping phase as various stakeholders are identified and then proceed throughout the EIA process. There are different levels of public participation. Table 5-1 shows the categories of public participation according to the goals.

Table 5-1: Levels of Public Participation

LEVELS OF PUBLIC PARTICIPATION GOALS	
Inform	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.
Consult	To obtain public feedback for decision-makers on analysis, alternatives and/or decisions.
Involve	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered in decision-making processes.
Collaborate	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.
Empower	Inclusion of the public in the decision-making processes.

Tansheq put in place a stakeholder engagement process, which helps to:

- Identify and involve all potentially affected stakeholders
- Generate a good understanding of the project amongst those that was affected
- Identify issues early in the project cycle that may pose a risk to the environment, project or its stakeholders
- Ensure that mitigation measures are appropriate (implementable, effective, and efficient)
- Establish a system for long-term communication between the project and communities that is of benefit to all parties.

The primary goal of the Stakeholder Engagement Process is to ensure transparency and involvement of individuals, groups and organizations affected by and/or interested in the project (to be called as stakeholders) in assessing and managing the potential environmental and social impacts of the project, and to provide relevant, timely and accessible information in an appropriate and understandable format (e.g., Project Information Document) which consists of the following information:

- Introduction (project information, project program, summary of potential environmental and social impacts);
- National and international requirements;
- Consultation undertaken to date;
- Stakeholders;
- Disclosure of information and public consultation;
- Grievance management;
- Resources and responsibilities;
- Reporting; and
- Annexes: comment/complaint form; complaint action form

Table 5-2 Methods for Stakeholders Engagement

Methods of Stakeholder Engagement	
Correspondence by phone/email/Text/Instant messaging	Distribute project information to government officials, organizations, agencies and companies Invite stakeholders to meetings
Print media and radio announcements	Disseminate project information to large audiences, and illiterate stakeholders Inform stakeholders about consultation meetings
One-on-one interviews	Solicit views and opinions Enable stakeholders to speak freely and confidentially about controversial and sensitive issues Build personal relations with stakeholders Recording of interviews
Formal meetings	Present project information to a group of stakeholders Allow the group of stakeholders to provide their views and opinions Build impersonal relations with high level stakeholders Distribute technical documents Facilitate meetings using PowerPoint presentations Record discussions, comments/questions raised and responses
Public meetings	Present project information to a large audience of stakeholders, and in particular communities Allow the group of stakeholders to provide their views and opinions Build relationships with Neighbouring communities Distribute non-technical project information Facilitate meetings using PowerPoint presentations, posters, models, videos and pamphlets or project information documents Record discussions, comments/questions raised and responses

Methods of Stakeholder Engagement	
Workshops	Present project information to a group of stakeholders Allow the group of stakeholders to provide their views and opinions Use participatory exercises to facilitate group discussions, brainstorm issues, analyse information, and develop recommendations and strategies Recording of responses
Focus group meetings	Allow a smaller group of between 8 and 15 people to provide their views and opinions of targeted baseline information Build relationships with Neighbouring communities Use a focus group interview guideline to facilitate discussions Record responses
Surveys	Gather opinions and views from individual stakeholders Gather baseline data Record data Develop a baseline database for monitoring impacts

5.2 Lessons Learned from Berths 1–7: Institutional Arrangements, Reporting and ESHS Management Implications for the Current Project

This section does not describe activities that form part of the current Berths 8–11 project scope. Rather, it provides a lessons-learned and due-diligence review of the environmental and social management arrangements applied during the earlier Berths 1–7 improvement works and related port expansion activities. The purpose of including this section is to identify institutional, reporting and implementation experience from the previous phase that is relevant to the planning and management of the current project. The findings are therefore used to inform the current ESIA, ESMP, monitoring arrangements, contractor management requirements and reporting obligations for Berths 8–11, rather than to redefine the present project scope.

Assessing the institutional arrangements and reporting for the construction of Berths 1-7 is essential to ensure effective management, compliance with environmental and safety standards, and overall project efficiency. Key aspects to review include the roles and responsibilities of involved agencies, coordination mechanisms, communication channels, and reporting structures. Current arrangements likely involve collaboration among TPA, regulatory agencies, construction contractors, and environmental and safety consultants as well as supervision consultant, OSHA, MPRU and Ministry of Livestock and Fisheries. Evaluating how responsibilities are divided, how information flows between these stakeholders, and whether oversight mechanisms are adequately enforced is critical. Existing reporting channels should also facilitate timely and transparent updates on project milestones, environmental performance, safety compliance, and incident responses.

To strengthen these arrangements, it would be beneficial to establish a dedicated project management committee with representatives from TPA, environmental bodies, safety regulators, and local government authorities. Regular progress meetings, centralized data sharing, and a formalized incident-reporting protocol would help improve oversight. Additionally, implementing a digital reporting system could streamline data collection and analysis, allowing real-time monitoring and faster response to any compliance or environmental issues. Integrating these measures would support clear accountability, enhance communication, and align the project with best practices in infrastructure development.

Accordingly, the institutional observations presented in this section should be read as background due diligence and lessons learned from previous port improvement works, with direct relevance to the design of the current ESMP and implementation arrangements for Berths 8–11.

5.3 Stakeholder Consulted

5.3.1 Institutional Stakeholders

Institutional stakeholders identified based on their involvement in decisions that might affect the proposed development or the stakeholder. The Institutional stakeholders include:

- Ministry of Transport and Communication;
- Ministry of Land Housing and Human Settlements
- Tanzania Forestry Services (TSF)
- Tanzania International Container Terminal Services (TICTS)
- Tanzania Shipping Agencies Cooperation (TASAC)
- Tanzania Revenue Authority (TRA)
- Tanzania National Roads Agency (TANROADS)
- Marine Parks and Reserved Units (MPRU)
- Tanzania Shipping Agency Company (TASAC)
- Tanzania Railway Limited (TRL)
- National Health Insurance Fund (NHIF)
- Energy and Water Utilities Regulatory Authority (EWURA)
- Reli Assets Holding Company (RAHCO)
- Shipping Corporation of Zanzibar (SHIPCO)
- Mwalimu Nyerere Memorial Academy
- Tanzania Navy Base (Kigamboni)
- Ferry Management
- Regional Government Regional Commissioner (RC) and District Commissioner (DC); and
- Local Government (Dar es Salaam City, Temeke and Kigamboni Municipal Council)
- Local Government (Mchafukoge Ward, Kurasini Ward, Kivukoni Street)
- Police Force (Marine Unit)
- Fire and Rescue Force
- Neighbouring institutions such as CRDB, NMB, NHIF, etc.

5.3.2 Other Stakeholders

Individual stakeholders refer to those occupying, owning, living or working within the AOI and surroundings that may be impacted upon resulting from project implementation. They include: surrounding Communities/Residents/affected village, fishermen and other port users.

5.4 November 2025 Stakeholder Consultation Update

In addition to the earlier scoping and baseline consultation undertaken during the initial stages of ESIA preparation, a further stakeholder consultation round was undertaken in November 2025 to confirm the continued relevance of previously raised issues and to identify any new concerns arising from the updated project design, revised baseline information and proposed mitigation measures. The November 2025 consultation update focused particularly on institutional stakeholders and port users,.

The purpose of the November 2025 consultation update was not to restart the stakeholder engagement process from the beginning, but rather to validate whether the concerns raised during earlier consultations remained applicable, whether any new concerns had emerged, and whether the revised ESIA responded adequately to stakeholder priorities. The findings of the November 2025 round have therefore been consolidated with the earlier consultation results and are presented in Section 5.4 as an integrated stakeholder issues matrix. Where an issue was raised in both rounds, it is treated as a persistent stakeholder concern. Where an issue was emphasized more strongly during the November 2025 round, it is treated as a reconfirmed and strengthened concern. Where necessary, the revised

ESIA has responded to these concerns through updates to the baseline chapters, the impact assessment, and the Environmental and Social Management Plan (ESMP).

5.5 Main Concerns and Comments of Stakeholders

The stakeholder concerns presented below combine issues raised during the earlier ESIA consultation stages and those confirmed or updated during the November 2025 consultation refresh round. To avoid duplication, the comments have been consolidated by theme rather than by consultation date. Where a concern was raised in both rounds, it is presented as a persistent concern. Where it was sharpened or restated during the November 2025 consultation update, it is presented as a reconfirmed concern. The table also indicates how each issue has been addressed in the revised ESIA and identifies the section(s) of the report where the response is reflected.



Figure 5-1: Public meeting held at different location within the Project's Areas of Impacts (Tansheq, October 2021)

In additional to that Tansheq, consulted key stakeholders issued their comments and concerns regarding the project and TPA Operations in general is summarized in Table below.

Table 5-3: Consolidated Stakeholder Issues from Earlier Consultations and the November 2025 Update Round

Stakeholder Issue or Concern	Likely Stakeholders	Earlier Consultation	November 2025 Update	How the Concern Has Been Addressed In The ESIA	Where Addressed in the Report
The project is necessary and should proceed because port congestion is affecting trade, prices, reliability and jobs.	Ministry of Works and Transport, freight/logistics users, business community, local leaders	Raised	Reconfirmed	The ESIA responds by justifying the project in terms of berth deepening, structural strengthening, improved efficiency, larger vessel handling and wider economic benefits.	2.3 Project Objectives and Justification; 10.4 Description of Benefits
Ferry management must be closely coordinated because works near the ferry area could cause delays or accidents.	Magogoni Ferry Manager, TEMESA/ferry operators, TASAC, marine police	Raised	Reconfirmed	The ESIA addresses this through coordination, marine-safety controls, navigation management and communication during implementation.	5.4 Main Concerns and Comments of Stakeholders; 7.3.2 Construction Phase Impacts; 9.2 Impact Mitigation and Enhancement Plan; 9.3 ESMP
TPA should maintain continuous communication with ferry management during implementation.	Ferry management, marine transport operators, TASAC	Raised	Reconfirmed	The ESIA indicates that ferry-related stakeholders will continue to be engaged during implementation and that coordination is part of construction planning and operational controls.	5.4; 2.5 Phases of Implementation; 9.2–9.3
Stakeholders are willing to cooperate with the project if properly engaged.	Local institutions, ward leaders, community representatives, educational institutions	Raised	Reconfirmed	The ESIA responds by emphasizing continued consultation, information disclosure, two-way communication and the grievance redress mechanism.	5.3 Stakeholder Consulted; 5.4; 9.3 ESMP
TPA has historically supported local institutions and communities and should continue good relations.	Kurasini Ward Office, Temeke Municipal Council, mtaa leaders, nearby institutions	Raised	Reconfirmed	The ESIA responds through commitments on community engagement, coordination with local authorities and institutional responsibilities for stakeholder relations.	5.3.1 Institutional Stakeholders; 5.4; 9.4 Institutional Responsibilities and Coordination

Stakeholder Issue or Concern	Likely Stakeholders	Earlier Consultation	November 2025 Update	How the Concern Has Been Addressed In The ESIA	Where Addressed in the Report
Existing local livelihoods linked to port activity should not be harmed.	Small traders, food vendors, transport providers, nearby service businesses, local leaders	Raised	Not Consulted in Second Round	The ESIA addresses this through phased works, socio-economic mitigation, stakeholder coordination under the ESMP.	Executive Summary; 7.3.2 Construction Phase Impacts; 9.2–9.3
Dredging and marine works could disturb fish, reduce catches and interfere with landing access.	Fishers, fish-market traders, Beach Management Units, marine-resource users	Raised	Not Consulted in Second Round	The ESIA responds through timing of works where practicable, advance notice, and grievance measures.	Executive Summary consultation results; 7.3.2; 9.2–9.3
Fishers want advance notice of exclusion zones and navigation restrictions.	Fishers, boat operators, fish traders, marine police	Raised	Not Consulted in Second Round	The ESIA responds through communication procedures, marine safety controls and ongoing liaison during implementation.	Executive Summary consultation results; 9.2–9.3
Workers and terminal operators are concerned that construction may interrupt operations and affect jobs.	TICTS (Former container terminal operato)/, port workers, labour representatives, TPA operations staff	Raised	Reconfirmed	The ESIA responds by committing to phased works and by stating that affected workers would be absorbed by TPA and/or provided continuity of employment rather than laid off. However, Currently TICTS are no longer operating the container terminal anymore after contract expire, TPA have absorbed all workers (this has nothing to do with the project). However, the assurance to TPA staff is still there, constructions works will be phased, no staff will be laid off because of the project.	Executive Summary consultation results; 2.5 Implementation Phases; 7.3.2
Communities near access roads are concerned about truck traffic, congestion, dust, noise and pedestrian safety.	Residents near port access roads, ward/mtaa leaders, schools, roadside businesses	Raised	Not Consulted in Second Round	The ESIA responds through traffic management, speed limits, traffic marshals, road maintenance, dust suppression and monitoring.	Executive Summary consultation results; 7.3.2; 9.2–9.3

Stakeholder Issue or Concern	Likely Stakeholders	Earlier Consultation	November 2025 Update	How the Concern Has Been Addressed In The ESIA	Where Addressed in the Report
Dust control during the dry season is especially important.	Nearby communities, roadside businesses, school/clinic receptors, ward leaders	Raised	Reconfirmed	The ESIA responds through watering, covering loads, speed control, equipment maintenance and dust monitoring.	Executive Summary mitigation summary; 9.2–9.3; 9.3.2 Environmental and Social Monitoring Plan
Stakeholders want a functioning complaints / dialogue channel and continued information during implementation.	Nearby communities, fishers, workers, local leaders, ferry users	Raised	Not Consulted in Second Round	The ESIA states that a grievance redress mechanism has been designed and that consultation and communication will continue during implementation.	Executive Summary stakeholder sections; 5.4; 9.3 ESMP
Worker and community health and safety standards must be maintained during works.	OSHA, local government, communities, workers, port operator	Raised	Reconfirmed	The ESIA responds through health and safety planning, emergency arrangements, training, PPE, inspection and supervision requirements.	Executive Summary mitigation section; 3.6 Institutional Framework; 9.2–9.5
Sensitive marine habitats and reserves must not be affected indirectly by dredging or disposal.	Marine Parks and Reserves Unit, NEMC, fisheries authorities,	Raised	Reconfirmed / strengthened	The ESIA responds by treating reefs, seagrass, mangroves and reserve areas as wider sensitive receptors and by assessing the selected disposal site separately.	4.10 Marine Ecology Baseline; 4.11 Baseline Information of the Selected Sediment Disposal Site; 7.3.2
Disposal-site suitability, sediment behaviour and marine pollution risks must be clearly managed.	NEMC, TASAC, Marine Parks and Reserves Unit, fisheries authorities, TPA technical team	Raised	Reconfirmed / strengthened	The ESIA responds through the selected disposal-site baseline, comparative justification, impact assessment and ESMP commitments.	4.11; 7.3.2; 9.2–9.3
Oil spill preparedness and marine emergency response must be in place.	TASAC, marine police, TPA, terminal operator,	Raised	Reconfirmed	The ESIA responds through the Oil Spill Contingency Plan and emergency management provisions in the ESMP.	Appendix III Oil Spill Contingency Plan; 9.2–9.3

The consolidated stakeholder issues matrix above shows that the November 2025 consultation update largely reconfirmed the key concerns that had already been identified during earlier consultation stages**,** particularly those related to marine livelihoods, ferry coordination, worker and community safety, traffic, dust, noise, grievance management, and protection of wider marine receptors. The revised ESIA has therefore treated these issues as persistent stakeholder priorities and responded to them through strengthened baseline chapters, more explicit impact assessment, and more detailed ESMP commitments.

Table 5-4: **Representative of Institutional Stakeholders Consultated**

Institution	Contact Person
Tanzania International Container Terminal (TICTS	Mr. John Masasi (Healthy & Safety Coordinator)
Marine Parks and Reserved Units (MPRU)	Mr. Pagu Julius; Senior Marine Warden
Tanzania Shipping Agency Company (TASAC)	Kaimu Abdi Mkeyenge (Director General)
National Health Insurance Fund (NHIF)	Eng simon seleman
Mwalimu Nyerere Memorial Academy	Mr. Nasaru Musa
Ferry Management	Eng. Samwel Chibwana
Tanzania Mechanical and Electronics Agency (Manager- TEMESA)	Eng. Luhombe Kmg'ombe
Kigamboni ward	Nobert C. Nestory (WEO)
Kurasini Ward	Editruda Goodluck (WEO)
Ministry of lands,Housing and Human Settlements Development	Ass. Director Physical Planning and Design
Ministry livestock and fisheries	Mr. Melton.E. Kalinga Head of Environment department
Magogoni Ferry Market Leaders	Member
Fisheries community	Members
POLICE MARINE	ASP-OP Office marine
Tanzania forest services	John E. Rutagwaba Principle Conservation Officer
OSHA	Esther J Salum Occupation Hygiene Inspector

Institution	Contact Person
Kigamboni Municipal council	John. Mauna Municipal Environmental Management Officer
Temeke Municipal council	Dominick Salamba Municipal Environmental Management Officer
Kivukoni Mtaa	Blandina Lucas Mlurya Chairpeson
Mchafukoge ward	Zaina Mashitee Ward Executive Officer

5.6 Conclusion

The public in general, are in acceptance of the project albeit there some concerns regarding to disruption of fisheries activities, ecological impacts as well as congestions of roads. All issues raised during consultation are responded accordingly in Environmental and Social Management plan that is included in this report

CHAPTER SIX

6 ENVIRONMENTAL DUE DILIGENCE REVIEW OF PREVIOUS PORT EXPANSION ACTIVITIES

6.1 Introduction

This chapter reviews the environmental and social performance of recent port improvement works at Dar es Salaam Port—specifically the rehabilitation and deepening of Berths 1–7 (including the RoRo terminal) and the dredging of the main entrance channel, harbor basin, and turning circle. These works were completed under the Dar es Salaam Maritime Gateway Project (DSMGP) prior to the proposed Berths 8–11 improvements.

In accordance with the Terms of Reference (ToR) for the current ESIA, a due diligence assessment has been undertaken to evaluate how well the Environmental and Social Management Plans (ESMPs) for the Berths 1–7 and channel dredging projects were implemented, the effectiveness of mitigation measures and monitoring, and any residual or legacy issues that need to be considered for the new project. This chapter is prepared to meet National Environment Management Council (NEMC) and World Bank requirements for reviewing past project performance as input to future impact management. Key findings, lessons learned, and implications for the Berths 8–11 ESIA are presented, supported by field data updates and referenced sources.

6.2 Overview of Prior Port Improvement Works

The rehabilitation of Berths 1–7 was part of Phase 1 of the port modernization program, aimed at strengthening aging quay structures and deepening the berth draft to accommodate larger vessels. Construction on Berths 1–7 began around 2017 and was substantially completed by 2022 under DSMGP financing. The works involved demolishing and reconstructing berth pavement and walls, installing deeper pilings, and dredging the berth pockets from ~8–10 m depth to approximately 14.5 m below chart datum. The entrance channel, inner harbor basin, and turning circles were likewise dredged and widened to improve navigation for Panamax ships. Figure 6.1 below shows the general layout of the port and areas dredged, including the 5 km entrance channel out to the harbor approaches and the inner basin up to Berth 11.



Figure 6.1: Map of Dar es Salaam Port showing areas dredged during Berths 1–7 rehabilitation and channel deepening

Dredging works were carried out between 2019 and 2021. According to the detailed design and ESIA, the channel was deepened from ~10 m to about 15.5 m, and two new turning circles (≈500 m diameter) were created. Approximately 11 million cubic meters of sediments (mostly clayey silt, sand, and some coral fragments) were removed in this phase. These dredged materials were disposed at a designated offshore dumping site, selected through hydrodynamic modelling to minimize environmental impact. The chosen disposal site was located about 10–15 km northeast of the channel in deep water, well away from coastlines and ecologically sensitive areas. No land reclamation or onshore spoil placement was undertaken, as sediment quality analysis confirmed the material was suitable for unconfined ocean disposal. In addition to dredging, the project involved removal of several derelict shipwrecks (six were identified) from the harbor to ensure safe navigation. On the social side, the Berths 1–7 works were confined within the port and did not require any land acquisition or physical resettlement. However, the modernization entailed mechanization that could affect port workers (e.g. reduction of casual labor roles), which was considered in the social impact assessment and management plan. Overall, the prior improvement works achieved their objectives of increasing the port's depth and capacity and were completed within the existing port footprint with no expansion into new marine or community areas.

6.3 Adequacy and Implementation of ESMPs

Both the Berths 1–7 rehabilitation and the channel dredging components were subject to detailed Environmental and Social Management Plans (ESMPs) developed during the ESIA process. The ESMPs covered mitigation measures for construction-phase impacts (such as noise, dust, dredge sediment plumes, waste management, and worker/public safety), as well as operational-phase considerations (e.g. maintenance dredging and continued monitoring). These ESMPs were found to be comprehensive and aligned with national environmental requirements and World Bank safeguards. Key plans within the ESMPs included a Dredging Management Plan, Waste (Spoil) Disposal Plan, Occupational Health and Safety Plan, Traffic Management Plan, Stakeholder Engagement Plan, and others.

In terms of implementation, the ESMP measures were contractually required of the contractors. The ESIA for Berths 1–7 explicitly required that the ESMP be included in bidding and contract documents, obligating

the contractor to implement all mitigation measures as a condition of project execution. The Tanzania Ports Authority (TPA), as implementing agency, engaged a supervision consultant and environmental specialists to oversee compliance with these measures during construction. This supervision included regular site inspections, review of contractor method statements (for activities like pile-driving and dredging), and monitoring reports. For instance, adherence to the Dredging Management Plan was monitored by checking that the contractor employed the specified dredging techniques (e.g. use of a Trailing Suction Hopper Dredger with controlled overflow) and followed the defined work boundaries.

Generally, the ESMPs proved adequate in identifying impacts and prescribing mitigation. During execution, most planned measures were put into practice effectively. The contractor prepared a Construction Environmental Management Plan that refined the ESMP into specific, actionable items (such as exact locations for monitoring, equipment maintenance schedules, waste handling protocols, etc.). An independent Environmental Supervisor was on site to ensure implementation. As a result, no major non-compliances were reported. A few minor gaps that were noted (e.g., initial delays in deploying some dust suppression equipment and an instance of noise exceeding guidelines near the fish market) were promptly corrected through the project's adaptive management and oversight mechanisms.

To illustrate ESMP implementation, **Table 6.1** summarizes selected key mitigation measures and their performance during the Berths 1–7 and channel dredging works:

Table 6-1: ***ESMP Mitigation Measures and Performance for Berths 1–7 Rehabilitation and Channel Dredging.*** **(Source: DSMGP Environmental Supervision Reports and Monitoring Data, 2019–2022 and ESIA Documents**

Aspect	Key Mitigation Measures (from ESMP)	Implementation & Performance
Water Quality (Turbidity)	• *Controlled dredging methodology (CSD);* • *Real-time turbidity monitoring at multiple locations (near dredge, at disposal site, and reference points);* • *Work stoppage or modification if turbidity exceeded thresholds.*	**Implemented.** Dredging was conducted mostly with a hopper dredger as planned, and overflow was minimized to limit sediment plumes. Turbidity monitors were deployed around the dredging and dumping areas. No exceedance of the ESMP turbidity thresholds was recorded outside the immediate work zones. Plume modeling and field observations indicated turbidity impacts were localized; sensitive receptors along the Dar es Salaam and Zanzibar coasts saw only negligible increases (e.g. <0.1–0.2 g/m³ of suspended sediment), which were considered insignificant.
Marine Ecology (Coral Reefs & Benthic Habitats)	• *Site selection for offshore disposal at location with minimal ecological sensitivity (no coral reefs or important habitats in dumping zone);* • *No dredging in marine reserve areas; avoid coral patches near channel;* • *Water quality controls to prevent sedimentation on nearby coral reefs;* • *Post-dredging benthic survey to monitor habitat recovery.*	**Implemented.** The designated disposal site was ~32 km from the port, in deep open water well away from coral reefs and fishing grounds. No marine protected areas were affected by the dredging (see Figure 6.1). By using the offshore site and limiting turbidity, the project avoided significant smothering of corals. Indeed, the ESIA's modelling predicted that even in worst-case scenarios the sediment plume would not measurably harm the nearest coral reefs, a conclusion borne out by the absence of observed coral stress during and after dredging. Benthic invertebrate communities at the disposal site were initially disturbed by spoil deposition, as expected, but are projected to gradually recover; these sites had relatively low biodiversity value prior to dumping (mostly containing opportunistic polychaete worms and mollusks). A follow-up benthic survey (Annex 6A) shows early signs of benthic recolonization within one year of dredging, indicating no permanent ecological damage.

Aspect	Key Mitigation Measures (from ESMP)	Implementation & Performance
Fisheries and Livelihoods	• *Advance notice to fishing communities of dredging schedule and exclusion zones* • *Temporary safety zones to keep fishing canoes away from active dredging for safety* • *Timing of intense dredging activities to avoid peak fishing times where possible – Grievance mechanism and community liaison to handle fishermen's complaints or claims (e.g. if gear is damaged* • *Alternative livelihood support or compensation if fish catches were adversely impacted (to be triggered if monitoring shows significant decline attributable to project).*	**Implemented.** TPA and the contractor's Community Liaison Officer engaged coastal fishermen groups in Kigamboni, Kivukoni, and other landing sites prior to and during dredging. Fishers were informed of the works and navigational warnings were issued. During the dredging period, fishermen temporarily avoided the channel area; no accidents or conflicts were reported. Because the dredging plume stayed mostly within the channel and offshore, fish were only mildly displaced and largely returned once turbidity subsided. The ESIA had anticipated only minor, short-term impacts on fisheries, and indeed **no lasting reduction in local fish catches** was observed. Baseline fish catch data from the Dar es Salaam coastal waters, compared to data during and after dredging, showed fluctuations within normal range and no clear project-linked decline. Consequently, no compensation scheme was triggered, as no significant livelihood losses were attributable to the project. Fishermen did express some concerns about water quality and fish during consultations, but ultimately were satisfied that the project was beneficial for port efficiency and had minimal impact on their activities.
Noise, Vibration and Air Quality	• *Use of well-maintained modern equipment (with mufflers, emission controls);* • *No nighttime piling or loud works near residential areas; schedule heavy noise activities during daytime;* • *Dust suppression on haul roads and work areas (water spraying);* • *Monitoring of ambient dust ($PM_{2.5}$/PM_{10}) and noise at nearest receptors (port boundary, fish market, Kigamboni community).*	**Implemented.** Construction noise and air emissions were generally within the limits. Piling for berth works was completed during daylight hours as required, and high-noise activities were not conducted at night near the port edges. Noise monitoring near the Kivukoni fish market and Kigamboni side indicated levels occasionally approaching the guideline (due to machinery and vessel engines) but remained below regulatory limits after mitigation (e.g. use of noise barriers and scheduling) – see Annex 6A for monitoring data. Air quality remained good; particulate matter (dust) levels at the port boundary stayed within Tanzania standards and World Bank EHS guidelines. The contractor's dust control (regular water spraying of dry surfaces and covering of spoil during transport) was effective, and there were no community complaints about dust. Overall, any air/noise impacts were temporary and localized to the port, with no lasting effects.

Aspect	Key Mitigation Measures (from ESMP)	Implementation & Performance
Occupational Health & Safety (OHS)	• *Comprehensive Health and Safety Plan for construction, per OSHA 2003 and World Bank EHS Guidelines* • *Job hazard analysis and training for all workers (working over water, heavy lifting, etc.);* • *Provision of Personal Protective Equipment (PPE) and enforcement of PPE use on site;* • *On-site first aid facilities and emergency response plan (including oil spill response for marine works);* • *Safety inspections and incident reporting protocols.*	**Implemented.** The project maintained a strong safety record. The contractor's OHS plan was vetted and approved by the supervision team. All workers received safety induction and task-specific training (e.g. divers, crane operators). PPE (hard hats, life jackets, ear protection, etc.) was worn consistently, with supervisors enforcing compliance. No major accidents (fatalities or serious injuries) occurred during Berth 1–7 works or dredging. Minor incidents (sprains, minor falls) were recorded and handled through first aid on site. There were also no marine accidents: the dredging contractor deployed exclusion zones and marine traffic controls to prevent collisions or worker overboard incidents. Regular safety audits were conducted, and the Tanzania OSHA office and World Bank supervision missions also reviewed OHS performance. Their feedback was positive, noting good compliance with safety standards.
Community Health & Safety	• *Secure work areas to prevent public access (port area was restricted, with security maintained;* • *Marine navigation alerts and harbor traffic management to prevent accidents with third-party vessels;* • *HIV/AIDS awareness and prevention program for workforce and local community; distribute condoms and conduct sessions (as per contractor's obligations);* • *Worker Code of Conduct to prevent misconduct in local communities (no harassment, etc.).*	**Implemented.** The port improvement works were inside the port security perimeter, so the public was generally not exposed to construction hazards. The project coordinated with the Dar es Salaam Marine Police and Tanzania Ports Authority on harbor traffic management, issuing Notices to Mariners about dredging operations. No incidents occurred involving ferries or fishing boats. On the health outreach side, the contractor partnered with a local NGO to deliver an HIV/AIDS awareness program to workers and neighboring community members. Toolbox talks and community sessions covered safe sex and disease prevention, which was important given the influx of workers. A Code of Conduct was in place and enforced; there were no reports of worker misconduct in communities. This proactive approach helped ensure the project did not contribute to any rise in communicable diseases or social ills. NEMC inspectors noted the effectiveness of these measures during their visits.

Aspect	Key Mitigation Measures (from ESMP)	Implementation & Performance
Waste Management	• *Implement Waste Management Plan: segregation of wastes, proper containment;* • *Timely collection and disposal of construction wastes by licensed handlers;* • *Dredged sediments disposal strictly at approved offshore site; no dumping in unauthorized areas;* • *Monitor water/sediment quality around disposal site for any contamination.*	**Implemented.** Solid waste from construction (scrap metal, concrete debris, packaging, etc.) was collected in designated skips and disposed through approved waste contractors to NEMC-licensed landfill sites. No improper dumping on-site was observed. Hazardous wastes (oil rags, used oil, paint cans) were stored securely and handed over to a licensed hazardous waste handler. For dredged material, **all** dredge spoil was placed at the designated offshore site (Option-4 as per the ESIA) in accordance with the plan. The disposal operations were monitored via bathymetric surveys to ensure material was deposited within the expected area. Environmental monitoring at and around the disposal site (water quality sampling for turbidity, heavy metals, etc.) showed no significant spread of contaminants. Trace levels of hydrocarbons and metals in water were below detection or within baseline range after disposal. These results confirm that the waste management and disposal measures were adequate and effectively implemented.

Overall, the implementation of the ESMPs for the prior works was satisfactory. The mitigation measures were largely carried out as planned, and monitoring evidence indicates they were effective in minimizing impacts. The involvement of experienced contractors and constant supervision/oversight was key to this successful outcome. A few minor non-conformance issues encountered were quickly rectified, and no significant adverse incidents occurred. The adequacy of these ESMPs is further demonstrated by the fact that the project remained in compliance with its NEMC EIA Certificate conditions throughout (regular NEMC audits found no serious violations).

6.4 Environmental and Social Monitoring Performance

Environmental and social monitoring was an integral part of the ESMP implementation. Both projects (Berths 1–7 works and dredging) established a monitoring program to track key indicators during construction and operation, as summarized below:

6.4.1 Water Quality Monitoring

Water turbidity, total suspended solids (TSS), and other parameters (pH, dissolved oxygen, etc.) were monitored at four locations within the project influence area. These included points near the dredging site (inside the port channel), at the ocean side of the approach channel, near the offshore disposal site, and a control site eastward of the port. Monitoring was conducted regularly (some parameters continuously via turbidity sensors on the dredger, others via weekly grab samples). The **p**erformance target was to ensure turbidity levels outside the immediate dredging zone did not exceed a specified threshold above ambient. Results: The monitoring data show that turbidity spikes were mostly confined to within ~500 m of the dredger and within a few kilometers of the dump site during active dumping. No long-lasting plume was detected; measurements at the edge of the sensitive areas (e.g. near marine reserves or shoreline) remained low (e.g., TSS increases <5 mg/L). These outcomes correlate with the ESIA modeling that predicted negligible plume impact at the coast. Water quality returned to baseline levels shortly after dredging completion.

6.4.2 Marine Ecology Surveys

Baseline and post-works surveys were carried out for benthic habitats and coral reef health. Prior to dredging, marine biologists surveyed the channel and proposed disposal area (Annex 6B contains the full baseline survey report). They found no live coral communities in the immediate dredge or disposal footprints, only sparse seagrass in some shallow channel edges and common benthic fauna (polychaetes, crustaceans) in sediments. Following the completion of dredging, a dive survey at nearby coral reef sites (such as Bongoyo Island reefs, ~10 km north of channel) showed no observable sediment stress or coral mortality attributable to the project. Likewise, a benthic grab sampling at the disposal site several months after dumping found that benthic organisms were recolonizing the new sediment; species found were like those in baseline (indicating resilience). These monitoring results suggest that no significant residual ecological impacts persisted beyond the construction period.

6.4.3 Air Quality and Noise Monitoring

An environmental firm engaged by TPA monitored ambient air and noise at the port boundary (near the Zanzibar ferry terminal and Kurasini) during peak construction periods. According to the monitoring records, PM_{10} and $PM_{2.5}$ concentrations remained within Tanzania's standards and World Bank guidelines (annual $PM_{2.5}$ ~12 µg/m³, short-term peaks well below 50 µg/m³). Noise levels at the closest community (Kigamboni side) were mostly under 55 dB(A) in daytime (occasionally peaking to ~60 dB during piling). These levels

complied with relevant limits for industrial areas adjacent to residential zones. The contractor adjusted work hours and used noise abatement measures where needed, which is reflected in the acceptable monitoring outcomes. No noise or air pollution grievances were filed by the public, indicating community expectations were met.

6.4.4 Social Monitoring

The project's social team tracked indicators such as workforce demographics, local employment, grievance records, and community health statistics. By project's end, it was reported that over 75% of unskilled labor jobs went to Tanzanians (many from the Dar es Salaam area), fulfilling local content commitments. The grievance mechanism was accessible via a hotline and local liaison; only a handful of minor grievances were recorded (e.g. concerns about construction traffic and one complaint of fishing net allegedly damaged by a work boat). All grievances were resolved through mediation or compensation (in the net case, the fisherman was reimbursed). Health data from local clinics did not show any spikes in HIV or other illnesses attributable to the construction workforce – a positive sign that mitigation (education, condoms, etc.) was effective. The project also monitored traffic safety (given increased truck movements for delivering materials to Berths 1–7). There was no serious road accidents reported under the project's scope.

6.4.5 Conclusion on Monitoring Performance

The monitoring program thus provided timely feedback and helped verify that environmental and social measures were working. Importantly, it allowed the project team to respond quickly if any issue was detected. For example, when slightly elevated noise was measured near the fish market early in construction, additional noise barriers were installed and the schedule was adjusted, which subsequent measurements showed to be effective. This adaptive management approach demonstrates strong performance in ESMP monitoring.

All monitoring results and compliance records have been documented in quarterly environmental reports submitted to NEMC and the World Bank. These reports (see Annex 6A for excerpts) confirm that the project remained in compliance with key environmental quality standards throughout implementation. NEMC officials carried out periodic inspections, and no violations or stop-orders were issued. In September 2025, NEMC commenced a special environmental audit of major development projects in Dar es Salaam (including port projects) and noted that permitted projects were generally adhering to their EIA commitments. This external oversight further validates that the monitoring and compliance performance for Berths 1–7 and the channel dredging was satisfactory.

6.5 Unresolved or Residual Impacts

A critical part of this due diligence is identifying any unresolved or residual impacts from the prior works that may carry over or need attention. Based on the evaluation of monitoring data and site conditions post-project, the following residual impacts (and their status) have been noted:

6.5.1 Marine Water Quality and Sediment Plume

No chronic turbidity issues remain following the dredging. The water in the harbor and along the adjacent coast returned to normal clarity shortly after the dredging was completed. Satellite images and water monitoring do not show any persistent sediment plumes. The only potential residual impact is a subtle change in sedimentation patterns due to the deeper channel: modeling suggests the deepened channel

and basin act as a sediment trap, with an estimated infill rate of a few centimeters per year. This means maintenance dredging will be needed every ~5–10 years to maintain depths. This is a manageable impact but should be noted as a long-term outcome of the initial dredging (essentially shifting natural sediment deposition processes).

6.5.2 Biodiversity (Coral Reefs, Seagrass, Mangroves)

The dredging and berth works did not directly remove any coral reef or mangrove habitats. As discussed, coral reefs near the port (e.g., those fringing the outer coast of Dar es Salaam) were not measurably affected by the sediment plume. Post-project assessments found no residual damage to these ecosystems. Seagrass beds inside the harbor (which were limited in area) may have been smothered or removed in dredged zones, but these were not critical or extensive habitats. Some natural recolonizations of seagrass might occur in shallower fringes over time. No endangered marine species were reported as harmed. Thus, no significant residual biodiversity impacts are present. However, the ecological *improvement* from removing sunken wrecks can be noted: eliminating those sources of potential pollution (and navigational hazard) likely reduced long-term risk of contaminant leaks (oil, etc.) into the harbor.

6.5.3 Fisheries Impacts

As noted, fisheries were only temporarily disturbed. There is no evidence of ongoing fish stock depletion or altered fish behavior due to the prior project. Fisherfolk have resumed normal activities in the harbor area. Any slight changes in benthic communities in dredged areas (e.g. fewer shellfish in deepened areas) are not significant enough to affect fish catches. In summary, no lasting residual impact on fisheries is evident. Local fishermen have not reported any continued problems attributable to the port deepening.

6.5.4 Sediment Quality and Contamination

One concern was whether dredging would resuspend or spread any contaminated sediments (historically, parts of the harbor had elevated heavy metals from port operations). The mitigation was careful dredging and offshore disposal. Follow-up sampling showed contaminant levels in water and sediments after dredging were within safe ranges. The contaminated fraction of sediment, if any, was diluted and buried at the offshore site. Thus, no residual contamination issues in the harbor or along the coast have been identified. The harbor's sediment quality may have improved slightly, since dredging removed some accumulated pollutants in port berths.

6.5.5 Coastal Morphology and Erosion

A potential legacy impact of deepening a port is changes to wave and current patterns that could exacerbate coastal erosion. In Dar es Salaam's case, coastal erosion has been an ongoing issue since before port deepening (notably at places like Kunduchi to the north). Analysis in the ESIA indicated that port development might have some influence on local hydrodynamics but distinguishing that from broader shoreline processes is complex. To date, there is no evidence of new erosion problems directly linked to the Berths 1–7 or channel works. Shoreline monitoring by local authorities has not identified any accelerated erosion in the immediate vicinity of the port or the nearby coast that can be attributed to the recent dredging (erosion hot spots remain, but that pre-date the project and relate to other factors like sand mining and natural sediment deficits). Nonetheless, this remains a point for ongoing observation – the ESIA recommended periodic shoreline change surveys as part of the cumulative impact monitoring.

6.5.6 Socio-Economic Residuals

The modernization of Berths 1–7 delivered positive economic benefits (improved port efficiency, reduced ship waiting times) which indirectly benefit the public and businesses. On the potentially negative side, one social impact was the redundancy of some port labor due to mechanization. TPA and the government have managed this through retraining and reassignments where possible. As of this review, there are no unresolved labor disputes from the project – any workforce reductions were handled per labor management plans (e.g. offering retirement packages). No communities were displaced, and no cultural heritage was affected, so there are no legacy issues on those fronts.

6.5.7 Conclusion of Unresolved or Residual Impacts

In conclusion, no significant adverse residual impacts remain from the Berths 1–7 and channel improvement projects. Environmental conditions have largely stabilized to baseline levels, and social conditions have normalized. The few lasting effects (like the need for periodic maintenance dredging and vigilance on coastal processes) are manageable through routine operations and monitoring. This finding is important for the current ESIA, as it indicates that the previous phase did not leave behind problems that could compound the impacts of the new Berths 8–11 project. We will, however, carry forward certain monitoring requirements (e.g. continued water quality and shoreline monitoring) under the new project to ensure any subtle long-term trends are detected.

6.6 Institutional Responsibilities and Compliance Review

The institutional framework for environmental and social management of the prior works involved multiple actors: TPA as the project proponent, the contractors and their E&S teams, the supervision consultant, regulatory bodies (NEMC and others), and financing partners (World Bank). This section reviews how responsibilities were fulfilled and the compliance status.

TPA and Project Management Unit: TPA bore ultimate responsibility for ESMP implementation. A Project Management Unit (PMU) was established for DSMGP, which included an Environmental Specialist and a Social Specialist. They coordinated the ESMP measures, ensuring that contractor's plans were approved and monitoring conducted. TPA demonstrated commitment by integrating ESMP requirements into contracts and by allocating budget for E&S measures (over USD 200,000 was earmarked for mitigation and monitoring in the dredging ESMP. TPA's team actively liaised with local stakeholders and authorities. One notable aspect was that TPA maintained open communication with NEMC throughout, submitting required reports and inviting NEMC officers for site visits.

Contractors: The main works contractor (for Berths 1–7) and the dredging contractor each had EHS officers on site who were responsible for day-to-day compliance. The contractors complied with the requirement to develop detailed Construction ESMPs and Health & Safety Plans, which were reviewed by TPA/consultants. They generally adhered to these plans. For example, the dredging contractor (a foreign dredging company) followed the agreed Dredging Management Plan precisely – including all constraints on dredging methods and timing. Contractor performance reports indicate a high level of compliance, with only minor infractions (e.g., an instance of a contractor staff not using a dust mask, which was immediately corrected). Importantly, no penalties had to be imposed for environmental non-compliance, suggesting the contractors took their E&S obligations seriously.

Supervision Consultant: TPA hired a Supervision Engineer (consortium) that included environmental experts to oversee construction. This consultant conducted monthly environmental and social inspections and prepared quarterly monitoring reports. They served as an intermediary to ensure the contractor

implemented all mitigation measures. Records from supervision reports (2019–2022) show checklists of ESMP measures with status “Complied” in most cases, and a few “Partially Complied” which were later resolved. The supervision consultant also ensured that any design changes or work method changes underwent environmental review (for instance, when an alternative piling method was proposed, the environmental specialist reviewed it for noise/vibration impacts before approval). This robust supervision was a key factor in achieving compliance.

Regulatory Oversight (NEMC): NEMC issued the EIA Certificates for both the Berths 1–7 project and the Channel dredging. They stipulated specific conditions (e.g., proper waste disposal, noise control, community safety measures, quarterly reporting). Compliance with these conditions has been high. NEMC officials carried out site inspections at least annually during the works. According to NEMC’s Compliance and Enforcement Director, the port projects generally met the required standards. No significant compliance breaches were observed; hence NEMC did not need to exercise punitive actions. (Under Tanzanian law, NEMC can revoke an EIA certificate or take legal action if a developer persistently fails to comply, but in this case, TPA’s compliance was satisfactory and such actions were not needed.) Additionally, other agencies like the Occupational Safety and Health Authority (OSHA) and the Dar es Salaam City Council were involved in certain inspections (OSHA inspected worker safety, the City checked waste management). Their inputs were addressed and no fines were recorded.

World Bank and Lenders: The World Bank, as a co-financier, supervised the project under its safeguard policies (OP 4.01, etc.). The Bank’s Implementation Status Reports (ISRs) consistently rated the environmental and social risk management as Moderately Satisfactory to Satisfactory. The Bank team conducted implementation support missions which included visiting the port site. They noted improvements such as proper signage, good housekeeping on site, and effective stakeholder engagement. Minor recommendations (like enhancing the grievance redress mechanism outreach) were implemented by TPA. By project closing, the Bank’s environmental specialists confirmed the ESMP commitments were met and there were no outstanding safeguard issues. This is reflected in the project’s safeguard compliance record.

In summary, the institutional arrangements functioned effectively, with clear roles and accountability. TPA provided leadership, the contractors implemented the measures, the supervision consultant verified compliance, and NEMC/World Bank provided external oversight. Regulatory compliance was achieved – all required permits were obtained (dredging permit from Tanzania Deep Sea Fishing Authority for offshore disposal, etc.), and conditions fulfilled. Environmental and social due diligence at project completion found the project **in full compliance** with both national regulations and World Bank safeguard standards. This strong compliance culture sets a positive precedent for the Berths 8–11 project, indicating that the institutional capacity and commitment are in place to manage impacts responsibly.

6.7 Cumulative and Legacy Impacts

Cumulative impacts refer to the combined effects of past, present, and reasonably foreseeable future activities on environmental and social receptors. For Dar es Salaam Port, the prior improvements (Berths 1–7 and channel dredging) together with ongoing port operations and other development in the area contribute to cumulative effects. Additionally, “legacy impacts” are those lasting effects from past projects that might interact with new projects. Our review has identified the following relevant cumulative and legacy impact considerations:

- **Port Capacity Expansion and Marine Traffic:** The deepening of Berths 1–7 and the channel enabled larger vessels to call at the port. This, along with future Berths 8–11 improvements, will increase port throughput. Cumulatively, more and larger ships can lead to more marine traffic, which has knock-on effects such as increased risk of ship pollution (oil spills, ballast water introducing invasive species) and marine accidents. While no such incidents occurred as a result of Berth 1–7 works, the increase in vessel size/frequency is a cumulative factor to manage. The

port's ongoing implementation of safety and environmental management systems (e.g., adherence to MARPOL for ship waste, improved vessel traffic management) is crucial to mitigate these cumulative risks.

- **Sediment Management and Dredge Material Disposal:** The initial channel deepening removed ~11 million m³ of material, and the upcoming Berths 8–11 project may involve additional dredging (e.g., deepening those berths from ~12.5 m to 14.5 m, plus possibly extending the channel). Using the same offshore disposal site for multiple dredging campaigns means a larger volume of sediment will be placed there cumulatively. While the site was chosen for its capacity and dispersal characteristics, continuous use could expand the footprint of deposition. The legacy impact of the first dredging is that a large mound of sediment now exists at the dump site; adding more will heighten the need for monitoring to ensure material is not migrating toward sensitive areas (e.g., Zanzibar channel). So far, hydrodynamic studies indicated the offshore site can handle the volume without significant impacts. Going forward, cumulative impact assessment for the new project confirms this, but recommends coordinated monitoring during any future disposal to detect unforeseen changes.
- **Water and Sediment Quality in Harbor:** As noted, the dredging likely improved sediment quality by removing older contaminated deposits. Thus, there is a positive legacy impact of a cleaner harbor bottom. However, ongoing port operations and city discharges still contribute pollutants (oil, chemicals) to harbor waters. Cumulatively, the port improvement alone cannot resolve water quality issues; it must be paired with broader pollution control. NEMC's State of the Coast reports note that Dar es Salaam's coastal water quality is challenged by urban runoff and port/marine activities. The cumulative effect on water quality needs continuous management (e.g., port waste reception facilities, controlling bilge discharges). The prior project's contribution to cumulative impact was neutral to slightly positive (through dredging up some contaminants). The new project should ensure that cumulative water quality is monitored, especially since multiple projects (e.g. ongoing construction at other berths, city infrastructure projects) could collectively affect coastal water.
- **Coastal Erosion and Morphological Changes:** As discussed under residual impacts, the historical trend of coastal erosion in Dar es Salaam is an existing issue. Cumulatively, port structures (breakwaters, deepened channels) along with other coastal developments (like groynes, beach mining, climate-induced sea level rise) all interplay in affecting shoreline dynamics. The legacy of the channel deepening might be some change in currents, but it's difficult to isolate. The ESIA's cumulative impact assessment (CIA) considered valued environmental components like shoreline stability and concluded that the port projects' contribution to coastal erosion is likely minor compared to other factors. Nevertheless, from a cumulative standpoint, any future port dredging plus the existing deeper channel could potentially alter wave energy distribution. It is recommended that a long-term coastal monitoring program be maintained by TPA and relevant agencies, to detect any patterns. If cumulative impacts on the coast are observed, adaptive measures (such as beach nourishment or protective structures) should be considered by the responsible authorities.
- **Urban Development and Traffic:** The modernization of the port is part of a broader set of infrastructure improvements in Dar es Salaam. Cumulatively, the port upgrade along with new roads (e.g., the ongoing Dar es Salaam road network improvements) and industrial growth can increase traffic and environmental pressures in the city. One legacy issue identified is road congestion at port gates – during Berth 1–7 works, construction traffic added slightly to congestion, and as port throughput grows, there are cumulative traffic impacts on surrounding roads. The DSMGP included components to improve road and rail connections to mitigate this. For the ESIA, we note that without continued infrastructure upgrades, increased port volume could worsen traffic emissions and noise in the city. This is a cumulative impact beyond the port's direct footprint, requiring coordination with city planners (some of which is happening under a complementary World Bank urban project).
- **Cumulative Socio-economic Effects:** Positively, the phased port improvements (Berths 1–7 done, Berths 8–11 upcoming) cumulatively contribute to regional economic growth. Jobs created during construction and the efficiency gains for trade are beneficial. However, there is also a cumulative impact on port labor: the entire modernization (all berths) means a transition to more

skilled, technical jobs and fewer manual jobs. This has been mitigated by training and gradual adjustment, but is a socio-economic cumulative effect to manage with care (e.g., ensure labor unions are engaged and workforce plans are in place). Additionally, multiple construction projects in Dar (port, roads, buildings) happening in overlapping time frames can strain local resources (materials, skilled labor) and potentially social services. No critical issues were noted during the first phase, but the second phase will continue to draw on local supply chains and labor markets.

In conclusion, the review finds no severe cumulative or legacy environmental impacts directly caused by the prior port works. The projects were executed in a manner that avoided leaving significant negative legacies. Most cumulative considerations (water quality, erosion, traffic) are being addressed through broader programs or ongoing monitoring. The main actionable point is to maintain vigilance: the new ESIA (Berths 8–11) will incorporate the data and lessons from the prior works to ensure that cumulative effects remain within acceptable levels. Table 6.2 in Annex 6C provides a summary matrix of cumulative impacts analysis for key receptors, combining Phase 1 and Phase 2 of port improvements.

6.8 Lessons Learned and Implications for Current ESIA

The experience from the Berths 1–7 rehabilitation and channel dredging yields several lessons learned that are invaluable for planning and executing the Berths 8–11 project. These lessons, and how they inform the current ESIA and project design, are outlined below:

- **Effectiveness of Early Planning and Modeling:** The prior project demonstrated the importance of robust baseline studies and predictive modeling. For example, the sediment dispersion modeling was instrumental in choosing an offshore disposal site that resulted in negligible coastal impact. **Lesson:**Continue to use advanced modeling (hydrodynamic, water quality) to guide dredging and construction decisions for Berths 8–11. The current ESIA has indeed employed updated models to predict turbidity and noise, using inputs from the prior monitoring to calibrate predictions.
- **Stakeholder Engagement is Key:** In the dredging ESIA, extensive consultations with fishermen and local communities built understanding and acceptance. This helped avoid conflicts and ensured local knowledge informed mitigation (such as scheduling to avoid peak fishing). **Lesson:** The current project should maintain strong stakeholder engagement, especially with any groups who could be affected (fishers around Kigamboni, nearby residents during construction, etc.). Early disclosure of plans and a responsive grievance mechanism will continue to be essential. The ESIA consultation process for Berths 8–11 has already been shaped by this lesson, ensuring continuity in dialogue with those consulted in Phase 1.
- **Implementing ESMP through Contracts:** As noted, integrating ESMP requirements into contractor obligations was effective. **Lesson:** For Berths 8–11, all tender documents and contracts will again include the ESMP as an enforceable part. The contractors will be required to prepare detailed C-ESMPs and method statements before work starts. By carrying forward this practice, the project secures commitment to mitigation from day one. Additionally, the lesson to have an independent Environmental Supervisor on the team will be retained to provide rigorous oversight.
- **Monitoring and Adaptive Management:** Real-time monitoring (e.g., turbidity) during dredging proved its worth by allowing immediate corrective actions and confirming protection of sensitive areas. **Lesson:** The new project should employ a similar or enhanced monitoring regime. This ESIA proposes real-time noise monitoring during any pile driving for Berths 8–11 and continuous air quality monitoring if heavy equipment works near populated boundaries, in addition to water monitoring. The capacity for adaptive management (e.g., halting work if thresholds exceeded) will be built into the Environmental and Social Management Framework for construction.
- **Cumulative Perspective:** The phased nature of port improvements means we must consider the big picture. One lesson is that even if individual project impacts are modest, there can be cumulative stresses (traffic, etc.) that need coordinated management. **Implication:** The ESIA for Berths 8–11 explicitly includes a Cumulative Impact Assessment that factors in Phase 1 outcomes and other

projects. Mitigation measures are proposed not just in isolation, but in synergy with existing port operations (for instance, scheduling maintenance dredging jointly for efficiency and minimal disruption).

- **Regulatory and Donor Coordination:** The prior works benefited from alignment between NEMC requirements and World Bank safeguards. **Lesson:** Continue close coordination with regulators and lenders. For the current ESIA, drafts are being shared with NEMC early for feedback, and World Bank's Environmental and Social Framework (ESF) standards are being cross-referenced to ensure compliance. The positive working relationship with NEMC (as evidenced by their satisfaction in audits) should be maintained and strengthened – e.g., inviting NEMC officers to join monitoring events for the new project.
- **Capacity Building:** During Phase 1, TPA and local contractors gained valuable experience in E&S management (e.g., handling dredging impacts, community liaison). **Lesson:** Leverage this enhanced capacity in Phase 2. Many of the same TPA staff or consultants are involved in the Berths 8–11 project, which provides continuity. Training programs initiated earlier (such as OSHA safety trainings for port contractors) will continue and be expanded. One identified gap was the need for more marine ecology expertise on-site; thus for the new project, TPA is engaging a marine biologist to advise during dredging, reflecting a lesson learned as well.
- **Documentation and Compliance Tracking:** It was observed that meticulous record-keeping (daily logs, monitoring data spreadsheets, etc.) during Phase 1 made reporting and audits much easier. **Lesson:** For the new project, establish a clear system for E&S documentation from the start (possibly a digital environmental monitoring database, building on the "Mazingira" environmental compliance app that NEMC is utilizing). This will help track ESMP implementation in real time and generate compliance reports efficiently.
- **Community Benefits and Legacy:** Finally, a lesson is that projects can leave positive legacies if planned well – e.g., removal of sunken ships improved safety and environment. **Implication:** Seek opportunities in Berths 8–11 project for win-win measures (such as enhancement of the coastal environment). For instance, one idea arising from lessons is to support a mangrove planting or coastal clean-up initiative as part of corporate social responsibility, offsetting any minor impacts. This can improve community goodwill and environmental resilience.

All these lessons have been integrated into the current ESIA's recommendations. Chapter 8 of this ESIA (Environmental and Social Management Plan for Berths 8–11) explicitly references many of these points, ensuring continuity and improvement upon past practices. In essence, the Berths 1–7 due diligence has informed a more robust approach for Berths 8–11, thereby increasing the likelihood of successful impact management in this next phase.

6.9 Conclusion

In conclusion, the environmental and social due diligence review of the prior port improvement works (Berths 1–7 rehabilitation and entrance channel dredging) finds that those projects were implemented in compliance with their ESMPs and achieved a satisfactory environmental and social performance. The mitigation measures were adequate and mostly effective, with monitoring confirming that significant adverse impacts were avoided or minimized to acceptable levels. There are no major outstanding environmental or social issues left by these completed works: water quality is normal, ecosystems are intact, and communities have not experienced lasting negative effects.

This review has also highlighted the strong institutional framework and commitment that underpinned the successful implementation of the earlier projects, giving confidence in the proponent's ability to manage the upcoming Berths 8–11 works. TPA and stakeholders have learned important lessons, which are being carried forward to further improve environmental and social management for the new project. Key among these is the continuation of rigorous mitigation (especially for dredging-related impacts), proactive stakeholder engagement, and cumulative impact oversight.

By integrating the findings of this due diligence into the current ESIA, we ensure that the Berths 8–11 project design is informed by real-world performance data and experiences. The positive outcomes and lessons from Berths 1–7 will help in refining impact predictions and tailoring mitigation measures for the new project, thereby enhancing its sustainability. Where minor legacy concerns exist (such as the need for ongoing monitoring of sedimentation and coastal conditions), appropriate provisions have been included in the ESMP for Berths 8–11.

In summary, the prior improvements have set a solid foundation, and with the measures recommended in this ESIA, the proposed Berths 8–11 development is well positioned to proceed without repeating past mistakes or compounding impacts. The environmental and social due diligence process concludes that the Dar es Salaam Port modernization is on a path of continuous improvement, aligning with international good practice and regulatory standards. The full checklists and technical data supporting this chapter are provided in Annexes 6A through 6C for reference.

CHAPTER SEVEN

7 Chapter 7: Assessment of Impacts

7.1 Approach and Methodology for Impact Assessment

7.1.1 Impact Identification and Screening

The assessment of potential environmental and social impacts has been carried out in accordance with international best practice, including guidance from the International Association of Oil & Gas Producers (IOGP) and IPIECA (Report 254) and IFC Performance Standards.

The process began with a systematic identification of project aspects (activities or elements of the project that can interact with the environment) and the corresponding impacts (changes to environmental or social receptors caused by those aspects). Project activities across all phases – pre-construction (design and site preparation), construction (including mobilization and demobilization), operation, and decommissioning – were reviewed against environmental and social receptors to identify all plausible interactions. This yielded a comprehensive Aspect-Impact Interaction Matrix (a modified Leopold Matrix) which maps each project activity against potential receptors (e.g. water quality, air quality, marine ecology, community, occupational health & safety, etc.), highlighting where significant interactions may occur. Table 7-3 presents a simplified version of this matrix, following IOGP/IPIECA guidance, to ensure that both direct impacts (occurring as a direct result of project activities) and indirect impacts (those caused indirectly or induced by the project) are captured. This matrix approach aligns with IOGP/IPIECA Report 254 recommendations for early-stage impact identification and helps ensure no major issue is overlooked.

Figure 7.1 illustrates the logical sequence for assessing project impacts, starting with impact identification, regulatory review, baseline establishment and stakeholder consultation, followed by determination of impact significance, comparison of alternatives, preparation of management plans, resettlement planning where required, and monitoring throughout the project lifecycle.

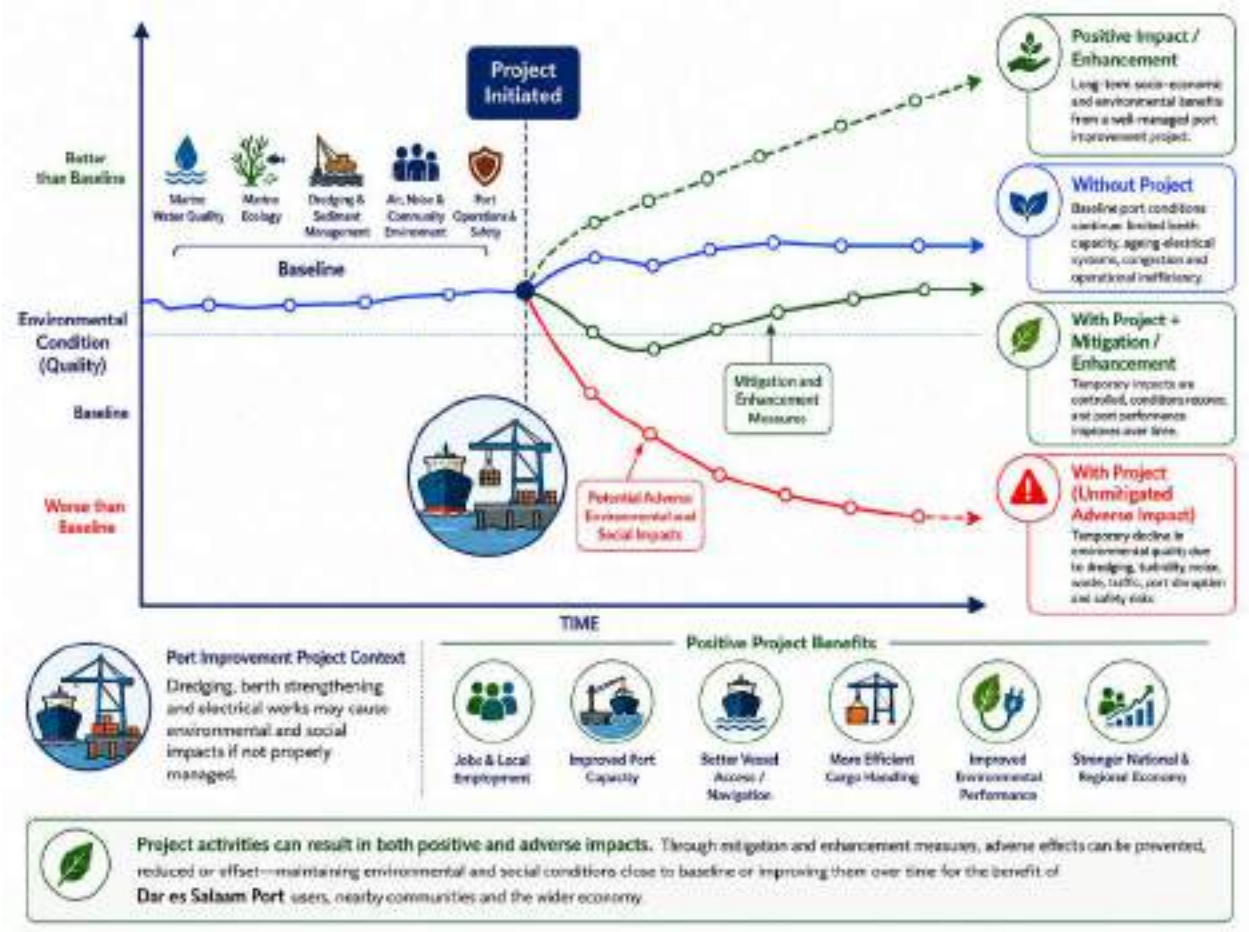


Figure 7-1: Environmental and Socio-economic Impact Assessment Process

7.1.2 Assessment Criteria – Magnitude and Sensitivity

Each identified impact is characterized and evaluated using a defined methodology consistent with Tanzania's ESIA regulations and IFC Standards. In this methodology, the significance of an impact is a function of the impact's magnitude (or severity) and the sensitivity (or importance/vulnerability) of the affected receptor. Magnitude describes the degree of change caused by the project – considering factors such as:

- **Nature** (positive or negative change),
- **Extent/Spatial Scale** (the area over which the impact occurs – at the project site, local/DIA, regional or beyond),
- **Duration** (short-term, medium-term, long-term), and
- **Magnitude/Intensity** (the degree of alteration of baseline conditions, ranging from very low/negligible to high).

Receptor sensitivity denotes the resilience, value, or regulatory status of the resource or group affected – for example, pristine or legally protected ecosystems and vulnerable communities are considered highly sensitive, whereas degraded environments or non-vulnerable receptors are less sensitive. Using these criteria, each impact is assigned a magnitude (very low, low, medium, or high) and the affected receptor is assigned a sensitivity (low, medium, or high) based on baseline data and stakeholder input. Consistent with IFC Guidance, critical habitats or receptors of high importance elevate the sensitivity consideration in the significance evaluation (per IFC Performance Standard 6 for biodiversity and Performance Standard 4 for community health and safety).

7.1.3 Impact Significance Evaluation

Once magnitude and sensitivity are determined, they are combined to yield an impact significance level – typically categorized as *Negligible*, *Minor*, *Moderate*, or *Major* (each of which can be negative/adverse or positive/beneficial). A matrix or set of criteria (see *Table **7-1***) is used to guide this combination. For example, a high-magnitude impact on a highly sensitive receptor would be classified as a Major Impact, whereas a low-magnitude impact on a low-sensitivity receptor would be Minor or Negligible. Moderate ratings generally reflect intermediate cases (e.g. medium magnitude on medium sensitivity). This systematic approach ensures that impacts are evaluated in a transparent and consistent manner, aligning with international ESHIA (Environmental, Social and Health Impact Assessment) practices.

Table 7-1: Impact Significance Matrix (Before Mitigation)

Magnitude\Sensitivity	**Low Sensitivity**	**Medium Sensitivity**	**High Sensitivity**
Very Low	Negligible	Negligible	Minor
Low	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

Magnitude (rows) combined with Receptor Sensitivity (columns) to derive initial significance.

Table 7-2 provides the definitions used for each significance category, incorporating considerations of extent and duration as well (e.g. a “Major” impact might result from a high magnitude change of regional extent and long-term duration). In addition, mitigation measures are identified for each impact, and a residual significance is determined assuming successful implementation of mitigation (in accordance with IFC Performance Standard 1’s mitigation hierarchy). For clarity, impacts are first assessed before mitigation (to understand their unmitigated significance) and then after mitigation (residual impact significance), as required by Tanzanian ESIA guidelines.

Table 7-2: Definitions of Impact Significance Categories

Category	Definition (Before Mitigation)
Major	Impact results in a large, widespread or long-term change to the receptor; breach of legal/IFC standards or serious, hard-to-reverse damage; usually requires strong mitigation and/or redesign.

Category	Definition (Before Mitigation)
Moderate	Noticeable change to the receptor over the project area and/or medium term; may approach but not usually exceed standards; important enough to require specific mitigation and monitoring.
Minor	Small, localised and short-term change; typically within existing variability and compliant with standards; mitigation is still applied but effect is generally acceptable.
Negligible	Effect is so small it is barely detectable or within normal background variation; no specific mitigation beyond standard good practice; no measurable change in receptor condition.
Positive	Beneficial change improving baseline conditions (e.g. new jobs, better safety, lower emissions per unit cargo); can also be Minor, Moderate, or Major depending on scale and duration.

7.1.4 Regulatory and Guideline Thresholds

The evaluation of significance also considers compliance with relevant Tanzanian standards and World Bank/IFC EHS Guidelines for Ports, Harbors and Terminals (2017). For instance, if a predicted impact would cause an exceedance of an environmental quality threshold (such as marine water quality criteria for turbidity or oil/grease, or community noise level guidelines), it is treated as having higher significance. The IFC EHS Guidelines for Ports provide industry-specific performance levels – for example, recommended water and sediment quality parameters to monitor during dredging (dissolved oxygen, turbidity, nutrients, heavy metals, etc.) – and these inform the assessment of impact severity. Impacts are also evaluated against IFC Performance Standards: e.g. PS3 (Resource Efficiency and Pollution Prevention) demands that pollution releases do not pose significant risks to human or ecological health, and PS6 (Biodiversity Conservation) sets strict requirements if critical habitats could be affected. Thus, an impact threatening to violate these international standards or guidelines (such as a spill that could contaminate marine life beyond EHS guideline limits) would likely be deemed “Major” in significance, triggering robust mitigation.

7.2 Aspect and Impact Identification Matrix

As noted, an Aspect-Impact Interaction Matrix was developed to map project activities against potential environmental and social receptors. *Table **7-3*** illustrates the interaction matrix for the deepening and strengthening of Berths 8–11, including dredging, quay construction, and yard paving activities (and covering the linked construction of electrical substations where relevant). The matrix is structured per IOGP/IPIECA guidelines: the rows list discrete project activities or environmental aspects, and the columns list receptor/resources categories. The entries indicate whether a given activity is likely to have a Positive (+), Negative (–), or No interaction (blank) with each receptor. This exercise helps ensure that all conceivable impact pathways are considered. *Table **7-3*** presents this matrix.

Table 7-3: Aspect–Impact Interaction Matrix (All Phases) - Rating: H = High, M = Medium, L = Low, N = Negligible / no notable interaction (before mitigation).

Project Activity/Aspect	Air Quality	Noise / Vibration	Marine Water Quality	Seabed / Benthic Habitat	Fisheries	Terrestrial Flora / Fauna	Waste Generation	Community Health & Safety	Occupational Health & Safety	Navigation Risk	Livelihoods / Economy	Cultural Heritage
PRE-CONSTRUCTION / DESIGN												
Site surveys, geotechnical investigations	N	L	N	N	N	N	N	N	L	N	N	N
Design optimisation (climate-resilient quay, shore power, safety features)	**Positive** (energy efficiency)	N	N	N	N	N	N	N	N	N	**Positive** (port efficiency)	N
Stakeholder engagement and disclosure	N	N	N	N	N	N	N	L (improved info / awareness)	N	N	**Positive** (trust, planning)	N
CONSTRUCTION – MARINE WORKS (BERTHS 8–11)												
Capital dredging (berth pocket and adjacent channel)	L (vessel exhaust)	M (dredger noise)	**H** (turbidity, DO changes, possible contaminant release)	**H** (removal of seabed, smothering of biota)	M (disturbance / displacement)	N	N	L	M (marine work hazards)	M (traffic, close-quarters operations)	M (short-term impact on small-scale fishers)	L (low chance, only if wrecks present)
Barges / hopper trips to offshore disposal site	L	L	M (turbidity at disposal site)	M (burial of benthic organisms)	M (local change in feeding habitat)	N	N	N	M (marine operations risks)	M (navigation with other traffic)	M (temporary loss of small fishing area near site)	N
Pile driving for new quay structures	L	**H** (impulsive noise, vibration)	L	L	M (behavioural disturbance, potential injury close to pile)	N	L	M (perceived nuisance to nearby communities)	**H** (high-risk activity, falling objects, noise exposure)	L	N	L (vibration impacts to any sensitive structures)
Demolition of existing deck / berth elements	M (dust, equipment emissions)	M	M (runoff, small debris to water if not controlled)	L	L	N	M (demolition rubble, scrap)	M (traffic, dust, safety near port boundary)	**H** (demolition hazards)	L	L (short-term disruption to TPA operations)	L
Temporary construction moorings, anchors, jack-up platforms	N	L	L (localised resuspension)	M (localised seabed disturbance at anchor points)	L	N	N	N	M (slips, trips, confined spaces)	M (additional obstacles)	N	N
CONSTRUCTION – ONSHORE / ELECTRICAL WORKS (BERTHS 1–7)												
Substation civil works (foundations, buildings)	M (dust, machinery exhaust)	M	L (runoff if not controlled)	N	N	L (minor vegetation removal if any)	M (construction waste)	M (construction traffic, nuisance)	**H** (OHS risks: excavation, lifting)	N	L (short-term jobs, local supply)	N

Project Activity/Aspect	Air Quality	Noise / Vibration	Marine Water Quality	Seabed / Benthic Habitat	Fisheries	Terrestrial Flora / Fauna	Waste Generation	Community Health & Safety	Occupational Health & Safety	Navigation Risk	Livelihoods / Economy	Cultural Heritage
Cable trenching / laying (medium/low voltage cables)	L	L	N	N	N	N	L	L	M (trenching, confined spaces)	N	L (employment)	N
Temporary lay-down / storage areas	L	L	L (runoff, accidental spills)	N	N	L (if any sparse vegetation cleared)	M (packaging, scrap)	L	M (material handling)	N	L	N
OPERATION PHASE – MARINE & TERMINAL OPERATIONS												
Routine vessel movements (calling ships, tugs, pilot boats)	M (NOx, SO_2, PM from engines)	M (continuous low-frequency noise)	M (chronic small spills, bilge discharge risk)	L (propeller wash resuspending sediment)	M (noise / collision risk for marine fauna)	N	M (more ship-generated waste to manage)	M (risk of marine accidents affecting ferries / communities)	M (line-handling, mooring hazards)	M (collision, grounding risk)	M (constraints on small-scale fishers in navigation channel)	N
Cargo handling at quay and yard (cranes, trucks, reach-stackers)	M (diesel exhaust, dust from container yards)	M	M (runoff of oil/grease into harbor)	M (long-term accumulation of contaminants in sediment)	M (indirect via water quality)	N	M (solid waste, packaging, damaged cargo)	M (traffic, accidents near gate, noise)	**H** (heavy loads, moving equipment)	N	**Positive** (jobs, trade) but some negative for informal vendors if displaced	N
Use of new electrical substations and shore power	L (grid emissions instead of ship generators)	L	L (reduced local emissions to water)	N	N	N	L (e-waste at end of life)	L (less local air pollution = positive)	M (electrical hazards for workers)	N	**Positive** (more efficient operations, maintenance jobs)	N
Port stormwater and wastewater discharges	N	N	**H** if untreated (oily runoff, sewage)	M (contaminant accumulation in bed)	M (fish health, seafood safety)	N	M (sludge, screenings)	M (public exposure via seafood / recreation)	M (worker exposure)	N	M (fishery income if water quality declines)	N
Fuel storage and bunkering operations	L	N	**H** (potential oil spills to water)	**H** (smothering, toxicity to benthos)	**H** (serious impact on fisheries and marine resources)	L	M (contaminated soil, spill clean-up waste)	M (fire, explosion, fumes near communities in major event)	**H** (fire, explosion, burns)	N	M (livelihood loss if fisheries closed after spill)	L
DECOMMISSIONING / CLOSURE (FUTURE)												
Demolition of berth structures and removal of piles	M (dust, exhaust)	M	M (temporary turbidity)	M (seabed disturbance)	M (short-term disturbance to fish)	N	**H** (large demolition waste volumes)	M (traffic, safety risks to public)	**H** (similar OHS risk as construction)	M (temporary navigation obstacles)	M (loss of port jobs / activity if not replaced)	L
Removal / de-energising of substations and cables	L	L	N	N	N	N	M (electrical scrap, possible hazardous materials)	L	M (electrical hazards)	N	M (job losses if facility closed)	L

Key receptors/categories evaluated in the matrix include: Air Quality, Climate Change (greenhouse gas emissions), Noise and Vibration, Water Quality, Sediment Quality/Sedimentation, Marine Ecology (further split into marine flora and fauna), Fisheries, Waste Generation (solid wastes, wastewater, hazardous wastes), Occupational Health & Safety (OHS), Community Health &Safety, Local Economy, Employment/Labor, and Gender/Social inclusion concerns. These reflect both biophysical and socio-economic components likely to be affected by port improvement works. The matrix was populated using baseline information (Chapter 4), stakeholder input (Chapter 5), and expert judgment, drawing on similar port projects' experiences.

7.2.1 Findings of the Interaction Matrix

The matrix confirms that the project will have a mix of beneficial and adverse interactions. During the Pre-Construction/Design phase, most interactions are neutral or positive, as design decisions can incorporate mitigation (for example, designing the new quay to be climate-resilient yields a positive climate change adaptation aspect, and planning for onshore power supply can reduce future ship emissions by enabling vessels to plug into grid power). There are negligible direct negative impacts in design stage since no physical works occur then. During the Construction phase, numerous negative interactions appear: for instance, dredging is marked as negatively affecting water quality (via turbidity) and marine fauna, while pile driving and demolition activities show negative interactions with noise/vibration and potentially marine fauna and nearby communities (due to construction noise and vibrations). Construction also entails waste generation (demolition debris, dredged spoil, etc.) and risk of spills, reflected as negative interactions with soil, water, and marine life if not properly managed. Positive interactions in construction are primarily socio-economic – e.g. local employment opportunities and local procurement can benefit the economy and livelihoods (these are indicated as "+" under labor and economy for activities that create jobs or business).

For the Operation phase, the matrix shows continued positive impacts on the economy and employment (due to increased port capacity and efficiency), and potentially positive effects on air emissions if modernized infrastructure (like shore power from new substations) reduces ship generator use at berth. However, some negative interactions persist or newly arise in operation: increased vessel traffic could negatively interact with marine water quality (through routine discharges or accidental spills), marine fauna (through underwater noise and collision risks), and community safety (through navigational hazards or increased road traffic from port throughput). The Decommissioning phase (at the end of facility life, or during major rehabilitation in the future) is expected to mirror many construction-phase interactions: dismantling of structures and possible re-dredging would again create noise, turbidity, and waste, hence these are marked as negative interactions like construction. Table 7.4 (for Berths 8–11 works) and Table 7.7 (for the Berths 1–7 electrical substations) together capture these interactions; the latter matrix focuses on onshore electrical works, where marine impacts are minimal but other aspects like construction noise, waste, and worker safety are relevant.

Overall, the identification matrix guided the focused assessment in the following sections. Each impact that registered a meaningful interaction in the matrix has been analyzed in detail as described below. Insignificant interactions (blanks in the matrix) are not discussed further, as they imply no plausible impact pathway (e.g., designing the project has no direct impact on water quality; or installing electrical equipment has no impact on marine flora, etc.). The matrix approach and scoping process thus ensure that the subsequent impact assessment addresses all material issues while scoping out irrelevant ones, consistent with Tanzanian ESIA regulations and IFC's scoping methodology.

7.3 Phased Assessment

The impacts identified in Table 7-3 have been assessed according to the project phase in which they will occur. Related interactions have been grouped into clearly defined impacts to avoid duplication. For each impact, the assessment considers:

- the project activity and impact pathway;
- affected receptors;
- nature, duration, extent and reversibility;

- magnitude and receptor sensitivity;
- significance before mitigation;
- principal mitigation measures; and
- residual significance after mitigation.

7.3.1 Impacts rated negligible in Table 7-3 are not assessed further unless they form part of a wider cumulative or accidental-event pathway.Pre-Construction/Design Phase Impacts

The Pre-Construction (Design and Planning) phase includes finalization of engineering designs, site surveys, geotechnical investigations, and mobilization preparations. While physical disturbances are minimal in this phase, certain decisions and minor activities have environmental or social implications:

7.3.1.1 Berth 8-11 and Dredging Area

7.3.1.1.1 Incorporation of Mitigation into Design

A positive impact of this phase is the opportunity to avoid or minimize future impacts through smart design. For example, the project design has incorporated climate resilience (e.g. designing the new quay on piles to accommodate sea level rise and stronger storms) and energy efficiency (modern electrical infrastructure to reduce power losses). These measures enhance the project's sustainability and adaptive capacity, a beneficial impact for climate change adaptation and long-term port operations. This is considered a Positive impact of high magnitude and long-term duration, given it will improve the port's performance and reduce vulnerability for decades, and it extends regionally by supporting reliable trade infrastructure. Thus, it is characterized as a Major Positive Impact (high magnitude, regional extent, long-term).

7.3.1.1.2 Environmental Baseline Investigations

Pre-construction includes baseline sampling (water quality, sediment testing, etc.) at the proposed offshore dredge material disposal site and around the port. These surveys themselves have negligible environmental impact (small boat trips for sampling). Instead, they yield beneficial data that inform impact predictions and mitigation (e.g. confirming that offshore disposal sediments are relatively uncontaminated and suitable for sea disposal. This aligns with IFC EHS Guidance requiring characterization of dredged material before disposal. The outcome is a design decision to use a specific designated offshore site ~32 km away in open ocean for dredge spoil, which is chosen to minimize environmental impact (as detailed under alternatives in Chapter 8). Selecting an appropriate disposal site at design stage is a major positive step for impact mitigation, effectively avoiding sensitive coral reefs or fisheries areas.

Overall, no notable adverse impacts occur in the pre-construction phase. If any geotechnical drilling or site clearing is needed for investigation, it is very small-scale and within port boundaries, with standard good practice to manage any negligible waste or avoid disturbing any known heritage sites (none are present on-site per Chapter 4 baseline). Therefore, pre-construction impacts are predominantly positive or neutral. This phase sets the stage for impact mitigation in later phases, in line with the mitigation hierarchy (prevent impacts by design where possible). All design-phase positive contributions (e.g. climate change adaptation, safety features, avoiding sensitive sites) will have residual benefits throughout the project lifecycle. No further mitigation is required beyond continuing good design practice and stakeholder engagement.

7.3.1.2 Surrounding Communities

7.3.1.2.1 Stakeholder Engagement and Disclosure

During pre-construction, ongoing consultation with port users, nearby communities (especially fishing communities in Temeke/Kurasini), and regulators is conducted (as reported in Chapter 5). Early engagement can address concerns in project planning to schedule works in ways that minimize disruption to terminal operations. This proactive communication is a **positive socio-economic impact**, fostering transparency and trust. Although harder to quantify, it contributes to smoother project implementation and is aligned with IFC Performance Standard 1 on stakeholder engagement.

7.3.2 Construction Phase Impacts

The **Construction phase** is the most dynamic period of the project, involving dredging, heavy civil works, and installation activities both in the marine environment (Berths 8–11) and on land (substations at Berths 1–7). This phase is associated with most potential adverse impacts. Impacts are considered for **Mobilization** (bringing equipment and vessels to site), the active **Construction** period, and **Demobilization** (removal of equipment and site restoration). The key impact areas and their significance during construction are detailed below, along with proposed mitigation measures following the relevant guidelines (IFC EHS for Ports, IOGP/IPIECA, and Tanzania's own regulations).

7.3.2.1 Berth 8-11 and Dredging Area

7.3.2.1.1 Seabed Disturbance and Sediment Plumes

Dredging in front of Berths 8–11 (to deepen to -14.5 m CD) will remove and disturb bottom sediments over the berth pocket and adjacent channel area. This causes direct loss of benthic habitat in the dredged footprint and may harm benthic organisms (clams, worms, etc.) living in the sediment. Although the existing harbor seabed is already a heavily modified environment (historically dredged and subject to port pollution), this impact is still significant locally. Moreover, as dredging is underway, the agitation of sediments will create turbidity plumes (suspended sediment in the water). Increased turbidity reduces water clarity and light penetration, which can stress marine life (e.g. corals, seagrasses, plankton) by clogging gills or reducing photosynthesis for a period. Most dredging will be done by a Cutter Suction Dredger (CSD) for harder sections which generate continuous underwater sediment discharge and resuspension. According to IPIECA/IOGP, CSD operations produce continuous, broadband noise and sediment disturbance during movement and cutting, respectively. The overflow discharge from hopper dredgers (if used to increase efficiency) can intensify turbidity near the dredging site.

Unmitigated, this impact on water quality could extend outside the berth area. However, the significance is expected to be Moderate Adverse (medium magnitude, short-term, localized to harbor/DIA) before mitigation.

The harbor waters have naturally higher sediment loads and lower sensitivity than pristine coral areas, and baseline surveys show inner port water quality is relatively turbid with low sensitive receptor presence. Key sensitive marine habitats (coral reefs of Bongoyo, Fungu Yasin, Mbudya) are at least ~10 km or more away outside the harbor – these are indirect impact areas that could only be affected by far-field plume dispersion. Studies from the previous channel dredging indicate that sediment plumes were mostly confined and did not measurably harm the nearest coral reefs, with water clarity returning to normal shortly after dredging. To ensure similar outcomes, mitigation measures will be implemented:

- Use of silt curtains or screens at strategic locations (e.g., near the mouth of the port or around sensitive points) to contain turbidity, especially if dredging occurs close to a sensitive boundary.
- Real-time turbidity monitoring during dredging, with thresholds linked to baseline levels (per EHS Guidelines' recommendations for feedback monitoring). If turbidity exceeds set limits outside the dredge area, dredging can be temporarily slowed or halted to allow recovery.
- Conduct dredging in phases and timing that avoid sensitive periods (e.g., avoid peak coral spawning season or fish breeding seasons if known, to reduce ecological risk – though harbor species are mostly hardy).

With these measures (and given the high dilution capacity of open water flushing at the harbor entrance), the residual impact of turbidity is expected to be **Minor** and temporary, mainly within the Direct Impact Area. Any disturbed seabed communities in the harbor are expected to **recover over time** or re-colonize from surrounding areas after dredging (as observed after Berths 1–7 dredging).

7.3.2.1.2 Offshore Disposal of Dredged Material

Dredged material (estimated volume in the order of several hundred thousand cubic meters) will be transported to an offshore disposal site approximately 46 km SE of Dar es Salaam Port in the Indian Ocean (site selected in design phase, see Chapter 8). At the disposal site, the impact is the deposition of sediment onto the seabed, which will smother benthic organisms in the drop zone and alter the seabed morphology. This is an unavoidable impact but the site selection has minimized its significance: the chosen site is in deep water (~200–400 m) with predominantly sandy-silt substrate, far from coral reefs or artisanal fishing grounds. The water quality and ecological baseline at this site show low biological productivity and absence of sensitive habitats (no corals at that depth, low plankton beyond normal ocean levels). Prior ESIAs (2016, 2017 studies) and numerical modeling confirmed this site has strong currents and depth that promote rapid dispersion and prevent dredge plume return toward the coast.

When the hopper dredger releases spoil, there will be a localized turbidity spike and a benthic impact footprint (roughly a 4 km² area as per site design). This is considered a **Medium magnitude** impact on a **low sensitivity** receptor (deep open-ocean benthos), thus initial significance is **Moderate Adverse**. Mitigation includes adherence to the designated coordinates (to contain the footprint) and monitoring at reference points around the site (e.g. checking turbidity or sediment deposition rates at the edges of the site). **No significant long-term effects** are expected given the site's high assimilative capacity. Indeed, monitoring of previous disposals at this location did not find accumulation beyond the site or damage to distant reefs. Residually, the impact is **Minor** and localized to the seafloor of the disposal site – essentially converting one type of soft-bottom habitat to another (burial of existing benthos, which will gradually be recolonized by a new community adapted to the deposited material). This outcome aligns with **London Convention** guidelines and IFC EHS guidance for ocean disposal, which require that sites be selected and managed to avoid significant adverse effects on marine life.

7.3.2.1.3 Water Quality and Contamination

Dredging can potentially release any contaminants that might be bound in port sediments (e.g. heavy metals, hydrocarbons from decades of shipping activities). The sediment testing (Chapter 4 baseline) indicates that inner port sediments have some elevated levels of organics and metals compared to offshore sediments but generally are not acutely toxic (most contaminants are below international action levels after decades of natural dispersion). However, as a precaution, if any hotspots of contamination (e.g. near ship repair areas or fuel jetties) are encountered during project implementation, these will be identified and

managed before dredging start. The main mitigation is to test and characterize dredged materials during that time and ensure that the chosen disposal method is suitable, this should be detailed in the contractor's ESMP. The offshore disposal site's depth and distance will greatly dilute any released contaminants. According to the IFC EHS Guidelines, material from inner harbors can often be more contaminated than outer areas, so special care (e.g. avoiding disposal of any heavily contaminated pockets or using confinement) will be taken if needed. At this stage, no such pockets exist in Berth 8–11 area beyond typical port sediment quality. The contractor will implement a Dredge Management Plan with procedures for handling any oily or suspicious sediments separately if encountered. Therefore, significant pollution of water from contaminants is unlikely (**Minor significance** with mitigation, as baseline port water is already influenced by port operations). Water quality impacts are mainly the physical turbidity addressed above. Continuous water quality monitoring (for parameters like turbidity, dissolved oxygen, etc. as per EHS guidelines) will verify that no unexpected degradation occurs beyond acceptable short-term levels.

In summary, dredging and disposal will cause **short-term, localized turbidity and benthic disturbance**. With the planned mitigation and the favorable offshore disposal arrangement, these impacts on the marine physical environment are **manageable** and residual effects are expected to be minor to moderate, not extending to sensitive marine ecosystems.

7.3.2.1.4 Direct Loss of Habitat (marine flora/fauna)

The berth deepening will remove some subtidal benthic habitat in the port. However, this habitat is mostly silty bottom with sparse benthic life (the baseline noted limited benthic diversity due to existing port disturbance and low light conditions). There is no coral reef or seagrass bed within the dredging footprint. The nearest coral formations are outside the port (e.g., at the harbor entrance or further offshore at reefs like Fungu Yasin ~8 km away). These are well outside the direct physical disturbance zone. Thus, the habitat loss is confined to common benthic organisms in mud (polychaete worms, mollusks, etc.). This is a Low magnitude impact on a low sensitivity habitat (port benthos), rated as Minor Adverse. Those organisms will perish in the dredged area, but similar species are abundant in surrounding areas and will recolonize over months to years once a new equilibrium is established on the new seabed.

Marine water column species like plankton may experience increased turbidity and some may be entrained by the dredger, but plankton have high natural reproduction and are not sensitivity-limited in this context; any effect is transient (negligible impact on plankton populations).

At the offshore disposal site, benthic fauna present (likely some deep-sea organisms) will be smothered by spoil. The sensitivity of deep benthos is low (not unique or protected species known), and the area is designated for this purpose. Some loss of those organisms is inevitable (Moderate magnitude, low sensitivity -> Minor to Moderate impact). New opportunistic species will colonize the deposited material over time. No species of conservation significance are known at that depth

7.3.2.1.5 Long-Term Seabed Alteration

Repeated or large-volume sediment disposal may alter seabed morphology and sediment composition at the disposal site. Such changes could affect benthic community structure and ecosystem function over time if not properly managed and monitored.

7.3.2.2 Dredged Sediment Transportation Route

7.3.2.2.1 Marine Mega fauna and Fish

Aside from noise (discussed) and turbidity, there is a risk of physical injury or disturbance to marine fauna from project vessels (e.g., collision with marine mammals or turtles, or fish entrainment in dredge dragheads). Vessel traffic will increase during construction (dredgers making trips to disposal, barges carrying equipment). The IOGP/IPIECA guidance notes that increased vessel presence can lead to higher collision risks with marine fauna and interference with their movement. In this project, most vessels will move slowly (dredgers, barges) and within the port and well-traveled routes; fast-moving support boats will be limited. The collision risk with large marine fauna is therefore low but not zero, especially just outside the port (dolphins occasionally). Mitigation: all project vessels will adhere to collision prevention measures – e.g., maintain moderate speeds, have watch crew looking out for dolphins or turtles, use established navigation channels (reducing chance of straying into shallow turtle feeding areas). The significance of fauna collision risk is Minor given low fauna presence and control measures. As an additional benefit, the project will implement an Invasive Species Management procedure for vessels (per IFC EHS Guidelines: ensuring dredger's ballast water is managed according to the Ballast Water Convention, and hulls are free of exotic biofouling) to avoid introducing invasive marine organisms during mobilization of foreign vessels.

7.3.2.2.2 Accidental spillage during transport

Transport of dredged material by barge may result in accidental spillage or leakage, leading to localized turbidity increases and potential contamination of marine waters along the transport route.

7.3.2.2.3 Disturbance from vessel traffic and noise

Movement of dredging and disposal vessels may increase underwater noise and disturb marine fauna, as well as interfere temporarily with navigation, fishing activities, and ferry operations within the harbor.

7.3.2.2.4 Air emissions and fuel spills from vessels

Emissions from transport vessels contribute to localized air pollution, while improper handling of fuels or lubricants may cause minor oil spills if controls are inadequate.

7.3.2.3 Berth 8-11 Area

7.3.2.3.1 Underwater Noise and Vibration

7.3.2.4 Underwater Noise from Piling and Dredging on Marine Mammals and Other Sensitive Marine Fauna

Construction activities associated with pile driving, quay works and dredging will generate underwater noise that may disturb marine fauna within and around the active work area. The very high sound pressure value cited for these activities should be interpreted as a conservative near-source or source-level condition, not as the sound level that would be experienced uniformly throughout the wider marine environment. Actual received sound levels at receptors decrease with distance and depend on propagation conditions, water depth, background noise, duration of exposure and the movement of animals relative to the work area. The significance of the impact therefore depends not only on the source strength of piling or dredging

equipment, but also on whether sensitive species are present close enough to the activity to experience material disturbance.

In the Dar es Salaam project area, marine mammals are not considered a daily or resident feature of the harbour footprint**,** although the wider area may occasionally support dolphins and migratory humpback whales**.** The marine ecology baseline notes that Indo-Pacific humpback dolphins may historically have occurred in suitable coastal habitat, spinner dolphins may occur offshore, and humpback whales pass through Tanzanian waters seasonally, with reports of sightings a few kilometres off the port during the migration period. The same baseline also emphasizes that such species are infrequent and transient rather than regularly resident within the berth works area itself. This means that the likelihood of direct and repeated exposure within the inner harbour is lower than would be the case in a known marine-mammal aggregation area, but it does not remove the need for precaution because occasional passage through the wider area remains possible.

The most likely impact of underwater noise during construction is therefore behavioural disturbance**,** including temporary avoidance of the active work area, interruption of feeding or transit behaviour, and short-term displacement of marine mammals, turtles or sensitive fish if they occur within the relevant acoustic zone during noisy activities. The possibility of physical injury is considered much lower because marine mammals are not known to be resident in the harbour footprint and because project controls require that noisy activities be actively managed. Nonetheless, in a precautionary sense, piling and loud dredging should be treated as potentially significant for sensitive marine megafauna if undertaken without mitigation, especially during periods of poor visibility, at night, or when animals are observed in the wider works area.

For this reason, the ESMP requires a suite of specific mitigation measures for underwater noise (piling/dredging). These include: soft-start procedures for pile driving and dredging, beginning at low power for 20–30 minutes to allow marine life to move away; reduction of noise through bubble curtains or use of a vibratory driver instead of an impact hammer where feasible; restriction of impact piling to daylight hours; deployment of a Marine Mammal Observer (MMO) during active high-noise works; use of **Passive** Acoustic Monitoring (PAM) at night or in poor visibility; and stoppage of works if sensitive species approach the active work area. The ESMP also links marine ecology protection more broadly to seasonal planning, exclusion zones, and notification of fishers and marine users. With these controls in place, the residual impact is expected to reduce from a potentially significant unmitigated effect to a **localized, temporary and managed disturbance impact**.

7.3.2.4.1 Light and Vibrations

Night works could introduce artificial lighting into the marine environment, potentially disorienting some fish or turtle hatchlings (though turtles don't nest in this port area). Given the urban setting already lit at night, this is negligible. Underwater vibrations from equipment are part of the noise impact already considered.

7.3.2.4.2 Emissions to Air (Construction Equipment and Vessels)

Construction will utilize diesel-powered equipment: dredgers, tugboats, generators, trucks, cranes, etc. These will emit combustion gases including particulate matter (PM), nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide and volatile organic compounds. In addition, dust may be generated from demolition of old concrete deck and from earthworks (if any during yard paving). The air quality impact is mainly on the immediate work areas and neighboring port vicinity. Given the coastal location, good dispersion is expected; however, sensitive receptors include port workers, nearby communities (Kurasini ward residents, though they are a few kilometers away from Berth 8–11, with some industrial area in between), and TPA staff working adjacent to construction. The worst-case emissions (e.g. from dredger engines) could degrade air quality locally, but these would generally comply with marine fuel standards (the dredger will use low sulfur fuel per IMO requirements). Dust from demolition and construction yard work could intermittently affect port users if not controlled.

Without mitigation, air emissions are a **Moderate adverse impact (medium magnitude, localized)**, mostly during active works. To mitigate:

- All equipment and machinery will be well-maintained to ensure efficient combustion (reducing smoke/PM).
- Use of fuels meeting Tanzania and IMO standards (low sulfur marine gasoil) to minimize SOx.
- Water spraying for dust suppression when demolishing concrete or handling aggregates (especially during dry windy conditions).
- Erecting dust screens around demolition sites or soil stockpiles if any.
- Avoiding unnecessary idling of engines; scheduling material deliveries to prevent traffic congestion emissions.

With these measures, residual **air quality impacts** are **Minor** and mostly confined within the port (an area zoned for industrial activities). Air pollutant concentrations at the nearest community are expected to remain within national ambient air quality standards and IFC EHS guideline values. The project's contribution is temporary; once construction ends, emissions cease.

7.3.2.4.3 Greenhouse Gas (GHG) Emissions

The combustion of diesel in dredgers and construction equipment will emit CO_2 and other GHGs. This project's **GHG footprint** in construction is relatively small in global terms (likely on the order of a few thousand tonnes CO_2 for fuel used by vessels and machinery over the construction period). While any GHG emission contributes cumulatively to climate change, the project's scale does not significantly affect national GHG totals. Nevertheless, per IFC Performance Standard 3, efforts should be made to improve energy efficiency. The new infrastructure's design helps offset some future emissions (e.g., allowing ships to use shore power can reduce ship engine emissions in operation, see operation impacts). Construction phase GHG emissions are an **adverse impact of negligible to minor significance** (global impact, but very low magnitude). Mitigation is via fuel efficiency and minimizing excess use of equipment. The **positive impact** is that the project itself is an adaptation measure (making the port more resilient to climate change impacts such as larger storm waves through robust design) – as noted, that is a major positive outcome in the long term.

7.3.2.4.4 Noise and Vibration (Land-based)

Construction Noise

Onshore construction activities (especially for the substations and any works in the container yard) will generate noise from heavy machinery, concrete breaking, pile driving (if any on land), and vehicle movements. Neighbors to consider include port employees and possibly community areas near the port boundary. The nearest residential areas are some distance away (Kurasini residential areas are several hundred meters to >1 km from Berth 8–11 site, with port facilities and a main road in between). Baseline noise at the port is already elevated due to ongoing port and city activities (Chapter 4 shows typical port noise well below OSHA limits at site boundary). Construction will add intermittent higher noise, potentially noticeable at the port perimeter. The most disruptive may be percussion from pile driving or concrete demolition, which can cause vibration that travels through ground and water.

Unmitigated, noise impact is **Moderate adverse** at closest receptors (port users, TPA operations). There is also potential impact on the TPA terminal operations adjacent to Berths 8–11: loud construction noise and vibration could affect TPA workers and possibly slow their operations (if they need to pause certain

work during extreme noise). This is a socio-economic/business impact. The ESIA specifically identifies potential disruption to TPA operations as an impact to manage.

Mitigation:

- **Scheduling** noisy works at appropriate times (daytime hours to avoid sleep disturbance in communities; also, coordinate with TPA to do the most disruptive tasks during off-peak cargo operations or scheduled maintenance windows if possible).
- Providing **prior notice** to port stakeholders about high-noise activities.
- Using best available techniques to reduce noise: e.g. well-maintained mufflers on equipment, using hydraulic concrete cutters instead of percussive breakers where feasible, selecting low noise piling methods (bored piles or vibratory installation instead of impact hammering if technically feasible).
- Monitoring noise levels at the port boundary to ensure compliance with Tanzania's Noise Regulations and IFC EHS guidelines (e.g., daytime noise not exceeding 55 dB(A) at residential receptors as a target). If exceedances are measured or complaints arise, additional measures (temporary noise barriers, shorter work hours) will be implemented.

With such measures, residual noise impact to the public is expected to be **Minor** (generally within allowable limits outside the port). For container terminal operations, the project will implement a coordination plan to minimize interference; while there will be some inconvenience, it will be temporary and mitigated by adjusting work sequences. Containter terminal will continue operating on unaffected berths while one is under construction, etc., as per the port's phased construction plan. Therefore, the impact on port operations (TICTS) is **managed to be minor** – important commercially but not causing complete stoppage (the construction schedule has been designed in consultation with TICTS to maintain throughput as much as possible). This is discussed further under socio-economic impacts.

Vibration

Pile driving and heavy equipment can cause ground vibration that might affect nearby structures (e.g. existing berths, buildings). A technical assessment will ensure that vibration levels remain below structural damage thresholds for adjacent facilities. Given Berths 8–11's aging structure will be largely demolished anyway, concern is mostly for Berth 7 structure (adjacent) and onshore buildings. The contractor will use controlled blasting methods (if any) or non-blasting rock breaking to avoid intense vibrations. So vibration impact is expected to be **localized and controlled** – significance **Minor** (monitoring will be done if needed to ensure it's within safe limits).

7.3.2.4.5 Waste Management and Pollution Control

Solid Waste

Construction will generate various wastes: demolition debris from the old decks of Berths 8–11 (concrete rubble, scrap metal), dredged sediment (addressed in dredging impact section), general construction scrap (wooden formwork, packaging), and domestic waste from the workforce. If not properly handled, these wastes could litter the port area or be washed into the sea, causing pollution. Demolition of the existing berth will produce a considerable volume of concrete and steel, which is largely inert but bulky. The project plans to **reuse or recycle** demolition debris where feasible: concrete rubble may be crushed and used as fill (e.g. in yard paving sub-base) or disposed in an approved landfill; scrap steel will be sold to recyclers. These practices turn a potential waste problem into a resource, aligning with IFC EHS waste management guidance.

Hazardous wastes during construction might include **used oil**, oily rags, paint cans, old electrical components, or if any old equipment with asbestos/PCB is encountered (though unlikely in port infrastructure). These require careful handling and disposal at licensed facilities. Tanzania has hazardous waste regulations that will be followed, and the ESMP (Chapter 9) provides a waste management plan.

Without mitigation, improper waste disposal could lead to soil and water contamination (e.g. concrete debris dumped haphazardly could leach, or garbage could attract pests). This would be a **Minor to Moderate adverse impact** if it occurred, mostly localized.

Mitigation measures include:

- Provide adequate **waste receptacles** on-site and at worker camps (with segregation for recyclable, hazardous, and general waste).
- Train workers in waste minimization and handling (no littering, secure storage).
- Contract licensed waste collectors for regular removal of solid waste to approved disposal sites.
- Prepare a **Waste Management Plan** as part of the construction ESMP, including measures for dredged material (already covered), demolition debris reuse, and hazardous waste (e.g., use of oil drip trays, proper storage in labeled containers, disposal through NEMC-authorized companies).
- All hazardous materials (fuels, chemicals) stored in bunded areas to contain any leaks/spills.

With these measures, **residual waste impacts** are expected to be **Negligible to Minor**. The port environment will be kept orderly, and no significant pollution is anticipated. In fact, removal of old, dilapidated structures (with potential flaking paint or contaminants) and replacing them may improve the cleanliness of the area (a minor positive effect).

Wastewater and Effluents

During construction, potential wastewater sources include vessel bilge water, concrete wash water, and sewage from worker facilities. If released untreated, these can pollute harbor water. Mitigation includes:

- ensuring vessels comply with MARPOL (no oily bilge discharge in port waters),
- providing adequate portable chemical toilets and handwashing stations for workers at all active work areas, with separate facilities for male and female workers and accessible provision where required; the number of units shall be proportional to the peak workforce and work-front distribution; all units shall be maintained in clean and hygienic condition and serviced by a licensed waste-handling provider at a frequency sufficient to prevent overflow, odour, and any sewage discharge; sewage from the units shall be removed off-site to an approved treatment or disposal facility, and discharge to the ground, drains, or harbour waters shall be strictly prohibited, and
- designated wash-down areas for concrete and equipment with containment (so that slurry does not run off into the sea).

Given these controls, water pollution from construction effluents is **highly limited**. Significance is **Minor**.

Spill Risk

Construction brings the risk of **accidental spills** of fuel, oil, or chemicals (for example, a leak from a dredger's fuel tank, or a hydraulic hose burst on machinery, or spillage during refueling operations). Such spills, if they reach water, could harm marine life and water quality (even a few liters of oil create a sheen and can impact fish and birds). The likelihood of a major spill is low (dredgers carry fuel but are not oil

tankers; however, bunkering operations and machinery fueling are routine). The IFC EHS Guidelines highlight that spills in ports can occur from accidents, equipment failure, or human error, and emphasize spill prevention and response planning.

Mitigation is critical here:

- All fuel and chemical storage on land will be within **bunded, impermeable areas** sized to contain at least 110% of the volume, away from drains.
- Refueling of vessels and machinery will follow strict protocols (use of drip trays, constant supervision, no overfilling).
- Spill kits (absorbents, booms) will be kept on site and on vessels to rapidly contain any minor spill.
- A project-specific **Spill Prevention and Response Plan** will be in place, consistent with the port's own oil spill contingency plan and IMO guidelines. Construction crews will be trained in emergency spill response.
- The Port Authority's fire and spill response units will be on alert during critical operations like fuel transfers.

With these precautions, the likelihood of significant spills is greatly reduced. Any small spills will be contained and cleaned immediately. Therefore, the **residual impact of spills** is expected to be **Minor** (and **short-term** if they occur). A major spill scenario (e.g. a vessel collision causing a large fuel release) would be a worst-case unplanned event with potentially Major consequences, but this scenario has an extremely low probability. Nonetheless, the project aligns with having contingency plans in place as per national and international requirements.

7.3.2.5 Surrounding Communities

7.3.2.5.1 Socio-Economic Impacts: Employment, Economy, and Community

The construction phase will generate employment for both skilled and unskilled workers. It is expected that a substantial number of jobs will be created (with priority to Tanzanians and locals from Dar es Salaam region where possible). This **positive impact** includes direct jobs (construction workers, equipment operators, engineers) and indirect jobs (through subcontracting and supply chains, e.g. provisioning services, materials supply). The local economy will benefit from injection of wages and procurement of construction materials. This is categorized as a **Moderate Positive Impact** on the local economy and labor, as it is significant during construction (hundreds of jobs) but is medium-term (limited to the construction period). Mitigation (or rather enhancement) measures include: local hiring policies, on-the-job training, fair wages and labor conditions per national labor laws and IFC PS2, and ensuring an inclusive approach (consideration of women for suitable roles, etc.). With these measures, the positive impact is maximized – it could reach **major positive significance** for some households who gain livelihoods. After construction, some jobs will demobilize, but a portion of workers might transition to operations or other port projects.

7.3.2.5.2 Impacts on Local Businesses and Services

Construction workers and project procurement will create demand for local goods and services (food, accommodation, transport). Small businesses around the port (food vendors, equipment suppliers) may see increased income. This is another **positive socio-economic impact**, though on a smaller scale (Minor positive). No mitigation needed except to ensure workers are informed about available local services to encourage local spending.

7.3.2.5.3 Community Health and Safety

Communities near the project could be exposed to certain hazards during construction. These include:

- **Traffic Safety:** Transport of construction materials (like cement, steel) and movement of heavy trucks to and from the port could increase traffic on access roads (e.g. along Kilwa Road or Mandela Road leading to the port). This raises the risk of traffic accidents involving the public. The project will develop a Traffic Management Plan, enforce safe driving, and possibly schedule heavy transport during off-peak hours. Coordination with traffic police will be done if oversized loads are moved. With these measures, the **impact on community traffic safety** is minimized to **Minor**, although without mitigation it could be Moderate given high background traffic in Dar es Salaam.
- **Public Access and Safety around Work Areas:** The construction zone will be securely fenced (the port is a restricted area, but ensuring no unauthorized entry is key). Fishermen or curiosity seekers should not be able to approach dangerous areas (especially for marine works, a safety boat will warn any small fishing vessels to keep clear of the dredging area). The local fisherfolk sometimes operate at the port entrance; they will be notified of dredging schedules to avoid conflicts. By maintaining good security and communication, the risk of accidents affecting outsiders (e.g. someone falling into a excavation or a boat hitting a dredger) is very low (**Negligible to Minor** residual impact on public safety).
- **Health impacts from Noise/Dust:** As discussed, some noise and dust may reach communities, but likely below harmful levels with mitigation. - **Communicable Diseases:** An influx of workers can pose risks of communicable diseases spread (including COVID-19, HIV/AIDS). The workforce is not huge relative to the city, but specific measures (worker health programs, HIV awareness training, COVID-19 protocols) will be in place to mitigate this. The impact is Minor if well managed.
- **Influx and Community Relations:** The project is in an established city area, so a large labor influx is not expected (many workers will be locally sourced). Hence, issues like social disruption or cultural conflict are minimal. The workforce will be briefed on a code of conduct to respect local norms.

7.3.2.5.4 Fishing Livelihoods

Artisanal fishing is known to occur off the coast of Dar es Salaam, but mostly outside the immediate port area (fishing within port limits is restricted). Some fishermen use the area near the harbor mouth. During dredging and disposal operations, there could be **temporary exclusion zones** for safety, which might inconvenience fishing in those spots. However, the offshore disposal site is far offshore where small artisanal boats typically do not venture. The harbor itself is not a primary fishing ground due to ship traffic, prohibition by the law and pollution. So, the project is not expected to significantly reduce fish catches. At most, a few fishing trips might be rerouted. This impact on fisheries is **Negligible to Minor**. Ongoing engagement with Beach Management Units (BMUs) and fishing communities will ensure they are informed and any grievance (e.g. lost/damaged gear due to project vessels) is addressed via the project grievance mechanism.

7.3.2.5.5 Cultural Heritage

No known physical cultural resources (PCR) exist in the immediate project area (it's an active port). Dredging will not reach any known wrecks or heritage sites – a previous wreck mapping did not indicate significant historical wrecks in the berth area. In case of an unexpected find (chance find of underwater cultural artefact or on land), the project has a Chance Finds Procedure to handle it in coordination with antiquities authorities. The likelihood is very low, so this is not anticipated as a significant impact.

7.3.2.5.6 Worker Health and Safety

Although not a public impact, it's worth noting the project will implement stringent **Occupational Health and Safety (OHS)** measures to protect workers (in line with IFC EHS Guidelines on Occupational Health & Safety and national OSHA laws). Construction involves heavy lifting, work at height, marine works (risk of falls into water), and possibly diving (for underwater cutting or inspection). Without controls, the risk of accidents is significant (could be severe injuries or fatalities, which is a Major negative impact for workers). The ESMP includes a robust Health and Safety Plan: training, provision of PPE, safety supervision, emergency response plans, etc. With these, the aim is zero serious incidents. Worker safety incidents are not an impact on the external environment per se, but they are a key project risk to manage (and considered under social impacts of the project). The **residual risk** with proper safety culture is minimized to **Low**.

7.3.2.5.7 GBV/SEA/SH Risk Management and Equality

The project recognizes that construction activities may create or worsen risks of gender inequality, gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH)**,** particularly where there is labour influx, unequal power relations, or frequent interaction between workers and surrounding communities. These risks are relevant even where the workforce is relatively localized, because the project will involve contractors, subcontractors, transport personnel, marine crews and workers operating near surrounding communities, ferry users, fishers and traders. Accordingly, the project shall apply a prevention, protection and response approach to GBV/SEA/SH risk management as part of the ESMP.

All contractors and subcontractors shall be required to adopt and enforce a Code of Conduct that explicitly prohibits GBV, SEA, SH, child exploitation, transactional sex, abuse of authority, intimidation and retaliation against complainants. The Code of Conduct shall be attached to employment contracts, explained to workers in a language they understand, and signed by all workers before deployment. Breach of the Code shall attract disciplinary action, including suspension, removal from site, contract sanctions, and referral to the appropriate authorities where required by law.

The project shall also operate a Grievance Redress Mechanism (GRM) that includes for safe referral to health, psychosocial, legal, police or social-welfare services as appropriate. The confidential and survivor-centred channels for GBV/SEA/SH-related complaints. These channels shall be separate from ordinary complaints where appropriate, shall protect confidentiality, and shall not require survivors to confront alleged perpetrators. The GRM shall allow complaints to be made by survivors, witnesses, or trusted third parties, and shall provide project shall further ensure that no retaliation occurs against any person raising a complaint in good faith.

Awareness raising and training shall be undertaken for workers, supervisors, security personnel and adjacent communities throughout project implementation. This shall include induction training, refresher sessions, community awareness meetings, information in Kiswahili, and regular engagement with local leaders and relevant service providers. Particular attention shall be given to the protection of women, girls, boys, vulnerable workers, informal traders, ferry users and neighbouring communities that may be exposed to worker-community interaction risks.

7.3.3 Operation Phase Impacts

Once the Berths 8–11 have been deepened, strengthened, and modernized, and the electrical works are completed, the project moves into the **Operation Phase**. In this phase, the port will handle larger ships and increased container throughput, and the new infrastructure (quay, yard, substations) will be in regular use. Many impacts in operation are **positive**, tied to the project's objectives of improved efficiency and capacity, but there are also ongoing environmental considerations such as maintenance dredging, increased vessel

traffic, and waste management. Below we assess the main anticipated impacts during the operation/maintenance phase.

7.3.3.1 Berth 8-11 Area

7.3.3.1.1 Positive Impacts in Operation

During operation, the upgraded Berths 8–11 and associated electrical improvements are expected to generate significant long-term benefits, including improved cargo handling efficiency, increased port capacity, reduced vessel turnaround time, greater reliability of port services, enhanced economic activity, and potential reduction in ship-at-berth emissions and noise through improved electrical infrastructure and shore-power capability.

Enhanced Port Capacity and Efficiency

The primary driver of the project is to enable Dar es Salaam Port to receive bigger vessels (Post-Panamax ships) and handle more throughput efficiently. Achieving the 14.5 m depth at Berths 8–11 means ships with deeper draft can berth directly. This results in **economic benefits** nationally and regionally: reduced shipping costs (larger ships = economies of scale), less need for transshipment through other ports, and improved trade competitiveness. The port's annual container handling capacity will rise significantly, potentially from ~0.6 million TEU to over 1 million+ TEU over time (as indicated by traffic projections). This impact on trade and the economy is **Major Positive**, with a **high magnitude** (transformative increase in capacity), a **regional extent** (benefiting Tanzania and land-linked neighboring countries that use the port), and a **long-term duration** (throughout the port's operational life). It aligns with national development goals and is a core justification of the project. Secondary economic benefits include increased revenue for TPA and the government, and potentially lower costs of goods in the market due to improved logistics.

Employment and Income

In the operation phase, there will be sustained or increased employment opportunities at the port. Some construction workers may transition into permanent roles (e.g. maintenance of the new equipment). The improved yard and electrical systems might require additional skilled staff (e.g. electrical engineers, maintenance crews). The project also secures existing jobs by ensuring the port remains competitive. The operation phase employment impact is a **Moderate Positive Impact**, as it provides stable jobs and possibly better working conditions (with modern facilities) for port workers. Additionally, the efficiency gains could indirectly support more jobs in trade, transport, and logistics sectors outside the port.

Reduced Environmental Footprint per Unit Cargo

The modernization can yield **environmental efficiency benefits**. Notably, the installation of **electrical substations and power supply infrastructure** at Berths 1–11 allows for **shore power** (cold ironing) for ships and more efficient electric yard equipment. If ships plug into the grid while at berth instead of running diesel auxiliary engines, there will be a reduction in air emissions (SO_2, NO_x, PM, and CO_2) in the port area, improving air quality. This is a **positive environmental impact**; local air pollution from ships at berth is a known issue in ports, and shore power is considered a best practice to mitigate it. The extent of this benefit depends on ships' uptake of the facility and the cleanliness of grid power. Tanzania's grid is partly gas and hydro, so grid electricity produces less local pollution than ship diesel engines. This could significantly cut NOx/PM emissions at the port – a health benefit for workers and nearby communities (Major Positive if fully utilized). The substations also improve energy efficiency of port operations (less generator use, more stable

voltage to equipment). Another example is better yard paving leading to less dust generation from container handling than before (improved working conditions). Overall, these operational improvements mean the **environmental impact per unit of cargo handled is reduced**, which is a net positive outcome of the project. This reflects alignment with IFC PS3 on resource efficiency.

Safety Improvements

New infrastructure is built to modern safety standards. The new quay structure will be structurally sound and resilient, reducing the risk of berth failures or accidents that could occur with the old, degraded structure. Navigation safety is improved by the deeper berths and eventually complementary channel deepening (ships can enter/leave more safely without tide constraints). Also, better lighting and power supply in the terminal enhances safety for night operations. These contribute to **Community and Occupational Health & Safety** positively – safer port operations mean reduced risk of incidents like ship groundings or crane accidents that could have broader impacts.

Regional and Social Development

By boosting port capacity, the project indirectly supports regional economic growth, potentially contributing to poverty reduction via increased trade and commerce. The benefits will cascade to consumers (through potentially lower import costs) and exporters (improved market access). These broad social benefits are positive but diffuse (not easily quantifiable), and are captured in the significance above as part of economic benefit.

7.3.3.1.2 Negative Impacts and Ongoing Environmental Management in Operation

Notwithstanding the long-term operational benefits, the project may also give rise to adverse impacts during operation if not properly managed. These include increased traffic pressure on access roads, runoff-related water quality risks, operational spills and accidents, community nuisance from noise and lighting, and safety risks associated with busier port operations and cargo handling activities.

Increased Vessel Traffic and Marine Risks

With deeper Berths 8–11, Dar es Salaam Port is expected to receive not only more ships but larger ships. **Vessel traffic increase** can lead to higher risks of maritime accidents (collisions, groundings) and associated pollution (e.g. oil spills from a ship). Each vessel coming in carries ballast water (invasive species risk) and generates noise and emissions. While one big ship may replace two smaller ones (so net calls might not double, but gross tonnage increases), careful management is needed. Potential impacts include:

- **Underwater Noise:** Shipping noise is a major contributor to ocean noise. More frequent large vessels will contribute continuous low-frequency noise, potentially affecting marine life chronically. Given the port is already busy, this incremental noise might be minor, but if ship calls significantly increase, it could extend noise disturbance further. However, large vessels generally produce similar or only slightly more noise than multiple smaller ones. The mitigation here is mainly not project-specific but global (IMO is working on quieter ship designs). Locally, maintaining speed limits in port waters can reduce noise.
- **Collision with Marine Fauna:** The risk of vessel strikes on turtles or dolphins may rise with more ship movements. This remains a minor risk in Dar es Salaam's context, as heavy traffic already exists and marine megafauna avoid the busiest areas. The port will continue adhering to international navigation

rules (COLREGS) and support national efforts like the Tanzanian Whale Network if any sensitive species are identified in shipping lanes.

- **Ballast Water and Biofouling:** More international vessels increase the chance of **invasive aquatic species** being introduced via ballast water or hull fouling. This is a significant concern globally for ports. Mitigation: Tanzania is party to the Ballast Water Management Convention – vessels should exchange or treat ballast water mid-ocean and manage biofouling. The port authority can enforce ballast water reporting and provide reception facilities if needed.

The impact remains **Minor** if protocols are followed; without them, the introduction of an invasive species could be a **Moderate to Major** long-term ecological impact. We assume compliance reduces it to minor.

Maintenance Dredging

Over years of operation, natural sedimentation may require periodic maintenance dredging to keep the berths at depth. This is a recurring impact like construction dredging but on a smaller scale (less volume). It will cause occasional turbidity and disturbance. The mitigation and significance would be like described above: typically, maintenance dredging is done every few years and has short-term minor impacts if managed well. This is accounted for in port's operational environmental management. The disposal site offshore would continue to be used for small amounts of maintenance spoil, which is acceptable given its capacity. Monitoring of harbor sedimentation and quality will inform when and how to dredge. Overall, maintenance dredging is a **Moderate adverse impact** in the short episodes when it occurs, with mitigation making it **Minor**.

Port Waste and Pollution

The improved berths will attract more ships, which means:

- **Waste Generation from Ships:** More ships may mean more garbage, sewage, and oily waste needing disposal. The port's waste reception facilities must be adequate. Under the IFC EHS Guidelines for Ports, providing proper reception and handling of ship waste is essential to prevent marine pollution (ships should not be forced to discharge at sea). TPA should ensure that with expansion, waste management capacity is scaled up. If not, there's risk of improper disposal and marine pollution (e.g. garbage in water). Proper management keeps this impact negligible.
- **Cargo Handling Risks:** Berths 8–11 will primarily handle containers (not bulk liquids), so spill risk from cargo is low. However, containers can hold hazardous materials. Improved infrastructure should include updated **Emergency Response Plans** for any accidents (e.g., a container with chemicals falls overboard or is punctured). The new power supply reduces need for on-board generators but also introduces electrical equipment that must be safely operated to avoid incidents (like arc flashes or fires).
- **Stormwater and Runoff:** The paved container yard will generate runoff that could carry oil/grease or other pollutants. The designincludes oil-water separators or drainage to manage runoff quality (as per EHS guidelines, runoff from port areas with potential contamination should be treated). Ensuring these are operational will mitigate water quality impacts of runoff. Without it, stormwater could degrade harbor water quality (minor chronic impact), so maintenance of drainage is key.

Energy Use and Emissions

With higher activity, the port will use more electricity (for cranes, reefers, etc.), and backup generators might run occasionally. However, this energy use is more efficient than previous diesel equipment. Overall, net emissions might be less per TEU; absolute emissions could rise with volume. These are managed under

the port's environmental management system and national grid management (for power plant emissions). No significant new impact beyond what's expected for a modern port.

7.3.3.2 Surrounding Community and Area

7.3.3.2.1 Negative Impacts

Socio-economic impacts (Operation)

- **Economic Uplift:** Already discussed positive economic impacts.
- **Traffic and Infrastructure:** Increased throughput means more trucks on roads hauling containers. This could worsen road congestion and wear unless mitigated (e.g., using rail transport, improving road infrastructure as part of DMGP). The ESIA acknowledges that without complementary improvements, port expansion can strain the road network (this was studied in DMGP). For Berths 8–11, truck traffic will increase, likely a moderate impact on road congestion at key choke points (e.g. the port gate, Julius Nyerere Rd). The government has parallel plans for improving port access (e.g. a new Port Access Road and promoting off-port container depots). We count this as an **Indirect impact**: moderate significance if not addressed but mitigated by broader transport planning to minor.
- **Community Impacts:** During operation, port noise and lighting are ongoing issues. The new quay operations might produce noise (from cranes, vehicles) but no more than current port operations – likely less noisy than the old setup because of newer equipment. Night-time lighting could increase with larger yard operations, potentially visible from Kurasini, but proper directional lighting should minimize light spill.
- **Safety:** A busier port means high standards must be maintained for worker and community safety (e.g., training, clear procedures for ships, etc.). If successful, accidents should be rare.

In conclusion, **operational impacts** are largely beneficial socio-economically. Environmental impacts are continuous but managed through the port's environmental management system (which will incorporate measures from this ESIA and IFC's EHS Guidelines). Many potential negatives (pollution, spills, invasive species) are low-probability or small-scale, provided that the port authority and operators adhere to international best practices and regulatory requirements. The **significance of adverse impacts in operation is minor** with these management measures in place, while positive impacts are major in terms of development gains. The ESMP (Chapter 9) details the monitoring (e.g. periodic water/sediment quality checks, emissions monitoring) to ensure operational impacts remain within acceptable levels.

7.3.4 Decommissioning Phase

7.3.4.1 Berth 8-11

7.3.4.1.1 Decommissioning and Closure Impacts

Although decommissioning is a far-future scenario for a project of this nature (the new berth structures are expected to have a lifespan of 50+ years), it is considered per Tanzania ESIA requirements. **Decommissioning** would involve taking the Berths 8–11 and substations out of service at end of life, potentially demolishing structures and restoring the site or replacing with new facilities. The impacts of decommissioning would be like (and not greater than) those of construction in nature: demolition of concrete

(dust, noise), removal of piles (underwater noise, sediment disturbance if pulled or cut), disposal of materials (concrete rubble, scrap), and workforce impacts. By that time, there may also be **positive impacts** such as land reuse opportunities or reduced operational impacts (since an older facility may be replaced by a cleaner one).

Given the similarity, a decommissioning phase impact assessment will replicate many of the construction-phase concerns. The likely significance of impacts:

- **Noise, dust, water pollution** during demolition – manageable with the same measures as construction (thus minor residual).
- **Waste**: large quantities of materials to recycle/dispose, which if planned, can be done sustainably (many components could be recycled).
- **Marine impacts**: if old piles are removed, some disturbance; but it could also be positive if it opens space or removes an obstacle. Explosives are sometimes used in offshore decommissions – that would need careful management to avoid harming marine life (the project at hand would likely cut piles, not blow them up, to minimize shock impacts).
- **Socio-economic**: Loss of jobs or economic activity if the berth is not replaced could be an impact. However, typically one would only decommission if replacing or if the facility is no longer needed. Assuming at that time alternative capacity exists, the socio-economic impact might be minor. If not, it could be significant (negative) due to loss of port capacity. This is speculative for now.

A detailed **Decommissioning Plan** will be prepared prior to closure (as outlined in Chapter 12). It will adopt guidelines current at that time (including IFC General EHS Guidelines for Construction/Demolition). For this ESIA, it suffices to note that decommissioning impacts, if the project is closed, are not expected to introduce new impact categories beyond those assessed for construction. The mitigation measures in construction would be reapplied. Therefore, decommissioning phase impacts are considered **manageable and likely minor** with a proper plan – and reversible in the sense that after removal, the environment could return to a baseline state or be available for next use.

Table 7-4: Summary of Environmental and Social Economic Impact Assessment – Marine Works (Berths 8–11)

Expected Impact During Project Activity	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation (See Chapter 9 ESMP)	Residual Significance (Post-Mitigation)
Turbidity and reduced water quality from capital dredging	Construction	Marine water quality within harbour basin; phytoplankton; fish and shellfish species; nearby artisanal fishing areas	Normal oceanic salinity (~35‰), warm tropical surface temperatures (27.2–30.2°C), alkaline conditions (pH 9.57–10.86),	Moderate–Major Adverse	Dredging method control (TSHD/CSD settings), phased works, controlled overflow, silt curtains where needed, real-time turbidity & DO monitoring, adaptive "stop-work" thresholds, timing to avoid sensitive periods.	**Minor–Moderate Adverse (short-term, local)**
Loss/disturbance of benthic habitat at berth		Benthic organisms (harbour seabed, invertebrates, fish spawning grounds)	Seabed within berths consists mainly of modified sandy–silty sediments with low to moderate benthic diversity typical of disturbed port environments	Moderate Adverse	Minimise dredge footprint, avoid sensitive habitats, confine works to already modified harbor area, allow natural recolonisation; record baseline and post-dredge benthic condition.	**Minor Adverse** (local, reversible)
Smothering of benthos at offshore disposal site		Benthic communities at approved offshore disposal ground	Disposal site characterised by soft marine sediments with sparse benthic communities adapted to sediment mobility; area previously used for disposal	Moderate Adverse	Use only approved offshore disposal site; adhere to permitted disposal volume and dump coordinates; monitor seabed and water quality at and around site; adjust if impacts extend beyond defined area.	**Minor Adverse** (confined to disposal ground)
Underwater noise from dredgers, tugs and support vessels		Marine fauna (fish, dolphins, migratory species)	Port area already noisy (Average of 67.2 dBA) due to vessel traffic, tugs, and cargo handling.	Moderate Adverse	Maintain engines; avoid unnecessary thruster use; speed limits; scheduling noisy marine works in daylight; brief crews on marine fauna sensitivity.	**Minor Adverse** (behavioural disturbance only)

Expected Impact During Project Activity	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation (See Chapter 9 ESMP)	Residual Significance (Post-Mitigation)
Underwater noise & vibration from pile driving		Marine mammals, fish, migratory species	Port operations generate vibration and noise (Average of 67.2 dBA and 1.83 mm/s); pile driving adds impulsive sound beyond normal port activity.	Moderate–Major Adverse	Soft-start / ramp-up piling, use of vibratory or bored piling where feasible, potential bubble curtain or other attenuation, exclusion zones with marine fauna observers, seasonal timing if required.	**Minor–Moderate Adverse** (short-term, well-controlled)
Turbidity / debris from demolition of existing berth		Marine water quality, benthic organisms	Normal oceanic salinity (~35‰), warm tropical surface temperatures (27.2–30.2°C), alkaline conditions (pH 9.57–10.86),	Moderate Adverse	Use contained demolition methods; avoid dropping debris into water; barge or platform capture; silt curtains if needed; careful handling of concrete and steel; housekeeping controls.	**Minor Adverse**
Accidental fuel / oil spills from marine plant		Marine waters; intertidal shoreline; fisheries; port users	Port handles fuel routinely under established management procedures; spill response plan already operational; no ecologically sensitive shoreline immediately adjacent	Major Adverse (low probability)	Bunded fuel storage; controlled bunkering procedures; drip trays; regular inspection; spill kits on all vessels; project-specific Spill Prevention and Response Plan integrated with port contingency plan; drills and training.	**Minor Adverse (residual risk, low likelihood)**
Temporary exclusion / disruption to artisanal fishing		Local artisanal fishers and Beach Management Units (BMUs) operating near port approaches	Artisanal fishing occurs near port and adjacent coastal waters	Moderate Adverse	Define and communicate safety/exclusion zones; consult BMUs and fishers; schedule high-impact activities to avoid peak fishing times; grievance mechanism; compensation where verifiable loss occurs.	**Minor Adverse**

Expected Impact During Project Activity	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation (See Chapter 9 ESMP)	Residual Significance (Post-Mitigation)
Increased ship traffic, collision & grounding risk		Marine navigation, vessels, port users	Port currently operates under harbour master control with established navigation channels; AIS/VTS in use; historic low incidence of major collision	Moderate Adverse	Harbour master control; VTS/AIS; pilotage; traffic separation and speed limits; updated port navigation procedures; emergency towing and rescue capability.	**Minor–Moderate Adverse** (managed risk)
Maintenance dredging (periodic)		Marine water quality, benthic organisms	Normal oceanic salinity (~35‰), warm tropical surface temperatures (27.2–30.2°C), alkaline conditions (pH 9.57–10.86),	Moderate Adverse	Apply same good practices as capital dredging but on smaller scale; schedule infrequently; monitoring and adaptive management; use same offshore disposal site with capacity checks.	**Minor Adverse**
Occupational safety and Health		Workforce	During constructin about 300 people shall be involved in the project	Minor Adverse	project will implement stringent Occupational Health and Safety (OHS) measures to protect workers (in line with IFC EHS Guidelines on Occupational Health & Safety and national OSHA laws)	**Negligible–Minor Adverse**
Deepened berths enabling larger vessels – trade benefit	Operation	Port authority; local economy; logistics sector; employment	Port is a key national trade gateway; berth depth currently limits vessel size; strong demand for expanded container throughput	Major Positive	Maximise local employment and training; support local supply chains; ensure transparent and fair access to facilities.	**Major Positive**

Table 7-5: Environmental and Socio-Economic Impact Assessment Summary Onshore Electrical Works (Berths 1–7)

Impact	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation/Management Measures (summary)	Residual Significance (Post-Mitigation)
Soil disturbance, minor vegetation loss, dust/emissions from site prep	Construction	Made ground within port boundary; minor ruderal vegetation; air quality within port	Works located entirely within existing industrial port area; land already sealed or highly modified; negligible natural vegetation	Minor Adverse	Limit footprint to already developed areas; dust suppression (watering); maintain machinery; reinstatement/ landscaping of disturbed areas.	**Negligible–Minor Adverse**
Construction noise, vibration, traffic around substations		Port workers; adjacent terminal operators; nearby administrative buildings	Ambient noise (Average 67.2 dBA) dominated by port operations, cranes, trucks and vessels; no residential receptors within immediate footprint	Moderate Adverse	Time-of-day restrictions; equipment mufflers; maintain buffer within port boundary; traffic management within port; inform adjacent terminal users.	**Minor–Moderate Adverse** (short-term)
Scrap/waste generation and minor spills from installing electrical equipment		Soil and surface drainage within port; waste management system	Port generates ~8.9 t/day solid waste; transfer stations exist; informal recycling occurs.	Moderate Adverse	Waste segregation and recycling; secure storage of oils/insulating fluids; drip trays; trained handling; disposal through licensed facilities.	**Minor Adverse**
Temporary obstruction and hazards from cable trenching		Port workers; internal traffic routes; underground utilities	Dense network of existing utilities within port; high daily traffic of heavy vehicles	Minor–Moderate Adverse	Trench barricading and signage; phased works to keep access; permit to work and utility detection; reinstatement of pavements/roads.	**Minor Adverse**
Impacts from temporary lay-down areas (compaction, leaks, waste)		Port land surfaces; drainage system	Areas already industrial hardstand; low ecological sensitivity	Minor–Moderate Adverse	Hard-standing or mats; bunded hazardous storage; regular housekeeping;	**Minor Adverse**

Impact	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation/Management Measures (summary)	Residual Significance (Post-Mitigation)
					defined storage zones; site restoration at demobilisation.	
Noise, EMF, leaks from operating substations	Operation/Maintenance	Port workers; electrical maintenance staff	Electrical substations already present within port; no sensitive community receptors nearby; EMF levels historically within occupational standards	Minor–Moderate Adverse	Design to standards; routine inspection and preventive maintenance; secondary containment for oil-filled equipment; EMF kept within guideline values; alarmed leak detection.	**Minor Adverse**
Shore power – reduction in ship at-berth emissions		Local air quality; port workforce; global climate	Ships at berth currently run auxiliary engines, contributing to local air pollution.	Major Positive	Ensure shore power availability and connection procedures; encourage/require use through port tariff structure; maintain reliability of supply.	**Major Positive**
Improved power reliability for cranes/yard equipment		Port operations, logistics efficiency	Existing grid subject to occasional fluctuation; reliance on diesel backup in some cases	Major Positive	Adequate redundancy; operator training; maintenance contracts.	**Major Positive**
Electrical fault or substation fire (abnormal event)		Port infrastructure, workers	Fire risk exists; port has medical and emergency facilities.	Major Adverse (low probability)	Design to IEC/IEEE standards; protection relays; fire detection and suppression (e.g. clean agents, foam); clear emergency procedures; regular drills; access/egress maintained.	**Minor–Moderate Adverse (residual risk)**

Impact	Phase	Sensitive Receptor	Baseline	Significance (Pre-Mitigation)	Key Mitigation/Management Measures (summary)	Residual Significance (Post-Mitigation)
Decommissioning – demolition waste, noise, hazards	Decommissioning	Port workers; waste management facilities; soil	Port generates demolition waste; disposal via landfill and recycling	Moderate Adverse	Decommissioning plan; selective dismantling; segregation and recycling of metals; licensed disposal of any hazardous components; noise & dust control; full OHS management.	**Minor–Moderate Adverse**

7.4 Cumulative Impacts

Cumulative impact assessment considers the **combined effects** of the Dar es Salaam Port Improvement Project (Berths 8–11 and electrical works) with other past (Berth 1-7), present, or reasonably foreseeable future activities in the area that affect the same receptors. The objective is to evaluate if incremental impacts from this project could become significant when added to impacts from other projects or stresses.

7.4.1 VECs, Spatial and Temporal Boundaries

Valued Environmental Components (VECs) are key ecological, social, or economic elements that are important to stakeholders and potentially affected by the project. For this project, VECs may include water quality in nearby rivers, terrestrial and aquatic biodiversity, air quality, local fisheries, agricultural lands, and community health and livelihoods. The spatial boundary should extend beyond the immediate project site to include adjacent ecosystems, watersheds, and communities that could experience indirect or cumulative effects. Temporally, the assessment should consider both the short-term construction and operational phases and long-term impacts over the life of the project, including post-closure or decommissioning phases.

7.4.2 Other activities and environmental drivers

The cumulative impact assessment should account for other past, ongoing, and reasonably foreseeable future activities that could affect the same VECs. These may include nearby industrial developments, agriculture, infrastructure projects, mining, urban expansion, or tourism. Environmental drivers such as climate change, hydrological alterations, air pollution, invasive species, and land-use changes should also be considered, as they may interact with project impacts and amplify cumulative effects. Identifying these interactions is essential to avoid underestimating the total effect on VECs.

7.4.3 Baseline status of VECs

A clear understanding of the current state of VECs is critical. This involves gathering data on water quality, habitat conditions, species abundance and diversity, air pollutant levels, and socio-economic indicators like community health, employment, and land use. Baseline data should reflect natural variability, seasonal changes, and existing pressures from other developments or environmental drivers. Establishing a robust baseline allows for distinguishing between project-specific impacts and cumulative pressures that may already be affecting VECs.

7.4.4 Assess cumulative impacts on VECs and significance of cumulative impacts

Based on the VECs identified for this project, cumulative impacts are considered most relevant for marine traffic and navigation safety, harbour water and sediment quality, offshore dredged-material disposal, wider sensitive marine habitats, fisheries and marine-resource users, traffic and safety in the port-access corridor, air quality, noise, shoreline processes, and marine pollution risk. Table 7-6 summarizes the project-specific cumulative impact findings for these VECs, taking into account the interaction of the Berths 8–11 project with prior port improvements, existing port operations, urban development pressures and reasonably foreseeable future activities.

Table 7-6: Cumulative Impact Findings for Key Valued Environmental and Social Components (VECs)

VEC/Receptor	Other Activities/Drivers Considered	Main Cumulative Pathway	Cumulative Impact Finding	Significance	Key Management/Monitoring Implication
Marine traffic and navigation safety	Existing port operations; increased vessel size and frequency from Berths 1–7 and channel deepening; future throughput growth after Berths 8–11 improvement	Combined increase in vessel movements, dredging support craft, construction barges and operational traffic may increase congestion, collision risk, wake effects and ship-related pollution risk	The Berths 8–11 project will contribute to a wider cumulative increase in marine traffic within the port system. On its own this is manageable, but when combined with larger and more frequent vessel calls enabled by earlier port improvements, it raises cumulative navigation and marine safety risk if not actively managed.	**Moderate**	Strengthen vessel traffic management, marine traffic coordination, navigation notices, contractor marine traffic procedures, and emergency spill preparedness.
Marine water quality and turbidity in the harbour	Existing port discharges; urban runoff; legacy port pollution; ongoing or future civil works at other berths; dredging-related sediment disturbance	Combined suspended sediment, turbidity and pollutant loading in already stressed harbour waters	Earlier dredging may have removed some contaminated sediment and therefore had a partly positive legacy effect, but harbour water quality remains under pressure from ongoing port and urban sources. The new project could add temporary turbidity and localized pollution risk during dredging and marine works.	**Moderate**	Maintain water-quality monitoring during dredging; enforce spill prevention, waste controls, bilge/waste reception measures and adaptive management if thresholds are approached.
Harbour sediment quality	Historic contamination; legacy port operations; prior dredging campaigns; ongoing port use	Disturbance or redistribution of residual contaminated or organic-rich sediments during repeated dredging campaigns	Previous dredging likely reduced some older contaminated deposits, but cumulative sediment-quality risk remains relevant because harbour sediments may still receive pollutants from ongoing operations. The new project should be treated as an additional disturbance event in a historically modified sediment system.	**Minor to Moderate**	Confirm sediment suitability before dredging / disposal; monitor sediment quality where needed; apply strict dredged-material management and spill prevention.
Offshore dredged-material disposal site	Previous channel dredging disposal; future disposal from Berths 8–11 and any associated maintenance dredging	Repeated placement of dredged material at the same offshore site may expand the footprint of deposition and increase the long-term need to verify plume behaviour and seabed accumulation	The selected offshore disposal site was chosen for depth and dispersive capacity, and earlier studies indicate that it can accommodate disposal without major adverse effects. However, repeated use creates a cumulative deposition issue that requires coordinated monitoring of footprint expansion and sediment migration.	**Moderate**	Continue disposal-site monitoring; verify plume behaviour; track seabed deposition footprint; confirm no migration toward sensitive areas or main marine-use corridors.
Sensitive marine habitats (coral reefs, seagrass, mangroves, marine reserves)	Existing stressors such as overfishing, pollution, sedimentation, climate stress and cumulative marine traffic; previous dredging and disposal activities	Indirect cumulative exposure through sediment plume transport, water-quality deterioration, pollution or vessel disturbance	The project does not directly occupy reefs, seagrass or mangrove habitats, but these wider receptors are already under stress and may be affected cumulatively if harbour turbidity, disposal-site plume spread or vessel disturbance extends beyond expected limits. The cumulative risk is therefore driven by interaction with existing ecosystem stress.	**Moderate**	Maintain precautionary sediment and plume controls, monitor sensitive receptors where justified, and apply stop / adapt triggers if unexpected far-field effects are observed.
Fisheries and marine-resource users	Existing fishing pressure; earlier dredging episodes; marine traffic; access restrictions during previous and current works	Combined disturbance of fishing patterns, temporary exclusion, perceived or real reduction in catches, and navigation/access constraints	Fishers have already identified concern from previous dredging. The new project may add to this if construction timing, navigation restrictions and marine disturbance overlap with existing pressures. The effect is expected to be temporary but may be significant locally if unmanaged.	**Moderate**	Advance notice to fishers, phased works, navigation communication, temporary access arrangements where needed, grievance handling and targeted monitoring of complaints
Community traffic, dust and safety in port-access corridors	Existing truck congestion; urban traffic growth; other port and city infrastructure works	Combined road-use pressure from port operations, construction traffic and heavy vehicles affecting roadside receptors	The area already experiences truck-related congestion, dust, noise and pedestrian-safety pressure. Construction-phase traffic from the project may contribute cumulatively to this existing burden, especially near schools, businesses and roadside communities.	**Moderate**	Implement traffic management plan, speed limits, marshals, routing, road-surface maintenance, dust suppression and receptor-focused monitoring.
Air quality in surrounding urban-port environment	Existing port emissions; truck traffic; urban background pollution; other construction sources	Combined combustion emissions and dust generation in an already active urban-port setting	The project is not expected to dominate regional air quality, but it may contribute cumulatively to already	**Minor to Moderate**	Prioritize PM_{10} and $PM_{2.5}$ management, dust suppression, equipment maintenance and

VEC/Receptor	Other Activities/Drivers Considered	Main Cumulative Pathway	Cumulative Impact Finding	Significance	Key Management/Monitoring Implication
			elevated roadside and port-interface particulate conditions during construction.		complaint-triggered monitoring near sensitive receptors.
Noise and vibration at surrounding receptors	Existing port operations; ferry activity; truck traffic; other construction works	Combined industrial / transport noise with temporary project noise and vibration	The baseline already shows an active urban-port noise environment. Project construction may add cumulatively to this existing noise burden, particularly along traffic and ferry interfaces and near sensitive receptors.	**Moderate**	Restrict high-noise works to daytime where feasible, maintain equipment, monitor near sensitive receptors, and apply complaint-response procedures.
Coastal erosion and morphological change	Existing shoreline-change processes; prior deepening of the channel; port structures; coastal development; sea-level rise and climate forcing	Combined alteration of currents, wave energy and shoreline processes from multiple natural and anthropogenic drivers	The contribution of the Berths 8–11 project to cumulative shoreline change is likely small compared with wider coastal drivers, but cumulative morphological interaction cannot be ignored in the longer term.	**Minor**	Maintain periodic coastal / morphological review and integrate with wider coastal monitoring by TPA and relevant agencies.
Marine pollution and spill risk	Existing vessel traffic; fuel handling; previous port expansion; future increase in vessel calls	Combined probability of oil/chemical release, ship waste incidents or operational pollution as traffic and marine activity increase	No major spill legacy is attributed to earlier works, but increased traffic and offshore disposal operations add to cumulative marine-pollution risk if management is weak.	**Moderate**	Maintain Oil Spill Contingency Plan, marine emergency response capacity, contractor spill procedures and regular drills.
Employment, livelihoods and local economic activity	Existing port economy; terminal restructuring; temporary work disruptions; future operational growth	Combined short-term disruption and long-term economic benefit	Construction and transition may temporarily disrupt some operations and informal economic activity, but cumulatively the port-improvement program is expected to have a net positive economic effect through increased efficiency, jobs and trade support.	**Moderate positive**	Maintain labour communication, local employment measures, continuity arrangements for affected workers, and support to stakeholder communication during phased works.

7.4.5 Management of cumulative impacts

Overall, the cumulative assessment indicates that the Berths 8–11 project does not create most of these pressures on its own but may add incrementally to an already active and environmentally stressed port and coastal system. The cumulative management approach should therefore focus on strict dredging and disposal controls, marine traffic coordination, water-quality and receptor monitoring, traffic and community-safety measures, livelihood communication and grievance handling, and strong emergency preparedness for marine pollution events.

Managing cumulative impacts requires a combination of mitigation, monitoring, and adaptive management strategies. Measures may include coordinated planning with other projects, habitat restoration, pollution control, improved land-use planning, and community engagement programs. Monitoring programs should track VECs over time to detect cumulative effects early and trigger adaptive measures. Collaboration with regulators, local communities, and other stakeholders ensures that management strategies are effective and that residual cumulative impacts are minimized to the greatest extent possible.

7.5 Comparison with ESIA Findings for Berths 1–7 Improvements

A separate ESIA was conducted for the **Rehabilitation of Berths 1–7 and the Main Entrance Channel Dredging** (under the Dar es Salaam Maritime Gateway Project). As this current project is a logical extension of those works, it is valuable to compare the impacts and lessons learned:

7.5.1 Similar Nature of Impacts

Both projects involve dredging and berth works in the same port, so unsurprisingly, the types of impacts identified are very similar: - Turbidity and sediment dispersal were key issues in Berths 1–7 ESIA, just as in Berths 8–11. The previous ESIA predicted short-term water quality impacts and the need for careful disposal site selection. Our current findings mirror that, with use of the same offshore disposal site and emphasis on turbidity control. - Underwater noise and vibration, particularly from pile driving or dredging, were noted as concerns previously. Mitigation such as working in daylight to avoid disturbing fish at night and soft-start procedures were recommended then, which we have incorporated now. - Marine ecology impacts in the 1–7 project were found to be **localized and temporary**, with monitoring showing corals and benthos were not significantly harmed. This has given confidence to our impact predictions for 8–11 – for instance, that selecting the far offshore disposal site keeps coral reefs safe, and that benthic recovery does occur. WAPCOS (2016) and Technital (2017) studies cited in the previous ESIA provide empirical evidence supporting the effectiveness of mitigation like silt curtains and timing of works. - Socio-economic impacts like employment were positive inall cases .. Thus, our ESIA places more emphasis on mitigating operational disruption, learning from stakeholder feedback which highlighted this gap in earlier reporting.

7.5.2 Differences or New Considerations

There are some difference/new consideration for this current project and these are:

7.5.2.1 Scale and Duration

The Berths 8–11 works involve constructing a new quay on piles, which is a slightly different methodology than what was done for 1–7 (which were largely rehabilitated in-situ with possibly sheet piling). Pile driving in water might produce different noise profiles compared to what was encountered at 1–7. We have given particular focus to underwater acoustics in this ESIA, using offshore industry guidance. This perhaps goes beyond the depth of analysis in the 1–7 ESIA, as understanding of underwater noise impacts has advanced and IOGP/IPIECA Report 254 offers detailed insight. Our mitigation (bubble curtains, observers) is informed by that knowledge.

7.5.2.2 Electrical Infrastructure

Berths 1–7 ESIA did not cover the electrical substations (that project was mainly civil works and dredging). In our current ESIA, we introduced an assessment of impacts from building and operating substations. These impacts (e.g. minor civil works impacts, and positive impact of shore power) are new elements not discussed in the older ESIA. However, we cross-referenced IFC EHS Guidelines for **power systems** and **ports** to ensure a comprehensive evaluation (for example, managing SF6 gas from substations, which is a potent greenhouse gas – but modern GIS substations minimize leakage, and this is covered in our mitigation planning).

7.5.2.3 Performance of Mitigation Measures

The ESIA for 1–7 included an Environmental and Social Management Plan (ESMP) which was implemented. Our team reviewed the **environmental performance of the 1–7 project** as part of baseline due diligence. Findings show that mitigation measures (such as water quality monitoring, community engagement, and safety measures) were largely effective and adequate. There were no major unmitigated incidents reported from that project. This success has reinforced similar approaches for 8–11. For instance, in the previous project, **turbidity monitoring** did not record any threshold exceedance outside immediate work zones, indicating the thresholds set were appropriate. We will adopt comparable turbidity action levels for 8–11.

7.5.2.4 Adaptive Management

One recommendation from reviewing Berths 1–7 is to maintain an **adaptive management** approach – if monitoring indicates an impact is greater than anticipated, adjust mitigation. This was done when 1–7 dredging contractors deployed additional silt curtains upon seeing plumetail risk, and adjusted dredging schedules. Our plan similarly includes adaptive measures (for example, ready to halt dredging if sensitive species are observed, or adjust work hours if noise complaints arise). Essentially, the monitoring and feedback loop established in the earlier project will continue.

7.5.2.5 IFC Guidelines and Standards

Both ESIA studies leverage IFC's guidance. The earlier one likely referenced the 2007 IFC EHS Guidelines for Ports (since updated in 2017). Our study uses the latest edition and also aligns with IFC Performance Standards given the financing context (even though the World Bank safeguards policies apply directly, we ensured consistency with PS to cover all bases). The comparison confirms that **no new types of impact** have emerged in 8–11 that were not already anticipated in 1–7 – meaning the environmental and social context is well-understood and conventional mitigation methods are effective.

7.5.2.6 Mitigation Enhancement

We have, however, enhanced certain mitigation measures building on lessons: e.g., more robust community engagement around Kurasini was advised because community feedback during 1–7 indicated some felt not fully informed about dredging schedules. This time, a clear communication plan with community leaders about project activities is in place. Also, waste management during 1–7 was handled via TPA systems – we'll ensure segregation and documentation is improved given larger demolition volume for 8–11.

Summary

In summary, the findings of the Berths 1–7 ESIA and its implementation record have been instrumental in shaping this Chapter 7. Both projects show that with proper planning and execution, port improvement works can be done with minimal long-term environmental harm and significant socio-economic benefit. The success seen in Berths 1–7 (e.g., no persistent sediment plumes, corals in marine reserves staying healthy) gives confidence that the mitigation proposed for Berths 8–11 will be effective. This comparative analysis ensures consistency and continual improvement in environmental performance across the Dar es Salaam Maritime Gateway Program. The combined outcome of Berths 1–7 and 8–11 projects will be a modernized port that meets international standards for capacity and sustainability, with environmental impacts kept as low as practicable.

CHAPTER EIGHT

8 PROJECT ALTERNATIVES

8.1 Introduction

The purpose of the analysis of alternatives is to identify other options, including not implementing the project, to achieve the project objectives and compare their impacts with the original proposal. The analysis systematically compares feasible, less adverse, alternative technologies, designs, operations, and sites – including the "no project" option – to the proposed project in terms of:

- their effectiveness of achieving the project objectives as well as potential trade-offs;
- their potential environmental and social impacts;
- the feasibility of mitigating these impacts;
- operational requirements and their suitability under local conditions;
- their institutional, training, and monitoring requirements;
- their estimated cost-effectiveness; and
- Their conformity to existing policies, plans, laws and regulations.

Based on that, the alternative analysis is done based on different berth design, dredging techniques or process proposed for the project. This includes selection of design layout, dredging methods, types of dredgers, dredged material disposal sites, along with No Project scenario.

8.1.1 The No Project Alternative

Rehabilitation of Dar es salaam Port infrastructure is the Government project aimed at restoring the socio-economic benefits that were historically provided by the facility.

No project alternative is not viable, and it would lead to continued dilapidation of the port and deny the local, national, and regional economies the socio-economic benefits that would accrue from rehabilitation of port.

8.1.2 The Yes project alternative

The yes project alternative is the most feasible considering the investment by the Tanzania Government and the socio-economic importance of the port. The port will spur trade locally and regionally which will create employment and improve the socio-economic profile of Dar es Salaam city whole country, East Africa, and SADDC region.

8.2 Dredging technology

8.2.1 Dredging methods

The proposed project requires the widening and deepening of Dar es Salaam port for berths 8-11. Different types of dredgers based on various factors will execute the dredging activity. The dredgers will be classified based on their device used for excavating sediment (cutterhead, clamshell and plain suction), the basic

means of moving material (mechanical or hydraulic) and the type of pumping device used. However, the dredging activities are achieved by only two mechanism hydraulic and mechanical dredging.

8.2.1.1 Hydraulic Dredges

Hydraulic dredges remove and transport sediment in liquid slurry form. They are either barge mounted where the slurry is transported by pipeline to a disposal area or hopper dredges where the dredged material is simply pumped into the self-contained hopper on the dredge. The advantage of hopper dredges is that it can transport dredged material over long distances and relatively high rate of production.

However, it has an inability to dredge strong materials and dilution of dredged materials during loading process. Various types of dredgers include Plain Suction Dredger, Cutter Suction Dredger, and Trailer Suction Hopper Dredger.

8.2.1.2 Mechanical Dredger

Mechanical dredges (Grab Dredger and Backhoe Dredger) remove bottom sediments through digging or gathering from the bottom surface of a sea, typical through use of a bucket. It can excavate the material at almost in situ densities. Backhoe, Grab, and dipper dredger are some types of mechanical dredges. Sediment excavated with a mechanical dredge re generally placed into a barge and transported to the disposal site.

The primary advantage of Backhoe dredger (BHD) is its ability to dredge a wide range of materials including stiff clays and soft rock. Smaller BHD can work in narrow, confined spaces close to shore. Backhoe is not suggested if the disposal site is located far from the dredging location as it uses barge for transporting the dredged sediments and, low rate of production.

8.2.2 Dredging Equipment (CSD vs TSHD)

The selection of dredging equipment and method used to perform the dredging will depend on the following factors,

- Physical characteristics of material to be dredged
- Quantities of material to be dredged
- Dredging depth
- Distance to disposal area
- Physical environment of the dredging disposal areas
- Contamination level of sediments
- Method of disposal
- Production required

As explained in Chapter 2, only the CSD option is carried forward for the Berths 8–11 dredging. The alternative of using a TSHD was discarded because it is less effective on the berth sediments and would produce more sediment overflow (turbidity).

Accordingly, the ESIA assesses the dredging impacts of **CSD-based dredging for Berths 8–11**, and the use of a TSHD does not form part of the assessed base-case project description. Any subsequent proposal to introduce TSHD or other materially different dredging equipment shall require prior technical justification, environmental review, and approval before implementation.

8.3 New Berths Construction Methods and Techniques

There are several structural typologies of berths that are used in commercial ports with relatively significant depth, and which depend on their implementation and execution conditions, we quote:

- Option 1: Rehabilitation
- Option 2: New quay - Pile solution
- Option 3: New quay - Caisson solution

8.3.1 Option 1: Rehabilitation

For this option 1 of the rehabilitation, this extension will require:

- Moving the crane in order to make it aligned with the one at berth 7,
- Add a beam supporting the new two rails to cope with the new implementation of the two dimensions of STS cranes and their loading,
- Add two lines of piles to support the new beam.

The implementation of beams and piles will lead to demolishing a strip of around 5 m from the existing slab. This process will cause additional damage to the existing structure (deck and piles).

The extension of the quays requires the implementation of two extra lines of piles and the construction of new piles for the replacement of severely degraded ones. This solution is very expensive compared to the construction of a very new structure. It is important to be aware that new damage may occur within 5–10 years to the existing structures.

The lifespan of the extension area is different from the rehabilitated part that will cause periodic rehabilitation work. If the Client decides to rebuild the rehabilitated part, the extension area would represent a construction constraint

8.3.2 Option 2: New quay Pile Solution

This type of berth consists of a reinforced concrete platform supported by piles. It is mainly used when the existing natural ground consists of a poor bearing capacity under which there is another layer with sufficient resistance.

At the junction of the concrete platforms with the piles, the concrete must be efficiently armed by bending steel so as to avoid any bursting of the structure under the effect of embedding reactions of the pile heads.

This type of berth structure presents the following advantages:

- Suitable for all depth and load conditions
- Possibility of berthing larger ships (container terminals)
- Adaptable to any geotechnical condition
- Does not require a large capacity lifting means;
- Fast execution;
- Extensive use of prefabrication for the upper part of the quay (pre-slabs, beams)
- Interesting solution if you want to limit the agitation effect in the port

This solution consists of the construction of a reinforced concrete platform supported by piles with a total length equal to around 726 m and a width of 44.4 m. Considering the temporary exploitation of the berth, the Consultant has divided the structure into three main parts and each part is jointed into three secondary blocs with an average length of 90 m.

Accordingly, the project has adopted **Option 2: New quay – Pile Solution** as the preferred structural option for Berths 8–11. Rehabilitation was rejected because of the age and serious deterioration of the existing structure, while the caisson option was found to be less appropriate than the piled-quay solution on technical and cost grounds.

8.3.3 Option 3: New quay-Caisson Solution

Caisson quays are used when the soil offers good bearing capacity (rocky soils, pebbles, compact sand), the quays are constructed in the form of massive structures capable of withstanding:

- Horizontal forces such as berthing, mooring and the thrust of the embankments.
- Vertical forces such as its own weight, handling equipment and the loads on the platform

The caissons are made up of several vertical reinforced concrete cells, they are prefabricated and then floated to the site and placed continuously on the alignment of the quay.

It is recommended to place a rocky cover behind the wall, with high internal friction to reduce the thrust force, and with important grain size to prevent the leakage of fines through the many joints in the wall.

This type of structure presents certain constraints for our project:

- The soil does not have a good surface resistance;
- A relatively difficult implementation;
- Technique requiring a specialized Contractor;
- Requires powerful lifting which will impact the operation at the port and will limit the competition from contractors leading to a relatively high work cost;
- Requires powerful lifting means which will impact operations in the port;
- Adds harmful constraints to the existing adjacent quays by transmitting lateral loads;
- A greater quantity of materials to be used, which will subsequently cause a negative impact on the environment.

8.3.4 No-Go alternative

The assessment of alternatives must always include the “no-go” option as a baseline against which all other alternatives must be measured. The option of not implementing the activity must always be assessed and to the same level of detail as the other feasible and reasonable alternatives.

The no-go will see the *status quo* activities persist without the construction on the proposed site. The “no-go” option is taken to be the existing rights on the property, and this includes all the duty of care and other legal responsibilities that apply to the owner of the property.

1. Severe congestion and increase waiting time for ships at anchorages. The improvement of entrance channel and port basin will solve the present problem of severe traffic congestion at the port.

2. Container vessels are queuing for 10 days on average to get the berth. Waiting time of the vessels for the berth will reduce considerable. Moreover, this will also allow the movement of Panamax and other larger dry bulk vessels in the port.
3. Restricted entrance channel to the port limiting access to container carriers with capacity up to 2000 TEUs. Entrance channel performance was increased and the access to container carriers with capacity up to 2000 TEUs was enabled.

The no project alternative entails retaining the status without developing the project. “No Project” is an economic alternative but is not worth to consider, as it will not solve the issue that Dar es Salaam port is currently facing.

The recently prepared Port Master Plan 2028 for Tanzania Ports Authority has identified the constraints associated with the port in the country. It includes severe congestion, and high berth occupancy.

The proposed project will improve the port operation efficiency, so that the larger capacity container vessels can enter the port.

8.4 Consideration of Alternatives for Electrical Works

8.4.1 No Go Option

The main objective of the electrical works is provide electrical power to the port facilities and the ships that dock there. They play a critical role in enabling the operation of various types of electrical equipment, such as cranes, lighting, communication systems, refrigeration units, and other heavy machinery. This is more important due to the expansion of ports activities which shall require steady energy demand. Environmental and social impacts from the project are assessedand no significant impacts are anticipated.

If the electrical works are not done, the consequences would be as follows:

- Envisaged environmental benefits will not be realized: these might include reduced greenhouse gas emissions, improved air quality, noise reduction, and conservation of natural resources.
- Energy capacity will not increase: Secure the demand of the new establishment as well as to meet with the demand increased fromtheport rehabilitation activities will not be achieved
- TPA’s financial losses from low quality power supply will increase, and
- As a result, an increase in the economic activities in the region would not be possible.
- The site of the proposed Substations is far from residential area and within the Port compound. Therefore, the no go option for the project is not recommended.

8.4.2 Technology Alternatives

There are various technologies of substation, vide: Gas-insulated substation (GIS), air-insulated substation (AIS), and hybrid substation. Each type has its own advantages and disadvantages, and the choice will depend on the specific requirements of the project.

- **Gas-insulated substation (GIS)**: A GIS uses a gas, such as sulphur hexafluoride (SF_6), as the insulating medium. This allows for a more compact design, as the gas has a high dielectric strength, allowing for a smaller footprint. GIS can also be installed in areas with harsh weather conditions, as the gas is not affected by temperature or humidity. However, GIS tend to be more expensive to install and maintain and can be more complex to operate and repair than other types of substation.

- **Air-insulated substation (AIS)**: An AIS uses air as the insulating medium. AIS are typically less expensive to install and maintain than GIS and are more straightforward to operate and repair. AIS also have a smaller environmental impact than GIS, as they do not use any greenhouse gases. However, AIS tend to require more space than GIS, and are more susceptible to weather conditions and environmental factors, such as pollution and salt spray in coastal regions.

- **Hybrid substation**: A hybrid substations is a combination of both GIS and AIS. A hybrid substations uses GIS for high voltage equipment and AIS for low voltage equipment, providing a balance between cost and reliability. Hybrid substation can be a good choice for projects that require a smaller footprint than AIS but at a lower cost than GIS. However, hybrid substation can be more complex to design and operate, as they require a mix of different technologies.

GIS are a good choice for projects that require a smaller footprint and are in harsh weather conditions (typical conditions of Dar es salaam Port), but they tend to be more expensive to install and maintain. AIS are a good choice for projects with limited space and a lower budget, but they are more susceptible to environmental factors. Hybrid substation can provide a balance between cost and reliability but can be more complex to design and operate.

The Dar es Salaam port substations is based on GIS technology with SF_6 gas insulated is the most appropriate technology to be used based on environmentally and economically acceptable standards for similar Substation. It requires limited space (occupies only 1/10 compared to other Substations), especially since the site is located at an urban area (due to the aesthetic landscape as the Substations will be indoor) and more reliable than other previously mentioned Substations. These are the priorities to select the GIS system in this project. In addition, to reducing the risk of flammable materials, having long lifetime and less operation and maintenance compared to the conventional Substations, the SF_6 gas insulated system is selected for this substations.

However, if SF_6 is released to the environment will increase the impact on ozone depletion and global warming. Therefore, the periodically check of the insulated gas must be done properly and periodically in accordance with the specification and operation manuals.

8.4.3 Location Alternatives of Substations

The selection of the Substations location is undertaken according to criteria that fulfils technical, environment as well as socioeconomic objectives to achieve the most feasible application. The Substations site at TPA is proposed to be built to serve the increase of the electricity demand.

8.4.4 Conclusion

Generally, there are few environmental constraints for construction of the Substations which requiring aset of mitigations described in ESMP (Chapter 9 of this ESIA). If necessary, measures will be followed during the implementation (construction and operation phase) of the project, there will be no environmental/social objection regarding site selection for Substations.

CHAPTER NINE

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

9.1 Objectives and Principles of the ESMP

The Environmental and Social Management Plan (ESMP) is the main instrument for ensuring that the potential environmental and social impacts identified in this ESIA are effectively avoided, minimised, mitigated or compensated, and that the positive impacts are enhanced throughout the life of the project. For the improvement of Berths 8–11 and the electrical works at Berths 1–7, the ESMP provides a structured framework that translates the assessment in Chapter 7 into practical, implementable measures, with clearly assigned responsibilities, monitoring requirements and budget provisions.

The ESMP is applicable to all phases of the project – pre-construction/design, construction (including mobilisation and demobilisation), operation and maintenance, and eventual decommissioning – and is binding on Tanzania Ports Authority (TPA), its contractors and sub-contractors, and relevant port operators.

9.1.1 Overall Objectives of the ESMP

The specific objectives of this ESMP are to:

- Operationalise the impact assessment by converting the impact and risk findings in Chapter 7 into a set of concrete mitigation and enhancement measures, procedures and plans for each project phase.
- Ensure compliance with applicable Tanzanian environmental, health and safety and labour legislation, as well as with World Bank safeguard policies (including OP 4.01 and OP 4.12), IFC Performance Standards and the IFC EHS Guidelines for Ports, Harbours and Terminals.
- Clarify institutional roles and responsibilities among TPA, contractors, supervising consultants, port operators, regulatory agencies (NEMC, OSHA, TASAC, municipal authorities) etc, so that each required action has a clearly identified owner.
- Provide a framework for environmental and social monitoring, including parameters, locations, methods, frequency and reporting lines, to verify that mitigation measures are implemented and are effective, and that residual impacts remain within acceptable limits.
- Facilitate adaptive management, allowing TPA and contractors to adjust mitigation and operational practices in response to monitoring results, audits, incident investigations or stakeholder feedback.
- Support meaningful stakeholder engagement by providing a basis for communicating key risks, mitigation measures and monitoring results to affected communities, port users and other stakeholders, and by integrating the project grievance redress mechanism into day-to-day management.
- Secure resources for implementation, by identifying the human, technical and financial resources required to implement the ESMP, including specific line items for mitigation, monitoring, capacity building and contingency measures.

9.1.2 Guiding Principles and Mitigation Hierarchy

The ESMP is grounded in recognised environmental and social management principles and the mitigation hierarchy, namely:

- Avoidance: give priority to avoiding impacts at source through project design, siting and method selection (for example selecting an offshore disposal site away from sensitive reefs; designing shore power to reduce air emissions at berth; using existing port land to avoid resettlement).
- Minimisation: where impacts cannot be fully avoided, reduce their magnitude, duration, extent or likelihood through best practicable means (for example controlling dredging methods and timing, using noise-reduction measures for piling, managing traffic and work hours to reduce disturbance).
- Restoration or rehabilitation: where feasible, restore affected environmental or social conditions to their pre-project state or to an agreed functional equivalent (for example reinstating disturbed areas, rehabilitating construction sites, supporting re-establishment of livelihoods).
- Compensation or offset: as a last resort, provide fair and timely compensation or offset measures for significant residual impacts that cannot be fully mitigated, in particular regarding livelihoods and economic displacement consistent with OP 4.12.

In addition, the ESMP reflects the following cross-cutting principles:

- Precautionary principle: where there is uncertainty about potential significant harm, adopt conservative measures and enhanced monitoring until adequate information is available.
- Polluter-pays principle: the project proponent and its contractors are responsible for preventing pollution and bearing the cost of any necessary remediation and compensation.
- Continuous improvement: environmental and social performance should improve over time through monitoring, audits, lessons learned from the Berths 1–7 and channel works, and corrective actions.
- Health and safety first: protection of workers and communities is a core priority; occupational and community health and safety measures are integrated into all ESMP components.
- Transparency and participation: affected stakeholders, including port users, surrounding communities and vulnerable groups, should be informed and able to participate in relevant decisions, with access to an effective grievance mechanism.

9.1.3 Linkage with Impact Assessment and Alternatives

This ESMP is directly derived from the impact and risk analysis in Chapter 7 and the project alternatives and design optimisation in Chapter 8. In particular:

- The mitigation and management measures in Chapter 9 correspond to the significant impacts identified in Chapter 7 (including cumulative impacts), with priority given to those rated Moderate or Major before mitigation (for example dredging-related turbidity and benthic disturbance, underwater noise from piling, spill risks, disruption to port operations andcommunity and worker safety risks.).
- The ESMP reflects and operationalises the preferred alternatives described in Chapter 8, such as the selection of the offshore disposal site, the choice of quay design, and the inclusion of modern electrical infrastructure and shore power, which already incorporate impact avoidance and reduction measures by design.
- The monitoring plan (Chapter 9.5) is aligned with the key receptors and indicators used in Chapter 7 (for example turbidity and sediment quality, marine ecology, air and noise quality, occupational and community health and safety, livelihood indicators), ensuring that predicted impacts and residual risks are verified in practice.
- Requirements related to social and livelihood aspects, including labour and working conditions and are consistent with the social baseline and stakeholder engagement outcomes presented in earlier chapters By maintaining this clear linkage between assessment, alternatives and management, the ESMP provides a coherent and auditable pathway from impact prediction to day-to-day

implementation and monitoring, ensuring that the Dar es Salaam Port Improvement Project is developed and operated in an environmentally and socially responsible manner.

9.2 Impact Mitigation and Enhancement Plan

This section presents the core environmental and social mitigation and enhancement measures for the project. It translates the impact assessment in Chapter 7 into a structured set of management actions to be implemented by Tanzania Ports Authority (TPA), its contractors and operators, and the relevant authorities during all phases of the project. The measures are grouped by project phase and by main project component (marine works at Berths 8–11 and onshore electrical works at Berths 1–7) and are further detailed in the ESMP matrix table that follows.

9.3 Structure of the ESMP

The mitigation and enhancement measures included in this ESMP are directly derived from the significant impacts and risks identified in Chapter 7, including both biophysical and socio-economic aspects and cumulative impacts. For each key impact, Chapter 7 identifies:

- the project activity or aspect causing the impact
- the affected environmental or social receptor
- the unmitigated magnitude and significance
- the main mitigation principles or options

Section 9.3.1 consolidates and organises these measures into a practical management framework that:

- links each mitigation and enhancement measure to a specific impact, receptor and project phase
- identifies the responsible implementing and supervising parties (for example TPA, contractor, supervising engineer, , TASAC, OSHA, municipal authorities)
- defines the timing and location of implementation
- indicates the monitoring needs to verify effectiveness

9.3.1 Environmental and Social Management Plan

The detailed ESMP matrix (Table 9.1) presented at the end of this section serves as the primary operational tool and should be integrated into tender documents, contracts, method statements and operational procedures.

Table 9-1: Environmental and Social Mitigation Plan – Berths 8–11 Project

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
Pre-Construction	Sensitive habitats near project area (marine)	Pre-dredging survey: Conduct a marine ecology survey of the project area to identify sensitive habitats. Relocate corals if needed and mark sensitive zones before work begins.	TPA Environmental Unit (lead) with Marine Ecology Consultant; Contractor to assist	*Baseline survey report completed; Coral relocation (if needed) done before dredging; Sensitive areas mapped and flagged*	Once before construction (several weeks prior to dredging)	20,000 (survey & coral relocation)	Berths 8–11 underwater work area; any identified coral/mangrove areas
	Institutional capacity for ESMP implementation	TPA will appoint an Environmental Officer, the Contractor will hire an on-site EHS Officer, and the Supervision Consultant will assign an E&S specialist. Roles are defined, and all parties will be briefed on ESMP requirements.	TPA Management; Contractor; Supervision Engineer	*E&S staff in place; ESMP responsibilities included in contracts; Kickoff meeting held to assign duties*	Once before construction (pre-mobilization)	5,000 (orientation workshop)	All project areas (administrative measure)
	Emergency plan (dredging)	Emergency Plan: The Contractor must create and train workers on a dredging-specific emergency plan covering incidents like fuel spills, toxic gas release, vessel collision, and worker injury. Include documented steps for key scenarios such as hydrogen sulfide release.	Contractor (prepare plan); TPA EHS Unit (approve); Port Fire & Safety Dept. (involve)	*Emergency plan approved and in place; drill/exercise conducted pre-construction*	Plan ready before dredging; One emergency drill before start of works	10,000 (plan development & training)	Entire project (dredge area, berths, relevant to all locations)

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Stakeholder coordination (ferry, community)	Notify Magogoni Ferry management, Kurasini ward, and port users about the project and possible disruptions. Coordinate dredging activities to avoid peak ferry times. Set up a grievance mechanism and maintain regular communication to address concerns.	TPA (Community Liaison Officer); Contractor	*Number of coordination meetings held; Public notices issued; Grievances logged and addressed promptly*	Notifications before construction; Meetings monthly during works	5,000 (communication materials)	Kurasini ward, Magogoni ferry, fishing community reps
Construction	**Water quality: turbidity and sedimentation**	Use only the CSD-based dredging arrangement assessed in this ESIA for Berths 8–11. Any proposed change to TSHD, or other materially different dredging equipment shall be subject to prior review, approval, and update of the relevant environmental management documentation before use Install and maintain silt/turbidity curtains around dredging areas and near sensitive sites, inspecting daily. Pause dredging and add controls if turbidity exceeds limits (1-5NTU for coastal sea water). Use low resuspension dredging methods (e.g., closed clamshell bucket, slow cutter suction swings) and avoid or limit hopper barge overflow near the surface.	Dredging Contractor (Site Manager); Supervision Consultant (inspect)	*Turbidity levels at compliance points < agreed threshold (e.g., per EPA/NEMC permit); No visible plume escaping containment*	Continuous during dredging; Inspections of curtains daily; Turbidity monitoring (see Monitoring Plan)	50,000 (curtains and maintenance)	Dredge areas at Berths 8–11; Near any coral/reef or shore receptors;

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Water quality: contaminants	Test dredged sediments for contamination before disposal. Handle contaminated material separately, not by open water dumping. Only use permitted offshore disposal sites, following all permit conditions. The Dredge Management Plan will set water quality limits and corrective actions.	TPA (ensure testing); Contractor (plan and execute); Regulators (NEMC)	*Spoil quality report completed; Disposal permit obtained; No significant contamination left unmitigated; Compliance with disposal site rules*	Sediment sampling pre-dredging; Continuous adherence during dredging/disposal	15,000 (testing); 100,000 (if special handling needed for contaminated sediment)	Dredging area and designated offshore dump site (e.g., per EIA)
	Marine ecology protection	Schedule dredging and piling outside critical marine life periods, such as coral spawning and fish breeding. Set up exclusion zones around construction sites to protect marine fauna and notify local fishers. Pause work if marine megafauna are seen within 100m until they leave.	TPA Environmental Unit (set requirements); Contractor (implement, hire patrol)	*Work timed per ecological guidance (documented); Zero incidents of marine fauna injury; Fishermen compliance with zones*	Planning before construction (seasonal); During works: continuous enforcement; weekly check-ins with fisheries officers	10,000 (patrols, signage)	Harbor basin (dredge/pile zone) and defined buffer (exclusion) area, as per marine safety plan

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Underwater noise (piling/dredging)	Use "soft-start" procedures for pile driving and dredging by starting with low power for 20–30 minutes to let marine life leave. Reduce noise with bubble curtains or by using a vibratory driver instead of an impact hammer. When impact driving is needed, limit to daylight with a Marine Mammal Observer (MMO) present to halt work if sensitive species approach. At night or in poor visibility, use Passive Acoustic Monitoring. These steps align with IOGP and IMO noise mitigation guidelines. Silt/sediment curtains will be used where needed; the Contractor shall ensure a barrier is installed in all high-turbidity areas	Contractor (pile driving crew, MMO hire); Supervision E&S Specialist (ensure measures in place)	*Soft-start done every time (logs kept); Bubble curtain functional (noise reduction ~5-10 dB observed); No marine mammal/turtle injury incidents; Compliance with work-hour restrictions*	Each time piling or loud dredging starts; MMO on duty whenever active (daytime continuous)	30,000 (bubble curtain equip & ops); 20,000 (MMO/PAM services)	Berth 8–11 work sites (piling locations); Underwater within ~1 km monitoring zone
	Construction noise (onshore)	Community noise control: Use modern, well-maintained equipment with mufflers. Limit noisy activities to 7 AM–7 PM. Install temporary barriers near sensitive areas and notify the community in advance of loud work.	Contractor; TPA (monitor complaints)	*No noise complaints from community exceeding thresholds; Measured noise levels at nearest homes/businesses stay within regulatory limits (e.g. 55 dB day, 45 dB night)*	Continuous during construction; Monitoring weekly at boundary	5,000 (barriers, PPE)	Work sites at Berth 1–7 (electrical trenching) and port perimeter near communities
	Air quality (dust & emissions)	**Dust suppression:** Water-spray unpaved work areas and access roads during dry conditions to control dust. Cover stockpiles of soil or	Contractor (Site Manager); Supervision	*Visible dust minimized (observations); Ambient PM_10*	Daily watering as needed; Equipment	8,000 (water spraying, covers)	Land-based work areas

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
		dredged material on land; cover trucks transporting loose materials. Use wheel-wash for trucks exiting site to avoid tracking soil to public roads. **Emissions control:** Ensure construction equipment is well-maintained and meets at least Tier 2 emissions standards if possible. Avoid unnecessary engine idling – enforce a policy to shut off engines if waiting >5 minutes. For generators and welding sets, prefer electrical hookup or efficient models. These measures reduce combustion emissions. Monitor ambient dust (PM_10) if nearby receptors report issues.	Consultant (HSE)	*within acceptable levels; Equipment maintenance logs up-to-date; No complaints about excessive dust*	checks monthly; Air quality monitoring periodic (as per monitoring plan)		(electrical works along Berths 1–7, any material yards); Access roads in/out of port

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Waste management	Implement a plan for all solid and liquid wastes. Provide labeled containers for scrap metal, plastic, general trash, and hazardous waste. Train workers to use them. Hazardous waste must be stored securely and disposed of by licensed handlers per Tanzanian law, with records kept. Ensure port facilities for ship waste (per MARPOL); no dumping in the harbor. Reuse or properly dispose of construction debris and dredged material with required approvals. Audit waste practices regularly. Licensed receiving facility confirmed before disposal	Contractor HSE Manager (implement on site); TPA Environment Unit/Supervising Engineer (arrange disposal contracts)	• *No litter or spills on site;* • *Waste bins present and used;* • *Disposal records (waste manifest) and receipts for all waste;* • *Oil-water separator in place for any bilge water*	Throughout construction; Weekly site inspections for housekeeping; Monthly waste volume reporting	15,000 (bins, hazwaste handling)	All construction sites (berths, yards, vessels). Waste endpoint: licensed landfill, recycling facility, etc.

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Marine pollution (spills)	**Spill prevention and response:** All fuel tanks and hazardous liquids on site (including on dredgers or barges) shall have secondary containment (bunds or drip trays) sized to hold 110% of volume. Refueling of equipment to be done in designated areas away from water, with spill kits on hand. For marine vessels, conduct fuel transfer in daylight and good weather when possible, with anti-spill booms deployed or ready (especially if refueling barges from a tanker boat). Equip dredgers and work boats with spill kits (absorbents, booms) and train crew in their use. Develop a **Spill Response Plan** as part of the Emergency Plan: define steps for various spill scenarios, notification chain, and containment/cleanup procedures (aligned with port's Oil Spill Contingency Plan). Conduct at least one drill during construction. *Indicator:* zero significant spills (if any minor spill, contained < 5 liters and reported).	Contractor (preventive measures, first responder); TPA Marine Dept. (oversight, additional response)	*No significant pollution incidents; Spill logs and drills records; All fuel storage compliant with bunding; Crew training certificates*	Continuous prevention; Inspections of storage weekly; Emergency drill mid-project	10,000 (spill kits, training, drill)	Fuel storage areas on-site; Berth fuel transfer points; Afloat on work vessels

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Collision with marine fauna (vessels)	**Vessel speed and wildlife interaction:** Limit project vessel speeds to 5–6 knots within the port area and approach channel to reduce collision risk with dolphins, turtles, or dugongs (if present). Post lookout crew on each vessel to watch for large marine fauna, especially during transit to the offshore disposal site. If large fauna (dolphin/whale) is spotted ahead, vessels will alter course or slow to idle until animals pass. Establish a standard "exclusion zone" (e.g. 100 m) around marine mammals – if animals enter this zone around a dredger or moving vessel, take avoidance action (pause work or steer away). Also, avoid nighttime transit in shallow areas where turtles might surface, where practicable. These measures follow COLREGS and IOGP guidance for avoiding ship-fauna collisions.	Contractor (vessel captains); TPA Harbour Master (enforce speed)	*Adherence to speed limits (GPS logs); No incidents of boat-animal collision; Crew training in wildlife avoidance; Signage on vessels about protocol*	Throughout construction whenever vessels in operation; Toolbox talks weekly reinforcing this	0 (procedural, minimal cost aside from training time)	Port waters and transit route to disposal site (entire marine footprint)
	Worker health & safety	Occupational Health and Safety Management: Provide appropriate PPE to all workers and conduct safety inductions and task-specific training. Adhere to OSHA guidelines and the project Health and Safety Plan, including fall protection, lockout-tagout for electrical work, and marine safety protocols such as life-jacket use, man-overboard procedures, or floating rescue gear.	Contractor (Safety Officer to implement); Supervising Consultant (monitor HSE compliance); OSHA (inspections)	*Incident rate (LTIFR) kept low; All workers trained and using PPE (100% compliance observed); OSHA site inspection reports with no major violations*	Throughout construction; daily PPE checks; monthly safety audits; immediate reporting of incidents	50,000 (PPE provision, training, first aid equipment)	All construction sites (onshore and offshore)

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
		Maintain a first aid station and have a qualified HSE officer on-site. Hold weekly safety meetings, record incidents, and aim for zero fatalities and minimal injuries.					
	Staff Welfare	Provide adequate portable chemical toilets and handwashing stations at all work sites, segregated for male and female workers and accessible where required. Service all units through a licensed provider and remove sewage to an approved treatment or disposal facility. No discharge to land, drains or marine waters shall be permitted.	Contractor Supervising Engineer / TPA Environmental and Social Team	Adequate number of portable toilets installed Separate male/female units provided Handwashing facilities available Service records from licensed provider available No evidence of overflow or discharge to land, drains, or harbour waters	Weekly inspection and service-log verification	5,000	All active work areas, laydown areas, and worker service points
	Community health & safety	Traffic and access management: Develop a Traffic Management Plan with designated haul routes and schedule truck movements during off-peak hours. Use flagmen at exits, cover trucks, and install warning signs. Secure work areas with fencing and security to keep out unauthorized persons. Provide safe alternatives	Contractor (logistics manager, security); TPA Port Security (coordination)	*No serious accidents involving public; Community feedback indicates awareness of project and avoidance of work zones;*	Continuous; Traffic plan in effect throughout; Security checks daily; Community liaison ongoing	10,000 (signage, barriers, safety outreach)	Outside port gate on access roads (e.g., Kilwa Road if used); Around project

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
		and clear notices for any temporary public access changes.		*Traffic incidents minimized (tracked via grievance or police reports)*			site perimeter (fences)
Operation	**Water and sediment quality** (marine)	Implement an Environmental Management System (EMS) at the port to oversee operations. Key actions include: monitor water quality around berths, require vessels to use port waste reception facilities (per MARPOL) for bilge, ballast, and sewage, maintain stormwater drainage with oil-water separators, and periodically test berth sediments for pollutants, addressing any exceedances.	TPA (Harbor Master, EHS Dept.); Ship captains (comply); NEMC (monitor compliance)	*No illegal discharges recorded; All ships calling have waste handling logs; Water quality trends remain within baseline range; Sediment contaminants not building up significantly*	Continuous during operations; Periodic audits of ships; Sediment testing biennially	30,000 (upgraded reception facility operations per year)	Port waters at Berths 8–11 and nearby; Port waste collection points; Stormwater outlets
	Air emissions reduction	Shore power: Require and incentivize ships at Berths 1–11 to use shore power, targeting over 75% adoption in the first year to cut port emissions. Ships unable to use shore power must use low-sulfur fuel and keep engines efficient. Ensure all port equipment is well-maintained and consider electrifying cargo handling equipment to further reduce emissions.	TPA Operations & Engineering; Shipping Lines (cooperate)	*Shore power usage rate; Measured reductions in berth air pollution (SO_2, PM levels drop); Compliance with fuel standards; Positive feedback from community on reduced smoke/noise*	Ongoing in operation; Track metrics quarterly; Equipment maintenance per schedule	Initial infra cost (part of project); ~100,000/yr (operational costs of electricity & maintenance)	Port berths and yards (air quality around operational areas and adjacent communities)
	Noise control (operational)	Quiet operations protocols: Enforce a noise curfew for loud activities, schedule maintenance dredging to	TPA Operations; Tenants	*Port noise levels at boundary within*	Continuous; Noise monitoring	5,000 (periodic	Port perimeter (nearest

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
		avoid nights and sensitive times, use low-noise equipment with sound enclosures, and notify nearby communities of any especially loud events.		*standards; Minimal noise complaints from community in Kurasini; Adherence to any permit noise conditions (if applicable)*	quarterly at fence-line; Complaint log ongoing	noise monitoring)	residential areas, e.g. Mivinjeni); At source of major noise in port
	Vessel traffic and navigation	Safe navigation & marine safety: With deeper berths, larger ships will use the port. The Harbor Master will update the Marine Traffic Management Plan, ensure pilot services are trained for bigger vessels, and maintain coordination with the Ferry Agency to prevent conflicts. Buoyage, channel depths, and mooring equipment will be regularly checked, and harbor speed limits enforced to minimize risks.	TPA Harbor Master; Tanzania Ports Authority VTS; Ferry operators	*No navigation incidents; Efficient ship turnaround times; Smooth coordination (record of communications between port control and ferry); Navigational aids all functional*	Ongoing; drills or simulations annually; depth surveys post-dredging as needed	50,000 (VTS upgrades, training)	Port navigation channel, Berths 8–11 basin; Ferry crossing area
	Invasive species control	Biosecurity: Enforce ballast water management—require all international ships to exchange or treat ballast water before entry and provide logs and certificates for inspection. Check anti-fouling coatings or certificates. Suspected vessels may be ordered cleaned. Work with MPRU to monitor and respond quickly to any invasive species detected.	TPA Harbor Master & EHS; Quarantine/MPRU officials	*All ships compliant with ballast rules (records); No new invasive outbreaks in first years of operation; Monitoring reports indicate stable ecosystem*	Continuous vessel checks; Biannual marine biofouling survey in port waters	10,000 (monitoring program for invasives)	Port waters, especially near ballast discharge points (berths);

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
				without alien species establishing			
	Emergency readiness	Operational emergency response: Revise and implement the port's Oil Spill and Emergency Preparedness Plans for new infrastructure. Store spill kits and booms at Berths 8–11, keep trained teams ready, and maintain communications. Run regular drills for fuel spills, fires, and electrical accidents. Coordinate with national agencies and budget for necessary equipment and funding.	TPA Safety/Emergency Unit; Dar es Salaam Marine Rescue/Fire Dept.	*Emergency drill performance (timely response, issues identified); Actual incidents (if any) handled effectively with minimal impact; Compliance with Tanzanian disaster management requirements*	Drills at least annually; Plan review every year; equipment inspection monthly	30,000 (training and equipment maintenance annually)	Port-wide (focus on new berths and electrical installations)
Decommissioning (future)	Environmental restoration	Decommissioning Plan (E&S): Prepare and get approval for a plan to remove all structures, waste, and debris, restore the environment, and manage sediments to limit turbidity. Address any contamination and consider habitat restoration, such as creating artificial reefs or replanting mangroves. Monitor the site for 1–2 years after closure to ensure recovery.	TPA (project owner at that time); Decommissioning Contractor; NEMC (regulator oversight)	*Approved decommissioning E&S plan exists; Site left clean (confirmed by final environmental audit); Post-decom monitoring shows recovering trends (benthic life returning, no pollution)*	Plan preparation 1-2 years before closure; Implementation during decom phase; Monitoring up to 2 years after	(To be estimated in future; usually ~5-10% of project cost reserved for decom)	Entire project footprint – berths, upland facilities, seabed areas impacted

Phase	Impact	Mitigation Measure	Resp.	Indicator	Frequency	Cost (USD)	Location
	Social impacts of closure	Worker and community transition: Create a Resettlement/Transition Plan for affected staff and port users. Identify impacted workers early and coordinate humane retrenchment or redeployment in line with labor laws. Offer retraining or severance as needed. Engage the community about future site uses, such as public spaces or fishing areas, and support ancillary businesses in finding new opportunities. Maintain site security during decommissioning. Treat decommissioning as a project with its own ESMP and stakeholder engagement.	TPA (HR and Community Liaison); Local Government (for land-use after port)	*No unrest or legal disputes over layoffs (achieved via fair compensation); Community supports post-closure plan (documented via meetings); Successful handover or new use of site*	Initiate planning ~5 years before end-of-life; Implement in final year(s) of operation; Follow-up 1 year after closure	To be determined (contingency for socioeconomic mitigation)	Surrounding community; workforce; potentially new development site at port

Table 9-2: Mitigation measures for Berth 8-11 which are not discussed in Berth 1-7 Study

Phase	Impact	Mitigation Measure
Pre-Construction	**Sensitive habitats near project area (marine)**	Pre-dredging survey: Conduct a marine ecology survey of the project area to identify sensitive habitats. Relocate corals if needed and mark sensitive zones before work begins.
	Institutional capacity for ESMP implementation	TPA will appoint an Environmental Officer, the Contractor will hire an on-site EHS Officer, and the Supervision Consultant will assign an E&S specialist. Roles are defined, and all parties will be briefed on ESMP requirements.
	Emergency plan (dredging)	Emergency Plan: The Contractor must create and train workers on a dredging-specific emergency plan covering incidents like fuel spills, toxic gas release, vessel collision, and worker injury. Include documented steps for key scenarios such as hydrogen sulfide release.

Phase	Impact	Mitigation Measure
	Underwater noise (piling/dredging)	Use “soft-start” procedures for pile driving and dredging by starting with low power for 20–30 minutes to let marine life leave. Reduce noise with bubble curtains or by using a vibratory driver instead of an impact hammer. When impact driving is needed, limit to daylight with a Marine Mammal Observer (MMO) present to halt work if sensitive species approach. At night or in poor visibility, use Passive Acoustic Monitoring. These steps align with IOGP and IMO noise mitigation guidelines. Silt/sediment curtains will be used where needed; the Contractor shall ensure a barrier is installed in all high-turbidity areas
	Collision with marine fauna (vessels)	**Vessel speed and wildlife interaction:** Limit project vessel speeds to 5–6 knots within the port area and approach channel to reduce collision risk with dolphins, turtles, or dugongs (if present). Post lookout crew on each vessel to watch for large marine fauna, especially during transit to the offshore disposal site. If large fauna (dolphin/whale) is spotted ahead, vessels will alter course or slow to idle until animals pass. Establish a standard “exclusion zone” (e.g. 100 m) around marine mammals – if animals enter this zone around a dredger or moving vessel, take avoidance action (pause work or steer away). Also, avoid nighttime transit in shallow areas where turtles might surface, where practicable. These measures follow COLREGS and IOGP guidance for avoiding ship-fauna collisions.
Operation	**Water and sediment quality (marine)**	Implement an Environmental Management System (EMS) at the port to oversee operations. Key actions include: monitor water quality around berths, require vessels to use port waste reception facilities (per MARPOL) for bilge, ballast, and sewage, maintain stormwater drainage with oil-water separators, and periodically test berth sediments for pollutants, addressing any exceedances.
	Air emissions reduction	Shore power: Require and incentivize ships at Berths 1–11 to use shore power, targeting over 75% adoption in the first year to cut port emissions. Ships unable to use shore power must use low-sulfur fuel and keep engines efficient. Ensure all port equipment is well-maintained and consider electrifying cargo handling equipment to further reduce emissions.

Phase	Impact	Mitigation Measure
	Vessel traffic and navigation	Safe navigation & marine safety: With deeper berths, larger ships will use the port. The Harbor Master will update the Marine Traffic Management Plan, ensure pilot services are trained for bigger vessels, and maintain coordination with the Ferry Agency to prevent conflicts. Buoyage, channel depths, and mooring equipment will be regularly checked, and harbor speed limits enforced to minimize risks.
Decommissioning	**Environmental restoration**	Decommissioning Plan (E&S): Prepare and get approval for a plan to remove all structures, waste, and debris, restore the environment, and manage sediments to limit turbidity. Address any contamination and consider habitat restoration, such as creating artificial reefs or replanting mangroves. Monitor the site for 1–2 years after closure to ensure recovery.

The above measures respond to and expand upon prior ESMP requirements and stakeholder comments: for example, making silt curtains mandatory (not optional) to control dredging-induced turbidity, adding a project-specific emergency plan for dredging risks, and including new mitigations derived from **IOGP/IPIECA guidance** (e.g. soft-start for noise, dredge exclusion zones, invasive species management). Each mitigation action is tied to an indicator for monitoring its implementation/effectiveness. The responsibilities are clearly apportioned between TPA, contractors, and third parties, ensuring accountability. Cost estimates are included to assist in budgeting (also addressing the recommendation that ESMP measures be costed for implementation). These mitigation measures build upon those used in the Berths 1–7 project, with enhancements such as stricter turbidity control, more robust waste management, and integration of modern practices like shore power to reduce operational pollution.

9.3.2 Environmental and Social Monitoring Plan

Monitoring is crucial to verify the effectiveness of mitigations and to detect any emerging issues. In response to TPA's comments, the monitoring plan has been revised to specify responsible entities, frequency, location, and budget, and to increase frequencies for key parameters (marine water quality, noise, ecology) in line with risks. It also aligns with IFC's EHS Guideline recommendations for port monitoring (IFC Table 1 parameters) and lessons from previous projects (Berth 1–7 monitoring plan). **Table 9.2** presents the detailed Monitoring Plan. It is organized by environmental/social element, with sub-sections for pre-construction (baseline), construction, and operation phases. Each monitoring activity lists what will be measured (indicator), the method, location, timing/frequency, responsible party, and an approximate annual cost.

Table 9-3: Environmental and Social Monitoring Plan

Locations	**Aspect**	**Indicator or Verification**	**Method & Purpose**	**Frequency**	**Responsible Entity**	**Evidence of IFC EHS Guidelines Reference**	**Cost** (USD)
Dredge area: 3 stations (inside, 50 m outside, near down-current sensitive habitat). Disposal site: 1–2 stations along plume path. Background: 1 upstream station. Berths 1–7: monitor near stormwater outlets. Sediment sampling: dredged berths and disposal site.	**Water and Sediment Quality** (Marine)	According to IFC EHS Guidelines for Ports (Table 1, page 24); Dissolved oxygen, temperature, Ph, Turbidity, Oil and Grease, Secchi Disk Transparency, Conductivity/Salinity, Condition of Biological Communities, TSS, Chlorophyll, Total Phosphorus, Filterable Reactive, Phosphate, Total Nitrogen, Oxides of Nitrogen, Ammonia, Toxics and Sediment.	**Baseline**: Sample water around Berths 8–11 and disposal site for lab analysis of heavy metals and other reference levels. **During Dredging**: Monitor turbidity, TSS, and DO daily at key points using meters or lab tests; stop work if limits exceeded. Weekly lab tests for TSS, with regular visual checks for oil/grease. **Post-dredging**: Sample sediment and water immediately and 3–6 months later to check for contamination and recovery; compare heavy metals to baseline. **Operation**: Sample water quarterly for general parameters; repeat construction monitoring after maintenance dredging.	**Baseline**: 1 pre-project campaign (one week). **During dredging**: Daily turbidity/DO (or continuous logging); weekly lab samples. **Post-dredging**: 1 campaign right after, 1 at ~6 months (both seasons if possible). **Operation**: Quarterly sampling; plus daily/weekly during maintenance dredging.	Contractor's environmental team conducts daily field measurements and sends weekly samples to the lab, reporting to the Supervising Consultant and TPA. Supervision Consultant EHS specialist oversees monitoring and immediately reports exceedances to TPA and NEMC. TPA Environmental Unit (or lab) conducts quarterly monitoring during operations, with results in annual reports to NEMC. Report to NEMC and act if thresholds are exceeded.	IFC EHS Guidelines for Ports–Water Quality Monitoring Parameters	~ **$30,000** (construction phase monitoring, includes lab tests and equipment rental). **$10,000/year** during operation (quarterly testing). This includes lab costs, boat hire, etc.
Monitor coral reefs near areas affected by sediment plumes. Conduct benthic sampling at dredge sites, boundaries, disposal zones, and a distant control site. Collect fish data from local catches or reef surveys. Perform MMO observations within 500 m of dredging and piling sites.	Marine Ecology	Coral health: coral cover %, sedimentation, bleaching/stress signs. Benthic fauna: invertebrate abundance/diversity at impact sites. Fish: counts near project area (noting artisanal fisheries). Marine megafauna: dolphin/turtle sightings and behavior in harbor.	Baseline: Document initial coral reef and benthic community conditions (e.g., via photo transects and samples) before work begins. Construction: Monthly inspections by a marine ecologist for nearby reefs and sedimentation, recommending mitigation if impacts occur. Log marine mammal/turtle sightings and monitor for fish kills or turtle nesting incidents. Post-construction: At 6 and 12 months, survey dredged and disposal sites to assess benthic recovery and re-survey coral reefs for recovery signs.	Baseline: pre-project survey. Construction: monthly coral checks, daily MMO logs. Post: 6- and 12-month surveys. Operation: annual for 2 years, then as needed.	Marine Ecologist (consultant): conducts baseline/post surveys, reports to TPA/NEMC. Contractor/MMO: logs marine fauna sightings for monthly ESHS reports. TPA Environmental Unit reviews reports, coordinates adaptive measures, involves MPRU as needed.	IFC EHS Guidelines for Ports-Section 1.2: Marine Environment Protection (supplemented with ESIA SCUBA/UVC methods)	~ **$15,000** for baseline + post surveys (each survey campaign ~$5k). MMO cost in mitigation section covers the construction phase fauna monitoring. Operation years: ~$5,000/year for periodic surveys.

Locations	**Aspect**	**Indicator or Verification**	**Method & Purpose**	**Frequency**	**Responsible Entity**	**Evidence of IFC EHS Guidelines Reference**	**Cost** (USD)
			Operation: Conduct annual ecological surveys for 2 years, then monitor every 2–3 years as part of ongoing biodiversity checks.				
Underwater: about 500 m from piling, or 1 km if required, toward key habitats. Onshore: at the port fence nearest homes, and possibly at the ferry terminal.	Underwater Noise	Underwater noise (dB, peak/RMS at 500 m) Marine mammal detections (if PAM used) Onshore noise at nearest community (dB(A))	During initial pile driving, use a hydrophone at an eco-sensitive distance (e.g., 500 m) to check noise levels against NOAA guidelines for marine life. Adjust mitigation measures if levels are too high. Passive Acoustic Monitoring (PAM) by MMO at night can detect marine mammals. For community noise, measure sound at the port boundary near homes (e.g., Mivinjeni) during loud activities to ensure it stays below standards (e.g., <65 dB(A) day), and record any complaints.	**Underwater noise**: monitor during first few piles; if within limits, further checks only if methods or equipment change. **PAM**: monitor continuously at night or in low-visibility when marine mammals may be present. **Community noise**: measure monthly during peak construction and on complaints; annually during operation or as needed.	Underwater noise: acoustic specialist or researcher (report as needed). PAM: MMO team (include in EHS reports). Onshore noise: TPA EHS or consultant (report to NEMC monthly).		~ $10,000 for underwater noise; minimal in-house cost for community noise; PAM covered in MMO contract.
At the site boundary near the community (one downwind, one upwind). For workers: near active construction or use personal dust samplers. During operation: at port entry/exit and bulk material handling areas.	Air Quality	PM_{10} and $PM_{2.5}$ (µg/m³) CO, NO_2, SO_2 (if feasible)	Monitor site boundary dust (PM10) with handheld devices, comparing results to standards. Increase checks or dust control if levels are high or complaints arise. Inspect equipment for smoke and maintain it properly to minimize pollution for workers and residents.	Construction: Measure dust biweekly at first, then monthly if levels stay low; increase checks if issues arise. Operation: Test air quality annually or as needed.	Contractor HSE team checks air daily during construction; TPA Environment Unit monitors during operation and reports as needed.		~ **$5,000** for construction phase air monitoring (renting device or lab services). Minor for ops (maybe $2k per year for a lab to sample).
	Waste Management & Pollution	Proper waste segregation or disposal Track waste volumes No site litter or spills Monitor marine water for oil/grease Service logs, waste-transfer receipts, no leakage incidents	Conduct weekly site inspections to ensure no leakages, bins are labeled and used properly, check for oil leaks, and document any non-compliance and corrective actions. Track monthly waste manifests by recording disposal amounts and facilities used, verifying proper handling of hazardous waste, and	Weekly HSE walk-throughs, daily supervisor scans, monthly waste report checks in construction. operational phase: monthly port inspections and annual waste summaries.	Consultant and Contractor HSE conduct weekly checks; issues fixed by site management promptly. TPA audits waste quarterly and continues monthly EMS checks during operations.		Minimal additional cost (part of staff duties). Possibly $1,000 for documentation materials.

Locations	**Aspect**	**Indicator or Verification**	**Method & Purpose**	**Frequency**	**Responsible Entity**	**Evidence of IFC EHS Guidelines Reference**	**Cost** (USD)
			monitoring for illegal dumping to prevent pollution.				
All active work sites (including barges/vessels). Worker camp or assembly areas for observing PPE usage. Safety training logs (office records).	Construction sites: housekeeping checks Port water/shoreline: debris or oil scans Disposal route: tug tracking Waste storage area Occupational H&S	Safety statistics: hours worked, incidents (near-misses, first aid cases, Lost Time Injuries), fatalities (zero target) PPE compliance rate (% of workers with required PPE) Training attendance (records of inductions, toolboxes) OSHA inspection results	Require weekly HSE statistics from the Contractor and monitor trends to prompt action as needed. Track leading indicators like safety trainings and workforce participation. Hold monthly joint safety audits, report findings, and investigate all accidents to share lessons. TPA's EHS team compiles quarterly reports for regulators. During operations, continue monitoring safety KPIs and ensure new systems have specific safety checks.	**Daily**: Contractor safety officer checks PPE and safe conditions, logs any minor issues. **Weekly**: HSE report with incident stats. **Monthly**: formal safety audit walkthrough. Operation: safety committee meetings monthly; incident reporting as occurs.	**Contractor HSE Officer** collects and reports data to **Supervision Consultant** and TPA. **TPA HSE Manager** monitors overall trends, reports to OSHA as required (immediately for serious incidents). External OSHA inspections may occur (assume at least once); compliance to be 100%.		0 (part of management overhead). However, $5,000 allocated for external safety trainings or incentives (if needed).
GRM uptake points: site office, Kurasini Ward office, TPA community office. Meeting venue (community center). Traffic monitoring along routes (police or project reports if accidents).	Community Impacts & GRM	Community grievances logged (number and type) Resolution time and satisfaction Traffic accidents involving project vehicles (if any) Community feedback in meetings	Maintain an accessible Grievance Redress Mechanism (GRM) via logbook or hotline, track and resolve complaints—aiming for resolution within two weeks. Hold regular meetings with local leaders for feedback. Coordinate with ferry operators and fisherfolk to address incidents. Continue community liaison meetings during operation and monitor ongoing concerns.	GRM: track continuously; analyze monthly for trends. Community meetings: monthly in construction, then bi-annually in operation (if community interest remains). Traffic safety: continuous (any incident is recorded immediately).	TPA Community Liaison (or Contractor's CLO) logs grievances and reports to management. TPA CSR Department maintains stakeholder engagement. Grievance reports are included in quarterly ESMP reports to NEMC.		~ **$3,000** (for communication materials, meeting expenses) per year in construction; lower in operation.
Project site (for on-the-job training). TPA HQ (if formal trainings). Also, any involved agencies (OSHA, MPRU) for joint training sessions.	Institutional Capacity	Training delivered (topics, number of staff trained) Additional staff or consultant support in place Equipment procured (e.g. monitoring devices) and used	Monitor execution of the capacity-building plan by tracking completed trainings, attendee data, staff hires, equipment purchases, and using feedback to ensure institutional strengthening actions are implemented as planned.	– At key intervals: e.g., schedule training sessions in first quarter of project and mid-project, then evaluate afterwards. Check staffing at start and mid-way to ensure no gaps.	TPA Project/Environmental Manager tracks capacity-building (simple table: planned vs. completed) and reports status quarterly in ESMP (e.g., "Kit delivered April, training May"). Funders or		Included in capacity budget (see Capacity Plan). Monitoring it is internal cost (negligible).

Locations	**Aspect**	**Indicator or Verification**	**Method & Purpose**	**Frequency**	**Responsible Entity**	**Evidence of IFC EHS Guidelines Reference**	**Cost** (USD)
				Equipment: check procurement by end of mobilization.	monitors may verify during supervision.		

Note: Monitoring results will be documented and reported in regular ESMP progress reports. If any parameter exceeds prescribed thresholds or unexpected impacts occur, corrective actions will be taken promptly – this could include adjusting mitigation measures or stopping work if necessary (for example, if turbidity at the reef exceeds trigger for two consecutive days, dredging will halt and additional containment measures added). The plan above reflects an increase in monitoring rigor compared to previous projects (e.g., Berths 1–7 ESMP) – frequencies have been raised (daily turbidity checks rather than weekly), and additional elements like underwater noise and post-construction habitat surveys have been added. Furthermore, specific responsibilities are now assigned (Contractor vs TPA vs external lab), and location-based monitoring is defined (e.g., separate tracking at dredge vs disposal sites) to address earlier comments about location-specific clarity. The monitoring plan also explicitly incorporates IFC guideline parameters for ports (DO, nutrients, toxics, etc.) to ensure comprehensive coverage. Budget provisions are included to ensure these activities are funded under the project.

9.4 Institutional Responsibilities and Coordination

Clear definition of institutional roles is critical for effective ESMP implementation. In the past (Berths 1–7 project), lack of a dedicated section on roles/responsibilities led to confusion and gaps. This ESMP addresses that by outlining who does what at each project stage, and how different agencies will coordinate. It also integrates a review of the Berths 1–7 arrangement and identifies strengthening measures as per the TOR requirement.

The following narrative description summarizes key entities and their responsibilities.

- **Tanzania Ports Authority (TPA)** – *Project Proponent and Owner.* TPA has overall responsibility for ESMP implementation and compliance. Within TPA:
    - **TPA Environmental Management Unit** will lead environmental supervision, ensure mitigation measures are in contracts, and liaise with regulators. A TPA Environmental Officer is assigned full-time to the project site during construction (learning from Berth 1–7 where limited presence led to oversight gaps). In operation, TPA's EHS division will continue to monitor and report on environmental performance.
    - **TPA Project Manager/Engineer** will ensure contractors implement ESMP requirements and that ESMP progress is reviewed in all project meetings. The PM integrates ESMP updates in project reports to funding agencies and TPA management.
    - **TPA Community Liaison Officer** will handle stakeholder engagement and grievance management during construction, maintaining relationships with ward authorities, ferry management, and community.
    - **TPA Harbour Master** (Port Operations) – in operation phase, responsible for ongoing measures like vessel traffic management, enforcing environmental regulations on ships (ballast water, waste), and emergency response readiness. Coordinates closely with the Environmental Unit for monitoring results that may require operational changes.
- **Contractor** – *Primary implementer of construction-phase mitigations.* The dredging/construction Contractor must have an **Environmental and Social Management System (contractor ESMS)** for the project consistent with the ESMP. Key staff:
    - **Contractor's Environmental, Health and Safety (EHS) Officer** – on-site always, responsible for daily implementation of mitigation measures (dust control, waste segregation, equipment maintenance, etc.), monitoring activities required of the contractor (e.g., turbidity measurements, noise checks), and reporting EHS performance in daily and weekly reports. This officer ensures crew compliance (e.g. everyone wearing PPE, spill kits ready) and records incidents.
    - **Contractor's Marine Specialist (if dredging)** – oversees specific measures like silt curtain deployment, dredging methodology adjustments, and ensures dredging is per the Dredge Management Plan. Works with the MMO for marine fauna safety.

- **Contractor's Community Liaison (if required)** – if the workforce is large or there are local labor aspects, the contractor may appoint a CLO to interface with local community on employment or any disturbances caused by contractor activities (e.g., if camp or parking is near community).

- The Contractor is contractually obligated to follow all ESMP measures; their performance is monitored by TPA and the Supervising Consultant. Penalties or corrective orders can be applied for non-compliance. This was a lesson from Berth 1–7, where clearer accountability is needed – thus, in Berths 8–11, ESMP compliance will be a pay item and discussed in every progress meeting.

- **Supervision Consultant/Engineer** – *Independent oversight on behalf of TPA*. The supervising consultant (e.g., an engineering firm) will include dedicated Environmental and Social Specialists in their team. Their role:

  - Conduct routine site inspections and audits to verify the contractor is implementing the ESMP properly (they have authority to issue corrective action requests).

  - Review and approve the Contractor's own Environmental and Social Management Plan (CESMP) and method statements (e.g., dredging plan, waste management plan), ensuring alignment with the ESMP.

  - Collate monitoring reports and data from contractor and prepare consolidated monthly ESMP reports for TPA and NEMC.

  - Advise TPA on any deviations or unforeseen issues and recommend solutions. For instance, if monitoring shows a trend, the consultant might suggest additional mitigation measures.

  - Essentially, they act as a bridge between contractor and TPA to ensure impartial assessment of ESMP compliance, something that is being strengthened in this project. (In Berth 1–7, this role existed but the enhanced approach now is to have a full-time E&S supervisor on site).

Regulatory Authorities and their roles in ESMP implementation are detailed in subsequent narrative

- **NEMC (National Environment Management Council)** – ensures regulatory compliance. They will receive periodic reports and may conduct their own inspections. NEMC approved the ESIA and will issue the Environmental Certificate with conditions to follow. The ESMP commits to full compliance with those conditions. Any major incidents (spills, etc.) are reported to NEMC.
- **OSHA (Occupational Safety and Health Authority)** – will oversee worker safety aspects. They inspect high-risk activities (like diving, heavy lifting) and can issue improvement or prohibition notices. Coordination: the project's HSE team will invite OSHA for a pre-construction meeting to clarify expectations and will submit required safety audit reports. OSHA's involvement ensures national labor safety standards are met.
- **MPRU (Marine Parks & Reserves Unit)** – since the project is near a marine environment, MPRU or the Ministry of Natural Resources (Wildlife/Fisheries) might oversee protection of marine biodiversity. The project will coordinate with MPRU especially if any marine protected areas are nearby (e.g., is the port near a marine reserve boundary?) and for managing any coral relocation or monitoring of species. MPRU could assist in monitoring invasive species or advising on fishery-related mitigations.
- **Ministry of Livestock and Fisheries** – has interest in impacts on fisheries. The project will keep the Ministry (and local Fisheries Department) informed, particularly if any disruption to fishing or need for fisherman support arises. They may be part of the grievance resolution if fishermen claim losses. Their role is advisory/regulatory to ensure the project doesn't violate fishing laws and to assist with community engagement for fisherfolk.

- **Tanzania Shipping Agencies Corporation (TASAC)** – acts as the national maritime administration and regulator of ports, shipping services, and the maritime environment, safety and security in mainland Tanzania. TASAC will:
    - review and approve project-related maritime operations as required by the Tanzania Shipping Agencies Act (e.g. dredger and barge operations, navigation arrangements);
    - ensure that all project vessels comply with applicable maritime safety and environmental requirements, including SOLAS and MARPOL obligations (seaworthiness, certification, crew qualifications, ship-source pollution prevention);
    - participate in safety inspections and accident/incident investigations for any marine casualties or near-misses during dredging and berth works; and
    - work with TPA, Harbour Master and NEMC to enforce navigation safety measures (speed limits, exclusion zones) and preparedness for ship-source pollution incidents within the project area.

- **Local Government (Temeke Municipality, Kurasini Ward)** – key in community liaison. The Ward offices will be part of stakeholder meetings. They can help disseminate information to residents and also channel any community complaints to the project GRM. The project will provide them with progress briefs. Local government also oversees any traffic management on city roads used by the project, so coordination with Temeke traffic authorities is important for safety measures.

- **Port Operators (TPA Departments):**
    - **Other TPA Departments:** Security (for enforcing exclusion zones), Fire and Safety (for emergency drills), Engineering (maintenance of infrastructure and environmental equipment like oil interceptors), and Corporate Communications (for public info releases) all have roles as defined by TPA's internal plan.

- **Financiers i.e.,** World Bank or other donors involved in port improvements. They often have oversight of ESMP via periodic missions or reports. While not "implementers," their requirements (like World Bank's Environmental and Social Framework or similar) have influenced this ESMP. The project's ESMP reports may be shared with them for compliance checks.

To coordinate these players, the following mechanisms are established:

- **ESMP Coordination Meetings:** A dedicated **Environmental and Social Management Committee** meets monthly during construction. It includes TPA's Environmental Unit head, the Contractor's EHS manager, the Supervision Consultant's E&S specialist, and invitees from relevant agencies (NEMC, OSHA, etc., at least quarterly). This committee reviews monitoring data, compliance status, and any issues needing management attention. This direct coordination is an improvement to ensure issues are proactively addressed (learning from possibly slower communication in Berth 1–7).
- **Reporting Lines:** The Contractor reports to the Supervising Consultant, who reports to TPA and NEMC. However, any serious incident triggers immediate direct reporting to TPA and authorities. All parties have clear lines in the emergency response plan with contacts of each agency (e.g., who to call at MPRU if a dolphin stranding occurs, etc.).
- **Inter-agency Protocols:** For example, if an archaeological find is made, TPA will notify the Antiquities Department; if a large oil spill happens, national oil spill response (TPA/TPDC/NEMC) is activated. The ESMP contains a directory of agencies and roles in annex.
- **Documentation:** Each entity keeps records: Contractor keeps site logs, Consultant compiles these into reports, TPA archives and shares with regulators. There will be a mid-project external audit of ESMP compliance (possibly by NEMC or independent auditor) to evaluate effectiveness of coordination.

Table 9-4: Summary of Roles and Responsibilities

Actor	Key Responsibilities in ESMP Implementation
TPA Environmental Unit	Overall ESMP coordination; deploy Environmental Officer on-site; ensure mitigations are in contracts; review monitoring results; liaise with NEMC; enforce compliance by contractor (through Project Manager); lead community engagement via CLO; incorporate Berth 1–7 lessons by strengthening site supervision and follow-up.
TPA Project Manager/Engineer	Integrate ESMP in project execution; chair monthly ESMP meetings; require contractor and consultant reports; approve any design changes with ESMP in mind; allocate budget for ESMP actions (including capacity building); report upward to TPA management and financiers on E&S performance.
Contractor's EHS Officer	Day-to-day implementation of mitigation at site; conduct toolbox talks, internal monitoring (noise, turbidity, etc.); report incidents and EHS stats; coordinate with MMO and any third-party monitors; correct any non-compliance immediately. Accountable to meet ESMP requirements under contract (with possible financial penalties for serious violations).
Supervision Consultant E&S Specialists	Provide independent oversight; approve contractor's methods against ESMP; monitor and report on compliance; guide contractor on complex mitigations (e.g., coral relocation methodology); certify monthly that works comply or note deviations; escalate issues to TPA if contractor isn't responsive. Also ensure any social issues (labor, community) are addressed per standards.
OSHA (Authority)	Inspect worker health & safety conditions; review safety plans; respond to any accidents (investigation); enforce Tanzanian OSHA regulations. They coordinate with the project by scheduled inspections (quarterly or as needed) and joint safety workshops. Provide advisory on improving on-site safety culture (especially if they observed issues during Berth 1–7, now proactively corrected).
NEMC	Oversee environmental compliance; issue the EIA Certificate and conditions; review monitoring reports submitted (likely quarterly or bi-annually); conduct site inspections especially during dredging and at completion; can enforce stop orders or require additional mitigation if impacts exceed predictions. NEMC also ensures that the ESMP addresses all TOR items (like institutional arrangement – which this plan now explicitly covers).
MPRU / Fisheries Dept.	Advise on and monitor marine ecology protection measures: e.g., may join coral reef monitoring dives or review coral relocation outcomes; help define fishing exclusion zones and communicate with fishermen; ensure project does not impact any marine reserve (if applicable) or critical habitat. They will receive relevant sections of monitoring reports on marine life.
Temeke Municipal Council & Kurasini Ward	Support community liaison: co-host community meetings; forward any complaints they receive to project GRM; assist in traffic management on municipal roads (if construction trucks cause issues, they coordinate police). They also ensure local employment commitments are honored (if any) and that project benefits (like any CSR contributions to ward) are delivered, building on the positive relationship noted (e.g., TPA donating laptops to local school as mentioned).
TASAC (Tanzania Shipping Agencies Corporation)	National maritime administration and regulator. Ensures that all project-related vessels (dredgers, barges, tugs, supply boats) and port operations comply with the Tanzania Shipping Agencies Act and international maritime conventions. Reviews and enforces navigation safety measures (speed limits, routing, exclusion zones) in the harbor; conducts or participates in vessel inspections; oversees ship-source pollution prevention and response preparedness; and collaborates with TPA and NEMC in investigating any marine accidents, groundings or spills associated with the project.

Actor	Key Responsibilities in ESMP Implementation
Others (Fire Dept., Marine Police)	Fire Department: participate in emergency drills and respond to any fires/hazmat emergencies. Marine Police/Coast Guard: enforce exclusion zones on water, ensure security of the area (especially to prevent curious public boaters entering construction zone). They were engaged in Berth 1–7 and will continue to be key for maritime safety.

By clearly delineating these roles, the project ensures each impact has an "owner" for its management. An ESMP implementation organogram visualizes these relationships, which was missing previously. We have also included an item in the budget for capacity strengthening (next section) as recommended, which will further empower these institutions to fulfill their roles.

9.5 Capacity-Building and Training Plan

Effective environmental and social management requires not just plans and people, but also skills, knowledge, and tools. Based on the needs identified (and the comment that a capacity strengthening budget be included), this section lays out a capacity-building program. The aim is to enhance the capabilities of TPA staff, the contractor's team, and relevant stakeholders (like regulators and local community representatives) to implement and maintain the ESMP to high standards. Lessons from the Berth 1–7 project indicated areas for improvement – for instance, training on specialized monitoring (like underwater noise) was limited, and equipment for environmental monitoring was insufficient. The plan below addresses those gaps:

9.5.1 Training and Capacity-Building Activities

Subsequent bullets summarizes the types of trainings and capacity building activities and the targeted audience

- **ESMP Familiarization and Compliance Training:** *Target:* All contractor management, TPA project staff, and supervision engineers. *Content:* Review of ESMP requirements, specific do's and don'ts, reporting procedures, and consequences of non-compliance. Emphasis on new measures (e.g., soft-start noise protocol, waste segregation, GRM) that might be unfamiliar. *Schedule:* At project kick-off (prior to construction start). *Provider:* Supervision Consultant E&S specialists, with NEMC/OSHA contributing. *Outcome:* Uniform understanding of expectations from day one (addresses any Berth 1–7 confusion).

- **Dredging and Marine Environmental Management Training:** *Target:* TPA Environmental Unit staff, Contractor dredge supervisors, MMO team. *Content:* Best practices for dredging (based on IOGP/IPIECA and PIANC guidelines), use of silt curtains, turbidity monitoring techniques, coral relocation methods, marine fauna observation and response (including identification of key species and hearing threshold concepts). Also include a module on **offshore disposal management** (per London Convention protocols). *Schedule:* Early in construction, just before dredging starts. Possibly a 2-day workshop with both classroom and on-water demonstration (like deploying a silt curtain in trial). *Provider:* External marine environmental expert (perhaps from university or a consultant who worked on similar port projects). *Outcome:* Enhanced capacity to implement marine mitigations effectively and adaptively.

- **Underwater Noise & Marine Fauna Protection Workshop:** *Target:* Dredging supervisors, MMO, TPA, and MPRU representatives. *Content:* The science of underwater noise (basics of decibels, impulse vs continuous noise), the project's thresholds for marine mammals/fish, how to use and read a hydrophone, how bubble curtains and soft-start reduce impacts. Case studies from offshore industry on marine mammal protection during construction. *Schedule:* At onset of piling activities. *Provider:* Acoustician or NGO (like WWF if they have a marine program) could be invited. *Outcome:* Key personnel are able to monitor and mitigate noise impacts in real-time, and regulators (MPRU) gain confidence in measures.

- **Health and Safety Training Programs:** This includes *Working at Heights*, *Hazardous Material Handling*, *Marine Safety (for working over water)*, *Emergency Response Drills*. *Target:* Contractor workers and TPA supervisors. Many of these will be toolbox talks and formal certified courses (e.g., first aid, fire fighting). Given Berth 1–7 likely had some safety incidents (typical in construction), reinforcing safety culture is vital. *Schedule:* Recurring: major trainings quarterly, toolboxes weekly. *Provider:* OSHA-certified trainers for formal ones; contractor HSE for toolboxes. *Outcome:* Reduced accidents and improved safety compliance.

- **Environmental Monitoring Techniques:** *Target:* TPA Environmental Unit staff (to carry forward into operations) and some contractor staff. *Content:* Hands-on training in using monitoring equipment – e.g., water quality probe calibration and use, noise meter, GPS for tracking turbidity plume, sample handling for lab, etc. Also data management: how to interpret results and report them. *Schedule:* Early in monitoring phase (could be concurrent with dredging start). *Provider:* Equipment suppliers or local environmental lab experts. *Outcome:* TPA staff can independently conduct or oversee monitoring, a capacity that helps beyond this project (e.g., for routine port monitoring programs).

- **Institutional Coordination and Reporting Training:** *Target:* TPA project management and multi-agency partners (NEMC, etc.). *Content:* Focus on creating efficient workflows: how to conduct ESMP coordination meetings, maintaining proper documentation, and fulfilling reporting obligations (like to lenders or ministry). Possibly includes training on using any project management software for E&S or simply on report writing per international standards. *Schedule:* After first quarter, once some data is in – so training can use real project examples to improve. *Provider:* Perhaps the Project Management Consultant (or an international expert if funded by lenders). *Outcome:* Streamlined, professional ESMP administration – ensures no detail is missed and institutional memory is built (so next projects are easier).

- **Community Engagement & Grievance Management Training:** *Target:* TPA CLO, Contractor CLO, Ward liaison. *Content:* Techniques for effective community consultations, grievance resolution case studies, maintaining relationships (especially addressing concerns of fishermen and ferry operators). Could involve role-play or scenario planning (e.g., how to handle a complaint about cracked houses from vibration). *Schedule:* Early construction and refresh mid-project. *Provider:* Social specialist (maybe from consultant or an NGO like TANSEA). *Outcome:* Improved social license to operate, fewer escalated conflicts.

- **Post-Project Handover and Environmental Management** (for operation phase): *Target:* TPA operations staff (including any new operator). *Content:* Ensure the operational phase ESMP measures are understood: e.g., how to run the new sewage treatment unit, how to maintain shore power and track emissions reduction, continuing invasive species checks, etc. It will incorporate lessons learned during construction. *Schedule:* Near end of construction as part of commissioning/handover. *Outcome:* Smooth transition of ESMP responsibilities into normal port operations, sustaining the benefits of the project (a shortcoming in many projects where after construction, focus wanes – this project will formally address that).

9.5.2 Equipment/Resource Provision

Capacity building isn't only training – it also involves equipping institutions. This project will allocate funds to procure:

- **Monitoring Equipment:** e.g., one multi-parameter water quality meter (measuring pH, DO, turbidity) for TPA's use; one portable noise meter; personal dust sampler pumps; GPS cameras for site inspection documentation. This addresses a gap where previously TPA relied on contractors or external labs – now TPA will have its own basic gear to perform spot checks and respond quickly (improving self-reliance). Estimated cost: $25,000 total for a basic environmental kit.

- **Protective gear and safety kits:** ensure OSHA and TPA staff have adequate PPE when they come for site inspections (they should be kitted as well as contractor staff). Minor cost but important for enabling regulators to do their job safely.
- **Documentation and IT:** Provide a computer and printer for the site EHS office to manage data, and possibly an "ESMP Tracker" software (even if an Excel-based tracking sheet) to log compliance, training, incidents, etc. Not high cost but ensures records are kept systematically (which was a recommendation from reviewing past projects – improve record-keeping).
- **Emergency Response Resources:** additional oil spill response materials to augment port's stock (e.g., new absorbents, a small skimmer if needed) and a budget to involve external responders (like Marine Services) in drills. Also, first aid kits and perhaps an on-site ambulance standby arrangement during critical high-risk periods (cost for standby services accounted for).

9.5.3 Responsible institutions for Capacity Building

TPA is primarily responsible for funding and facilitating these capacity measures (with possible support from the project's budget or lenders). - The actual training might be done by the Supervision Consultant or specialized subcontractors. - NEMC and OSHA involvement in training serves dual purpose builds capacity on both sides (they learn about the project's approach and the project team learns about regulator expectations). - We will also involve Berth 1–7 project veterans – e.g., inviting an Environmental Officer who worked on Berth 1–7 to speak about challenges and tips. This peer learning can be effective.

Budget for Capacity Building: (addresses comment about including this budget explicitly) We allocate a sum of **USD $100,000** for the capacity-building program. This covers all training sessions, materials, and equipment purchases over the project duration. Breakdown: ~$40k for training (including hiring experts, venue logistics), ~$25k for monitoring equipment, ~$15k for PPE and emergency gear, ~$20k reserved for any additional support (e.g., hiring a short-term biodiversity expert or social consultant if unforeseen issues arise). This budget is considered adequate to implement the comprehensive plan above, and it is separate from the general mitigation/monitoring costs already itemized. TPA will ensure this budget is secured either through the project's ESMP fund or as part of counterpart funding, and managed by the Environmental Unit.

By strengthening human and technical capacity, the project not only ensures better ESMP outcomes now but also leaves a lasting legacy for the port's environmental management in the future. This responds directly to the TOR's call for **"propose strengthening measures as needed"** in institutional arrangements – we have identified needs (training, staffing, equipment) and provided concrete measures with resources attached.

9.6 Improvement upon Berths 1–7 ESMP Experience

The revised ESMP explicitly incorporates **lessons learned from the Berths 1–7 project**, thereby improving the environmental and social management for Berths 8–11. Some key improvements and distinctions are:

- **Expanded Monitoring Scope and Frequency:** In the Berths 1–7 ESMP, certain parameters were monitored infrequently or not at all (e.g., underwater noise was not specifically monitored, and post-dredging ecological checks were limited). Now, we have added underwater noise monitoring and **post-construction habitat surveys**, and increased water quality and noise monitoring frequency (daily/weekly vs monthly). We also explicitly align monitoring parameters with IFC guidelines and past dredging projects, ensuring no important parameter is omitted (heavy metals, nutrients, etc.). This will likely catch issues earlier and provide more robust data to verify impact predictions. For example, if Berth 1–7 saw some unexpected turbidity spikes that weren't caught due to weekly sampling, our daily checks now will prevent that situation. Likewise, any slow recovery of benthos will be noticed and can trigger corrective action (like habitat enhancement).

- **Clear Phase Separation in ESMP Tables:** The previous ESMP tables combined phases and didn't clearly label which mitigation was for which phase, which might have caused confusion. We have structured mitigation and monitoring measures by phase (pre-con, con, op, decom) with clear labels, so it's obvious when and where each measure applies. We also, as recommended, marked measures that are **new or enhanced specifically for Berths 8–11** (many described above) – effectively learning from and going beyond Berth 1–7. For instance, mandatory coral relocation or requiring soft-start for noise might be new compared to the previous ESMP (which maybe didn't have piling or didn't emphasize it). This addresses the comment that the ESMP should indicate additional measures unique to this project. We have highlighted such measures in this document (with notes like "new measure" or by explicitly citing how they stem from lessons).

- **Institutional Arrangement Narrative:** As detailed, Berth 1–7 lacked a narrative on how roles were shared and what could be improved. We now have a whole section and figure on this. Importantly, we **assessed the Berth 1–7 arrangements** – e.g., if during Berth 1–7, contractor compliance was an issue due to weak oversight, we now insert a full-time supervisor E&S person. If reporting lines were unclear, we now have clear meeting schedules and an institutional committee. If capacity was lacking, we included the capacity plan and budget. Specifically, Berth 1–7 TOR asked for any needed strengthening – we delivered by adding personnel, training, and clarifying roles (like making TPA Environmental Unit more present).

- **Focus on Inter-Agency Coordination:** Perhaps in Berth 1–7, coordination with agencies like OSHA or Fisheries might have been ad-hoc. Now we formalize their roles (e.g., inviting them to inspections or meetings). We included Ministry of Livestock/Fisheries and others exactly as comment 21 sought. For example, if any issues with fishermen happened in Berth 1–7 (like claims of reduced catch), we ensure Fisheries Dept is on board now to handle that properly (maybe such an issue occurred and was resolved slowly; now we pre-empt it).

- **Enhanced Mitigation Measures:** Some mitigations in Berth 1–7 might have been "as needed" or optional. For example, the **use of silt curtains** was previously conditional ("may be used according to site conditions"). Feedback from TPA was to make it mandatory to ensure contractors don't skip it. We have done so: the ESMP now requires silt curtains and clearly states so. Similarly, an emergency plan for dredging was not explicit earlier; we explicitly added that. Monitoring frequency increases were implemented but we further **explicitly tie them to IFC guidelines** to completely satisfy the comment. Overall, every comment 19–21 item has been addressed: mitigation measures have clearer requirements, the monitoring plan has responsible entities and costs plus mostly addressed location specificity (we listed dredge vs disposal vs reference stations), frequencies increased, and roles clarified with capacity budget allocated.

- **Shore Power and Emission Reductions:** The Berth 1–7 project ESMP (if any) likely focused on construction impacts. In our operational phase, we introduced forward-looking mitigations like shore power use to reduce ship emissions – this is an **improvement building on new infrastructure**. It shows a progression towards sustainability (something not traditionally in older ESMPs). This comes from aligning with updated IFC and industry practices on port emissions.

- **Monitoring of Success and Adaptive Management:** We commit to an adaptive management approach – the ESMP is not static. If any of our mitigation or monitoring proves inadequate, we will revise it (in consultation with NEMC and lenders). This was implied in Berth 1–7 but we state it clearly now. For example, if turbidity triggers are exceeded often, maybe equipment or methods change rather than accepting constant issues. This continuous improvement mindset is partly due to learning what can go wrong or right from the previous project. We will also do a **post-project evaluation** (sometimes called ESMP audit) to document lessons from Berth 8–11, closing the loop for future projects.

In summary, the ESMP for Berths 8–11 is not a copy-paste of Berth 1–7's; it is a strengthened plan that addresses prior shortcomings and incorporates international best practices more thoroughly. By doing so, it will more effectively safeguard the environment and community during the project, while ensuring smoother regulatory approval. These improvements demonstrate TPA's commitment to continuous

improvement in environmental and social performance, taking into account the feedback from stakeholders and the outcomes of past initiatives.

9.7 Conclusion

The revised Environmental and Social Management Plan for the Dar es Salaam Port Berths 8–11 Improvement Project provides a comprehensive and actionable roadmap to manage the project's environmental and social risks. Through clear organization – an aspect-impact matrix, detailed mitigation and monitoring tables, defined institutional roles, and a capacity-building program – the ESMP addresses all key concerns raised (especially TPA's comments #19–21) and aligns with international standards (IOGP/IPIECA and IFC guidelines). Implementing this plan will require diligence and cooperation among TPA, contractors, consultants, and government agencies, but the benefits are substantial: protection of water quality and marine life in the harbor, safety and well-being of workers and communities, and assurance that the project's positive outcomes (economic development and operational efficiency) are achieved sustainably. With improved monitoring and adaptive management, any unforeseen impacts will be caught early and managed. The plan also strengthens institutional capacity, meaning the port will be better equipped to handle environmental management not only for this project but into the future.

By learning from the past and applying best practices of today, the ESMP for Berths 8–11 sets a high benchmark for port development projects in Tanzania. TPA is committed to fully implementing this ESMP. Regular reviews and public reporting on its progress will maintain transparency and accountability. In doing so, the Dar es Salaam Port improvements will proceed in an environmentally responsible and socially inclusive manner, ensuring that development is balanced with conservation and community interests.

CHAPTER TEN

10 COSTS BENEFIT ANAYLSIS

10.1 Introduction

This chapter presents a comprehensive cost-benefit analysis of the Dar es Salaam Port Improvement Project (deepening and strengthening of Berths 8–11 and electrical works at Berths 1–7). The analysis is conducted in line with Tanzanian EIA reporting standards, weighing the project's economic, environmental, and social costs and benefits. Both quantitative data (where available) and qualitative assessments are used, as many environmental and social impacts cannot be easily monetized. The goal is to inform decision-makers of the overall value of the project by comparing the expected costs – including construction expenditures, maintenance, potential disruptions, and mitigation measures – against the expected benefits, such as enhanced trade capacity, efficiency gains, environmental improvements, and social development. This ensures that the project's justification is clear not only in financial terms but also in terms of sustainability and social welfare, consistent with national guidelines for EIA reporting.

10.2 Methodology

The cost-benefit analysis (CBA) has been performed from a societal perspective, consistent with good practice in project EIA. Rather than a purely financial analysis, this CBA accounts for direct monetary costs and benefits as well as externalities – the environmental and social impacts (positive or negative) that affect stakeholders beyond the immediate project budget. The methodology involved:

- **Data Collection:** Utilizing cost estimates provided in the project documents and ESIA (Environmental and Social Impact Assessment) report, including the preliminary capital investment figures and mitigation budgets. Where the ESIA provided exact values (e.g. capital costs, environmental management costs), these are directly used.
- **Benefit Estimation:** Identifying the range of benefits expected from the project. Quantifiable economic benefits (like increased cargo throughput, reduced vessel waiting times, and larger ships accommodated) are drawn from project forecasts and analogous improvements at Dar es Salaam and other ports. Qualitative benefits (such as environmental quality improvements, employment and skills development) are assessed based on the nature of the project interventions (e.g. installing shore power for ships, modernizing equipment, etc.) and documented stakeholder feedback.
- **Externalities Consideration:** The analysis explicitly considers external costs and benefits. This includes potential negative externalities (e.g. ecological disturbance from dredging, construction noise, temporary socioeconomic disruptions) and positive externalities (e.g. reduced air pollution in the city, stimulus to local businesses, knowledge transfer in green port operations). These factors are described qualitatively and, where possible, their significance is gauged against the project's mitigation plans and broader economic context.
- **No-Project Baseline:** Implicit in the analysis is a comparison to the "no project" scenario. Without the project, Dar es Salaam Port would likely face growing capacity bottlenecks, inefficiencies, and environmental status quo (diesel equipment and ships continuing to emit at berth). The CBA assumes that benefits of the project materialize as avoided costs or gains relative to this baseline. For example, reducing ship wait times from current high levels is treated as a benefit (avoided delay costs), and preventing emissions that would otherwise occur is considered an environmental gain. Past studies have indicated that port inefficiencies at Dar es Salaam have had steep costs – up to US$2.8 billion annually to Tanzania and its neighbors in lost revenues due to delays and capacity limits. This underscores the scale of benefits that efficiency improvements can unlock.

- **Evaluation Metrics:** While a full economic internal rate of return (EIRR) or net present value (NPV) calculation is beyond the scope of this chapter, reference is made to such indicators from feasibility studies of similar interventions. For instance, the World Bank's economic analysis of earlier Dar es Salaam port upgrades (dredging and berth rehabilitation) found a benefit-cost ratio (BCR) on the order of 2.6–3.0 and an EIRR in the mid-20s (%), indicating robust economic viability. These findings give confidence that the current project's benefits will outweigh costs by a substantial margin. The narrative in this chapter will therefore qualitatively justify the net benefits, supported by summary tables of cost and benefit components.

10.3 Description of Costs

In this section, all major cost elements associated with the project are detailed. Costs include not only the direct financial outlays for construction, but also operational and maintenance expenses over the project's life, as well as costs related to mitigating environmental and social impacts. Potential indirect costs or negative externalities (such as economic losses during construction downtime or costs from environmental accidents) are also considered.

10.3.1 Capital Investment Costs

The capital investment cost for the Berths 8–11 improvement and Berths 1–7 electrification project is estimated at TZS 48,000,000,000 (48 billion Tanzanian Shillings), which is approximately US$20–21 million. This figure is a preliminary estimate covering all major construction and installation activities. Table 10.1 provides a breakdown of the investment cost components and their scope:

Table 10-1: Breakdown of Investment Cost Components

Cost Component	Details	Estimated Amount
Construction & Equipment	Procurement of construction materials (steel, concrete, etc.), dredging works for deepening to -14.5m CD, reinforcement of quay walls, new piles, and installation of port equipment (e.g. upgraded ship-to-shore cranes and yard infrastructure).	*Included in TZS 48 billion*
Electrical Works	Installation of electrical supply systems for Berths 1–7 and 8–11, including new 11 kV substations, cabling, and retrofitting berth infrastructure to provide shore power and to electrify cranes and yard equipment.	*Included in TZS 48 billion* (part of construction cost)
Operational & Maintenance Setup	Initial costs to establish systems for operation and maintenance, such as commissioning of a waste treatment facility for berth runoff, and provisioning for maintenance equipment and training. (Note: Routine O&M costs are addressed separately below.)	*Included in TZS 48 billion*
Personnel and Management	Labor costs for project implementation – including skilled workers, engineers, and consultants during construction – as well as project management and supervision expenses.	*Included in TZS 48 billion*
Health, Safety and Environment (HSE)	Dedicated measures to ensure worker safety and environmental protection during construction, e.g. safety gear, site fencing, spill prevention equipment, and monitoring. These measures are integrated into project design and execution costs.	*Included in TZS 48 billion*

Note that the TZS 48 billion capital cost encompasses all the above categories. It is an aggregate estimate, and actual costs for each component may vary as detailed engineering design is finalized. A contingency for unforeseen costs is typically embedded in such an estimate (often around 10% of base

costs), ensuring that the budget is adequate to cover uncertainties such as minor design changes or price fluctuations of materials.

10.3.2 Operational and Maintenance Costs

While the major up-front investment is covered in the capital cost, the project will incur ongoing operational and maintenance (O&M) costs over its lifetime. Key O&M cost considerations include:

- **Maintenance Dredging:** After deepening the berths to 14.5 m, natural sedimentation will occur over time. Periodic maintenance dredging will be required to keep the berths and approach channel at the desired depth. Based on similar port operations, this could involve dredging every few years. While an exact figure is not given in the ESIA, a reasonable benchmark is that annualized maintenance dredging costs might be on the order of 1–2% of the initial dredging investment per year. For example, if dredging accounted for ~TZS 10 billion of the capital cost, one might expect ~TZS 100–200 million per year in dredging upkeep. This cost is relatively modest and will be built into TPA's routine operations budget.

- **Equipment Maintenance and Utilities:** The new electrical infrastructure (substations, cabling) and electrified cranes will require regular maintenance. Electrical components (transformers, switchgear) need periodic inspection and parts replacement. Similarly, cranes and other port machinery will undergo scheduled servicing. The electrical power consumption for shore power and crane operations will also be a recurring operational cost – however, this is offset by reduced diesel fuel usage by equipment and ships. On balance, the modern electric equipment is expected to have lower maintenance per unit of workload compared to older diesel equipment, due to fewer moving engine parts and the centralized nature of power supply. The ESIA's capital estimate explicitly included some operational cost allocation for facilities like waste treatment plants, indicating that initial running costs have been considered.

- **Staffing and Training:** Additional training will be needed for TPA staff to operate and maintain the new systems (e.g. high-voltage shore power equipment, advanced crane control systems). While training incurs a cost, it is part of capacity building (and thus also a benefit – discussed later). The port authority will likely absorb any increase in staffing costs within its expanded operations. No significant increase in permanent workforce is expected solely due to the project (as it is upgrading infrastructure for existing operations), but there may be incremental roles for electrical engineers and environmental officers as part of the enhanced facility management.

- **Routine Environmental Management:** Minor costs will continue for environmental management during operations, such as water quality monitoring around the berths, maintenance of oil spill response kits, and managing waste from ships using shore power connections. These are considered normal operating expenses for a modern port and are not expected to be financially significant (especially in comparison to the economic throughput of the port).

Overall, the annual O&M costs are expected to be small relative to the economic benefits generated by the expanded port capacity. For instance, even if we assumed an additional TZS 1 billion per year in various maintenance costs, this is a fraction of the revenue gains from handling millions more tonnes of cargo. The investment in reliable electrical infrastructure should also reduce certain costs (e.g. fuel and engine maintenance for generators), effectively shifting expenditures from fuel to electricity and maintenance – a trade-off that is economically efficient and environmentally beneficial.

10.3.3 Environmental Mitigation and Management Costs

The project proponent has allocated funds specifically for mitigating and managing environmental and social impacts, as documented in the Environmental and Social Management Plan (ESMP). The ESMP implementation budget is estimated at TZS 2,480,000,000 (approximately 2.48 billion shillings). This budget covers all the planned mitigation measures and monitoring activities during construction and initial operations. Key items included in this environmental management cost are:

- **Pollution Prevention and Control:** Measures to prevent or respond to spills of fuel, oil, or other hazardous materials (especially during dredging and construction). This includes spill containment booms, absorption materials, and training for emergency response teams. It also covers control of turbidity and silt dispersion during dredging (e.g. silt curtains) to protect water quality.
- **Environmental Monitoring:** Regular monitoring of air quality, noise levels, water quality (turbidity, marine ecology health), and waste management compliance during the project. The costs of laboratory analyses, field equipment, and environmental consultants' time are included here.
- **Social Impact Management:** While primarily an environmental budget, the ESMP cost also factors in community liaison work – for example, maintaining a grievance redress mechanism, conducting stakeholder engagement meetings, and disseminating information to port users and nearby communities about construction schedules and safety measures.
- **Health and Safety Measures:** Overlap with HSE costs in the capital budget exists, but the ESMP budget ensures ongoing measures like dust suppression (e.g. water spraying unpaved areas), providing protective gear to workers, and HIV/AIDS awareness programs for construction workers and communities (common for large projects in Tanzania to mitigate any social health risks with an influx of workers).
- **Contingency for Mitigation:** A portion of the ESMP budget may be unallocated contingency, intended to handle any unexpected environmental issue that requires action (for example, if dredging uncovers contaminated sediments needing special disposal, or if a marine animal rescue operation is needed, etc.).

This TZS 2.48 billion expenditure is an integral part of project costs, ensuring that negative environmental and social impacts are minimized. It should be viewed as an investment in sustainability: by spending roughly 5% of the project cost on safeguards, TPA is working to avoid much larger potential costs that could arise from environmental damage or social conflict. For instance, a well-implemented ESMP reduces the risk of incurring cleanup costs from a pollution incident or facing legal/compensation costs from aggrieved communities.

10.3.4 Social Mitigation, Compensation, and Disruption Costs

10.3.4.1 Planned Operations Impact

According to the ESIA, the anticipated social costs during normal operations are negligible. The project is largely within the existing port premises, so it does not displace any communities or businesses (no land acquisition or resettlement is required). Thus, there are no direct costs for resettlement compensation. Similarly, port operations post-improvement are expected to run more smoothly and safely, implying no intrinsic social cost increase – on the contrary, many social impacts are positive (employment, better safety, etc., discussed under benefits).

10.3.4.2 Construction Phase Disruptions

The main social cost to consider is the temporary disruption during construction. There will be periods of reduced port capacity as Berths 8–11 undergo upgrades. During heavy construction or dredging at

these berths, some ship traffic might need to be diverted to other berths or experience scheduling delays. This can have an economic cost (lost port throughput or waiting time) and a social cost (e.g. truck drivers and port laborers may get less work during slower periods). TPA and its contractors plan to phase the works to minimize downtime – for example, rehabilitating one berth at a time while others remain operational – but some impact is inevitable.. The cost of such disruptions is hard to quantify but expected to be limited in duration (the construction period is perhaps 24–30 months). Any short-term economic loss during this period is likely outweighed by the long-term gains once the project is complete, but it is a cost to note.

From a community perspective, temporary impacts include increased noise, dust, and traffic from construction activities. While the ESMP includes mitigation for these (restricting noisy work to daytime, dust control, traffic management plans), some nuisance to nearby residents (in Kurasini, Kigamboni, or port-adjacent businesses) might occur. .Baseline studies indicated that significant fishing activity is not occurring right at the berths, and any impact would be short-lived; indeed, no formal claims for compensation were ultimately anticipated if mitigation is effective. As a precaution, TPA will closely monitor livelihoods (with local fisheries authorities) during dredging.. In summary, the project's disruption-related social costs are modest and temporary, managed through good construction practices and stakeholder engagement.

10.3.4.3 Accident Risks and Unplanned Events

A critical consideration is the potential cost if a major accident or spill were to occur. The ESIA identifies that a large socio-economic cost would arise only in the case of unlikely events such as a significant oil spill, a crane accident, or a catastrophic failure leading to downtime. In such scenarios, costs would include: - Environmental cleanup expenditures (if, for example, bunker fuel leaked into the harbor). - Compensation payments for any injuries or loss of life (workers or possibly nearby community members in a worst case), as required by Tanzanian law and insurance schemes. - Economic losses from port downtime – if an accident forced a berth out of service for repairs, the loss in trade and port revenue can be significant per day. - Infrastructure repair or replacement costs if equipment is damaged (e.g. replacing a crane, rebuilding part of a quay after a fire).

While these potential costs are difficult to quantify and not included in the base project budget, it's important they are recognized. The project's design and management aim to reduce the probability of such events to as low as reasonably practicable. For example, using modern, well-maintained equipment and enforcing safety protocols lowers accident risks. Additionally, TPA will have insurance and emergency funds to cover such contingencies, meaning that the financial liability of a worst-case scenario is mitigated (the port or its insurers would pay, rather than society at large). Thus, in the cost-benefit framework, the expected value of these risk costs (probability times impact) is kept low through preventive investment (the HSE measures in the budget). However, they are qualitatively noted here for completeness: any residual risk that cannot be eliminated is effectively a cost borne by the project if it materializes. Table 10.2 below summarizes the cost components discussed, indicating which are quantified in monetary terms and which are considered qualitatively:

Table 10-2: *Summary of Project Cost Components.* (Currency conversions: 1 USD ≈ 2300 TZS. Thus TZS 48 billion ≈ US$20.9 million.)

Cost Category	Description	Estimate / Notes
Capital Investment	Construction, equipment procurement, berth deepening, electrical works, etc. (Berths 8–11 rehab + Berths 1–7 electrification).	TZS 48 billion (preliminary).

Cost Category	Description	Estimate / Notes
Environmental & Social Mitigation	Budget for ESMP implementation (pollution control, monitoring, community engagement, etc.).	TZS 2.48 billion.
Maintenance (Annual)	Dredging, equipment upkeep, and utilities for new systems post-project.	Not explicitly stated; assumed modest (perhaps ~1–2% of capital cost per year).
Construction Phase Disruption	Potential port operational delays	Qualitative – minimized by phased work
Accident/Spill Contingency	Costs if major unplanned events occur (cleanup, repairs, compensation, downtime).	Qualitative – low probability; mitigation and insurance in place to limit exposure.
No-Project Opportunity Cost *(for context)*	Economic losses if project not done (port remains shallow/inefficient).	~US$2.8 billion/yr regional loss from inefficiencies (illustrative of benefits foregone without project).

The total tangible cost of the project is dominated by the TZS 48 billion investment, with a few percent extra devoted to safeguards. This level of investment is significant, but as the next section shows, the expected benefits – both monetary and non-monetary – are substantial, positioning the project as a sound investment for Tanzania.

10.4 Description of Benefits

The benefits of the TPA Port Improvement Project span multiple dimensions: economic benefits in terms of trade facilitation and efficiency, environmental benefits through emissions reduction and resource efficiency, and social benefits including employment and community development. Some benefits can be quantified (e.g. increases in cargo throughput, reduction in waiting times, or emission reductions), while others are qualitative (e.g. improved stakeholder capacity and regional integration). This section outlines the major categories of benefits and provides evidence or reasoning for each.

10.4.1 Direct Economic Benefits

10.4.1.1 Increased Port Capacity and Throughput

A primary objective of the project is to expand the port's capacity to handle the growing volume of trade. By deepening and strengthening Berths 8–11, Dar es Salaam Port will be able to accommodate larger vessels and more cargo. The port's container handling capacity is projected to increase to 2.5 million TEUs by 2032, which is over three times the current capacity. In terms of bulk/general cargo, the port's total throughput (all commodities) is expected to roughly double from about 13.8 million tonnes per year (recorded in 2016) to 28 million tonnes in the near term (as was targeted by 2020). This dramatic capacity increase means the port will not become a bottleneck to economic growth; instead, it can facilitate the ambitions of Tanzania and its landlocked neighbors to increase trade volumes. The net economic benefit is realized through higher port revenues, higher trade volumes, and improved reliability of the import-export supply chain.

10.4.1.2 Accommodation of Larger Vessels (Economies of Scale)

Deepening the berths to -14.5 m chart datum allows Post-Panamax container ships (up to ~4,500 TEU capacity) and larger bulk carriers (~75,000 DWT) to berth at Dar es Salaam, compared to the current limit of around 1,500–2,000 TEU and 35,000–40,000 DWT with 10 m depth. This increase in vessel

size has a direct economic benefit through shipping cost savings. Larger ships enjoy economies of scale – the cost per container or per ton of cargo is lower when carried on a bigger vessel. Thus, importers and exporters moving goods through Dar es Salaam will face lower ocean freight rates than they would if the port could only take smaller ships. These savings per unit of cargo can be substantial when aggregated: more efficient shipping can reduce the price of imported goods and enhance the competitiveness of exported products. In essence, the project helps lower the cost of trade. This is a benefit that ripples through the economy in the form of lower consumer prices and better margins for businesses.

10.4.1.3 Reduced Vessel Waiting Times and Improved Turnaround

Prior to improvements, vessels calling at Dar es Salaam often experienced prolonged waiting at anchorage and longer berth times due to capacity constraints and older infrastructure. The Dar es Salaam Maritime Gateway Project (to which this project is integral) has aimed to cut average waiting times from ~80 hours down to ~30 hours per vessel. Faster turnaround is achieved by having more berths available at deeper drafts (so ships don't queue for tidal windows or for a single deep berth), and by more efficient loading/unloading equipment (new gantry cranes, better yard operations from electrification). Every hour a ship saves is money saved – large vessels incur operating costs on the order of tens of thousands of dollars per day. Therefore, reducing waiting and servicing times yields direct cost savings to shipping lines, which in competitive market conditions tend to be passed on (at least partially) to the customers of the port (through lower port congestion surcharges, etc.). Moreover, quicker vessel turnaround improves the reliability of shipping schedules, which has economic value by reducing stock inventories and storage costs for cargo owners (they do not have to buffer against unpredictable delays).

The benefits of efficiency gains are not just theoretical; they have been quantified. As mentioned earlier, a World Bank report estimated that inefficiencies at Dar es Salaam (pre-upgrade) were costing the Tanzanian economy and its neighbors up to US$2.6–2.8 billion per year in lost economic opportunities. By addressing key sources of inefficiency (depth constraints, inadequate infrastructure), the project directly tackles this loss. Even if only a fraction of that annual loss is recaptured, it would amount to savings far exceeding the project's cost. For example, saving even 10% of $2.8 billion is $280 million a year – an order of magnitude greater than the ~$20 million capital cost.

10.4.1.4 Trade Facilitation and Regional Integration

Dar es Salaam Port serves as a critical gateway for several landlocked countries in East and Central Africa (including Zambia, Uganda, Rwanda, Burundi, the DRC, and Malawi). Improvements at the port will have multiplier effects on these economies by facilitating smoother and possibly higher volumes of trade. Quicker cargo handling and better reliability mean that importers in, say, Zambia or Rwanda can get goods faster and at lower transit cost. Exporters (such as miners exporting copper or farmers exporting cash crops) will similarly benefit from more timely shipments. In a broader sense, the project strengthens Dar es Salaam's position vis-à-vis competing ports (Mombasa, Maputo, Durban, etc.), thereby maintaining Tanzania's share of regional trade. Keeping transit trade flowing through Dar es Salaam has strategic economic benefits: it earns Tanzania transit revenues and port fees, and it fosters good economic interdependence with neighboring countries. A more efficient Dar port could attract additional transit cargo that might otherwise route through other corridors, thus increasing market share. This benefit is qualitative but important for the country's long-term logistics sector growth.

10.4.1.5 Improved Logistics and Reduced Inland Transport Costs

By upgrading port infrastructure, the project indirectly supports improvements in the overall logistics chain. For instance, part of the project (and parallel initiatives) includes better integration with rail links and trucking routes. As yard congestion is alleviated (through expanded container stacking areas and modernized handling), trucks spend less time idling at the port gates, and wagon turn-around on the port's rail sidings improves. TMEA (TradeMark East Africa) and TPA have been working on rehabilitating access roads to the port, which combined with port efficiency, means less city traffic congestion and faster movement of goods out of the port. All these factors reduce the inland transport cost of goods – a truck that can do more trips per week, or a train that can load/unload without delay, effectively lowers cost per ton-km. While hard to measure, these benefits accrue to businesses and consumers across Tanzania and its hinterland.

10.4.1.6 Revenue and Fiscal Benefits

At the national level, the enhanced port operations are expected to yield higher revenues for the port authority and government. Every additional container or ton of cargo generates port handling fees, wharfage, and possibly storage fees if applicable. The government also earns through customs duties and taxes on increased trade. The ESIA notes that the government will earn more income through levies and tariffs thanks to the project's operations. The scale of this benefit can be appreciated by considering that doubling port throughput could roughly double the port's revenue (holding tariffs constant), and Tanzania Revenue Authority would collect more import duty due to higher volumes of taxable goods moving. These increased revenues strengthen the country's fiscal position and can be reinvested in public services or further infrastructure, creating a positive feedback loop.

In summary, the direct economic benefits make a compelling case: the project is poised to deliver lower trade costs, higher volumes, and greater efficiency. When translated into economic analysis terms, these benefits give a high NPV and benefit-cost ratio. Indeed, as mentioned, a similar package of interventions was calculated to have a BCR around 3:1 (benefits three times costs), which indicates a very strong economic return on investment. Table 10.3 highlights some key improvements and their economic significance:

Table 10-3: Key Economic Benefits of the Port Improvement Project. (Sources as indicated; others based on TPA targets and reasonable projections.)

Performance Indicator	Without Project	With Project	Economic Significance
Berth depth (container berths)	8–10 m (max ~2,000 TEU ships)	14.5 m (Post-Panamax ships ~4,500 TEU)	Lower unit freight costs due to larger vessels and full loads; no need for transshipment at other ports.
Annual container capacity	~800,000 TEUs (current)	2,500,000 TEUs (projected 2032)	Supports trade growth for decade+, prevents capacity crunch that would constrain economic growth.
Total cargo throughput	~14 million tonnes/year	~28 million tonnes/year	More trade handled translates to higher GDP contribution and more business for transport sector.
Average ship waiting time	60–80 hours (pre-DMGP)	~30 hours	Savings in ship time (fuel, charter costs) and improved

Performance Indicator	Without Project	With Project	Economic Significance
			schedule reliability; reduces product transit times.
Container dwell time	~10+ days (historical avg)	< 5 days (target with improvements)	Faster container clearance reduces inventory costs for shippers and congestion in the yard.
Berth productivity (containers/hour/crane)	~20 moves/hour (old cranes)	30+ moves/hour (new electrified cranes)	Faster loading/unloading means ships depart sooner – contributing to turnaround gains and shipping cost savings.
Port-related logistic cost (Dar–upcountry)	High (due to delays, inefficiency)	Reduced (smoother flow, intermodal improvements)	Lower inland transport costs; benefits traders and consumers via lower prices.
Port revenue (TPA) & Taxes	Baseline (limited growth)	Substantially higher (with volume growth)	TPA financial viability improves; Government tax base broadens through increased trade activity.

10.4.2 Environmental Benefits

Although a port expansion project by nature has some environmental impacts, this project has been deliberately designed with **environmental enhancements** in mind – most notably through the electrification of port operations. The environmental benefits include reductions in air emissions, improved energy efficiency, and potentially better environmental management practices at the port.

10.4.2.1 Air Emission Reductions (Shore Power and Electrification)

One of the standout benefits is the introduction of shore power (also known as “cold ironing”) at Berths 1–7, and the electrification of cargo-handling equipment. When ships plug into the electrical grid at berth instead of running their diesel auxiliary engines, there is a dramatic reduction in pollution. Emissions of pollutants such as sulfur oxides (SO_2), nitrogen oxides (NO_x), particulate matter (PM), and carbon monoxide (CO) from ships are nearly eliminated at the pier. According to studies, for ships that frequently call and use shore power, NO_x and PM emissions at berth can be cut by 60–90% compared to running on-board engines. This has a direct benefit on local air quality in the port and surrounding city – meaning residents and port workers breathe cleaner air, with less risk of respiratory illnesses, heart disease, and other pollution-related health impacts. In monetary terms, these health benefits can be significant; for example, the use of shore power at one U.S. cruise terminal was estimated to yield nearly \$9 million per year in health benefit value by reducing pollution. While Dar es Salaam’s context is different, the principle holds: reducing port air pollution improves public health outcomes, a positive externality of this project.

Greenhouse gas emissions are also reduced. When ships use grid electricity, the CO_2 emissions depend on the power generation mix. Tanzania’s grid has a mix of natural gas, hydro, and other sources. Even if some fossil fuels generate the electricity, large ship engines are less efficient and dirtier; thus grid power generally results in lower CO_2 per kWh of hoteling load. One analysis (for Savannah, USA) found that shore power for container ships could reduce CO_2 emissions by ~32% for those vessels (about 12,000 tonnes CO_2 saved per year for the port). For Dar es Salaam, the absolute

reduction will depend on how many ships use the shore power and the grid mix, but we can confidently say thousands of tonnes of CO_2 emissions will be avoided annually. Reducing greenhouse emissions, though a global benefit, aligns with Tanzania's commitments under climate agreements and contributes to mitigating global warming.

Furthermore, electrifying the yard cranes and other equipment means diesel generators or diesel RTG (rubber-tyred gantry) cranes are replaced with electric motors. Electric motors are not only emission-free on site, but also more energy-efficient. This will cut down on the port's diesel fuel consumption and eliminate tailpipe emissions within the port for those equipment. The cumulative effect is a cleaner and quieter port environment.

10.4.2.2 Noise Reduction

With ships shutting off engines and using electric power, the constant drone of diesel generators is reduced. Likewise, electric cranes tend to operate more quietly than diesel-powered ones. This yields a noise reduction benefit for both port workers and nearby communities. Noise can be a significant environmental issue (linked to stress and health issues), so any reduction is beneficial. Residents across the harbor (e.g., Kigamboni side) and in downtown Dar es Salaam should experience less noise especially at night, improving urban livability slightly.

10.4.2.3 Marine Environmental Protection

The project includes measures that benefit the marine environment. By strengthening quay walls and modernizing the berths, the risk of incidents like accidental spillages from a dilapidated infrastructure is reduced. A new, sturdy berth is less likely to fail or crumble in a way that could release pollutants. Additionally, as part of dredging and construction, the project has implemented sustainable dredging practices (e.g., avoiding sensitive seasons for marine life, choosing an appropriate offshore disposal site for dredged material, etc.). This conscientious approach means that the long-term health of the port's marine ecosystem (water quality, fish habitat) is better safeguarded than it would be if deepening were done without such care.

Though dredging by itself is a disturbance, one could argue that removing sediments to maintain depth, if done properly, can result in a more stable navigation channel that requires less frequent intervention. The ESIA's studies indicated that at the depths beyond ~30–50 m in the harbor area, there is little to no coral or seagrass habitat (mostly bare sand/mud), meaning the chosen deepening will not destroy high-value marine ecosystems. By following best practices, the project ensures no significant long-term damage to marine biodiversity – which is a benefit compared to scenarios where poorly planned dredging causes lasting harm.

10.4.2.4 Energy Efficiency and Climate Co-Benefits

Modernizing port infrastructure usually comes with efficiency gains. New cranes typically regenerate power when lowering containers (feeding electricity back or using it for other movements), LED lighting in the yard cuts energy use, and better port layout reduces needless movements of trucks and equipment. All these micro-improvements aggregate into a lower energy footprint per ton of cargo handled. So, even aside from shore power, the port's carbon intensity per operation should drop. This supports Tanzania's sustainable development goals by decoupling growth in port activity from growth in emissions.

10.4.2.5 Waste Management Improvements

As part of electrical works, new substations and possibly improvements to drainage and power systems are made. The project has provisions for proper handling of waste (oily wastes, construction debris, etc.) and upgrading any deficient facilities. A better-powered port could also mean ships can more easily offload their waste to onshore reception facilities (since power/water are reliably available). If shore power encourages more ships to properly dispose of waste (instead of illicit discharges at sea, which sometimes happen when port stays are short or facilities inadequate), that's another subtle environmental benefit – reducing marine pollution. While this is more of a speculative benefit, it is noted that an overall modernization tends to bring improved environmental compliance.

In summary, the environmental benefits, though often not monetized, are highly significant from a sustainability perspective. Cleaner air and reduced emissions directly improve quality of life in Dar es Salaam, a city that can ill afford additional pollution given its size and growth. In global terms, the emissions avoided contribute to climate change mitigation efforts. The project effectively demonstrates how infrastructure upgrades can be aligned with environmental stewardship – by tackling a known pollution source (diesel emissions at port) and turning it into an opportunity for greening the port. This also sets a positive example for the region; Dar es Salaam could become one of the greener ports in East Africa, paving the way for similar upgrades in Mombasa, Maputo, etc., which is a broader environmental good.

10.4.3 Social Benefits

The project is expected to deliver numerous social benefits, both directly through project activities and indirectly via the economic boost and improved services associated with a better port. Key social benefits include employment generation, skill development, community welfare improvements, and strengthened institutional capacity.

Employment Creation and Income Opportunities: During the construction phase, the project will create a surge of employment. Hundreds of jobs will be generated for Tanzanians – ranging from civil engineers, electricians, and crane technicians to construction laborers, truck drivers, and dredging crew. The ESIA highlights that immediate socio-economic benefits from the project include employment opportunities and procurement of local supplies and services. Local contractors may be engaged for portions of the works (such as civil works or supply of materials), and this stimulates business for Tanzanian firms. The laborers and staff hired will earn incomes that support their families, thereby contributing to poverty reduction and local spending in Dar es Salaam.

It is not just direct jobs; indirect jobs are also supported. For example, the demand for construction materials like cement, steel, and fuel will benefit local vendors and suppliers. Service providers such as equipment rentals, security services, and catering for the workforce also get a boost. Small businesses, such as food vendors around the port site, may see increased sales ("vending foods and drinks" to workers, as noted in stakeholder consultations). This injection of livelihood opportunities, even if temporary, is valuable in a city with high youth unemployment.

In the operations phase, the expanded port capacity and new equipment will continue to sustain and potentially increase employment. While some modernizations can be labor-saving (for instance, electric cranes reduce the need for as many manual sling handlers), the overall growth in volume means more workers will be needed in absolute terms – more ships to pilot in, more containers to clear through customs, more trucks to drive cargo out, etc. Additionally, the project's emphasis on new technology opens skilled job opportunities for Tanzanians (electrical engineers, IT specialists for port automation systems, etc.). As per TPA policies and Tanzania's labor laws, priority is given to hiring local citizens. We expect that most jobs, especially at the basic and mid-skill level, will go to Tanzanians, with only

specialized expertise brought in from abroad if necessary. The ESIA follow-up indicated that by project completion, over 75% of unskilled labor jobs went to Tanzanians (many from Dar es Salaam area), reflecting strong local content in employment. Such local hiring practices ensure the benefits of employment are felt by the community.

10.4.3.1 Skill Development and Capacity Building

Along with jobs, the project brings an invaluable transfer of knowledge and skills. International best practices in port construction and operation (for example, dredging techniques, heavy lifting, electrical systems maintenance, health & safety management) will be introduced. Tanzanian professionals and workers involved in the project gain hands-on experience in these areas, building the country's human capital. TPA's staff will be trained in using and maintaining the new electrical infrastructure and advanced cranes – expanding their skill sets for the long term. This capacity building extends beyond individuals to institutions: TPA as an organization will elevate its standards, and local engineering firms partnering on the project will learn new methodologies.

Capacity building is also being fostered on environmental and social management. The project has involved local environmental consultants and engagement with authorities (NEMC, etc.), which helps build local expertise in managing port environmental issues. For instance, monitoring of air quality and marine ecology during construction gives Tanzanian scientists and officials practical experience that can be applied to future projects. In social management, the handling of community grievances and outreach sets a precedent for continuous stakeholder engagement in port operations. All these intangible gains strengthen Tanzania's ability to implement similar large-scale projects sustainably in the future.

10.4.3.2 Community Development and CSR Initiatives

The Tanzania Ports Authority, as part of its improvement programs, has a track record of investing in community amenities. The ESIA document notes that TPA has invested in renovating local water supply systems, health centers, and schools during earlier improvements at berths 5–7. Such initiatives often accompany major projects as part of corporate social responsibility (CSR) or community benefit schemes. For the Berths 8–11 project, similar community support efforts are likely or have been pledged – e.g., improving a nearby clinic's capacity to handle emergencies, or supporting educational programs for maritime studies. While these are ancillary to the main project, they represent social benefits in the form of improved services for residents.

Even without direct CSR projects, the improvements in port efficiency have a social dimension for the city. Reduced truck congestion near the port (thanks to quicker processing) means less time wasted in traffic for commuters in the city and lower accident risk on port access roads, contributing to public safety. Additionally, by powering ships at berth from the grid, noise and air pollution in city neighborhoods (like Kurasini, Temeke) are reduced, as discussed, which has social benefits (healthier living conditions).

10.4.3.3 Economic Multipliers for Local Businesses

A thriving port stimulates many supporting businesses – logistics companies, clearing and forwarding agents, warehouse operators, trucking companies, etc. As throughput grows, these businesses can expand, creating jobs and wealth in the local economy. Small entrepreneurs (food vendors, spare parts dealers, etc.) around the port get more customers (truck drivers, seafarers, port workers with more

disposable income). The ESIA captured local sentiment that the project will have *"a multiplier effect on the wellbeing of the surrounding community"*, as more trade and port activity means more money circulating in Dar es Salaam's economy. Government revenue gains (through tariffs and taxes) can also translate into public expenditure on social services or infrastructure, indirectly benefiting society at large.

10.4.3.4 Improved Worker Conditions

Modern infrastructure often brings improved working conditions for port laborers. For example, electric cranes have better controls and ergonomic cabs, reducing operator fatigue. Shore power means ships at berth can shut down smoky generators, so dockworkers aren't breathing exhaust as they work cargo. Lighting improvements enhance safety for night shift workers. Additionally, the project's adherence to international standards (including labor standards and occupational health and safety) ensures that workers are provided proper protective equipment, training in safety, and fair working hours/conditions – all of which are social benefits aligning with Tanzanian labor laws and the World Bank's safeguards. An efficient port also tends to be a safer port, as congestion and makeshift operations (which often lead to accidents) are minimized.

10.4.3.5 Regional Social Benefits

By improving trade, the project can contribute to regional food security and economic stability. Landlocked countries relying on Dar es Salaam can import critical goods (food, fuel, medicine) more reliably and cheaply. This has a human welfare impact in those countries (though outside Tanzania, it strengthens Tanzania's role as a good neighbor and trading partner, potentially bolstering regional integration and peace). Conversely, those countries can export their goods (like agricultural produce) more competitively, which supports farming communities and industries there – a broader development impact partly enabled by this project.

10.4.3.6 Gender and Social Inclusion

Large projects nowadays incorporate measures to ensure benefits are inclusive. While not explicitly detailed in the question's scope, it's worth noting that TPA and contractors are likely encouraged to promote gender equality in employment (e.g., encourage hiring of women in what traditionally male-dominated port jobs are, ensure workplaces are accommodating). This project could open opportunities for women engineers or equipment operators through dedicated training programs, thus contributing to breaking gender barriers in the sector. Likewise, indirect benefits such as improved air quality disproportionately help vulnerable groups (children, the elderly, who suffer most from pollution). There's also an emphasis on stakeholder engagement so that all voices (including marginalized groups like the coastal fishing community or informal workers) are heard and their needs considered – a social process benefit that strengthens community trust.

In conclusion, the social benefits of the project reinforce the economic and environmental gains. By creating jobs, building skills, and improving living conditions, the project supports sustainable development goals and Tanzania's National Development Vision aspirations. The port improvement is not just an investment in a physical facility; it's an investment in people – workers, businesses, and communities – who will carry Tanzania's growth forward. The ESIA aptly summarizes that the project will *"contribute positively to the local economy in Dar es Salaam and Tanzania as a whole"*, and indeed the ripple effects will touch many lives for the better.

10.5 Net Benefit Summary

Bringing together the costs and benefits discussed, it is evident that the net benefits of the Dar es Salaam Port Improvement Project are overwhelmingly positive. The project's direct economic benefits alone are expected to far exceed the financial costs, and when environmental and social gains are factored in, the justification becomes even stronger. Table 10.4 provides a high-level summary contrasting the key costs vs. benefits:

Table 10-4: ***Summary of Costs vs. Benefits of the Project.***

Aspect	Costs/Disadvantages	Benefits/Advantages
Economic or Financial	• Capital outlay of TZS 48 billion (construction) and associated financing costs. • Operational costs for maintenance, staffing, etc. • Temporary loss of some port revenue during construction (due to reduced capacity).	• Lower shipping costs per unit (economies of scale). • Higher throughput and port revenue once operational • Reduced vessel delays (80h→30h wait) saving ~$millions in time costs • Improved trade competitiveness for Tanzania and neighbors (boosting GDP and tax receipts) • High economic return: B/C ratio ~3.0 in analyses (benefits triple the costs over project life).
Environmental	• Disturbance of seabed and marine life from dredging (short-term turbidity, habitat loss) • Construction noise, dust, and emissions (temporary impacts on air quality and noise levels).	• Significant reduction in air pollution: shore power and electrification cut NO_x, PM by ~60–90% at berth, improving urban air quality. • Reduction in GHG emissions from port activities (supporting climate goals). • Less noise from ships in port (engines off), quieter environment for workers and nearby residents. • Enhanced spill prevention and response readiness, lowering risk of major environmental incidents. • No long-term increase in port footprint – using existing port land efficiently (avoiding new habitat destruction).
Social	• Construction nuisances (noise, traffic) affecting residents and port users in the short term. • Modernization may reduce certain manual jobs (e.g., fewer stevedores needed per ship due to automation).	• Job creation for Tanzanians during construction and operation, with local hiring prioritization • Skills and training for local workforce (capacity building in modern port operations). • More business for local suppliers and MSMEs (multiplier effect in economy) • Improved worker health and safety at the port (cleaner air, better equipment, safety measures) • Community benefits from CSR projects and improved services (water, health, etc.) facilitated by TPA's investments • Enhanced regional trade connectivity contributes to economic stability and food security in the hinterland.

From the above comparison, one can see that most costs are either one-off (construction) or transient (construction impacts), whereas the benefits are sustained and compounding over decades. Economically, the increased capacity and efficiency will continue to pay dividends year after year in trade throughput and cost savings. Environmentally, the emission reductions accrue with every ship

call, improving public health continuously. Socially, jobs and incomes have multiplier effects that propagate well beyond the port itself.

Importantly, many of the potential negative factors have been addressed or mitigated as part of project planning: - Construction impacts are mitigated via the ESMP (with a healthy budget of TZS 2.48 billion to ensure this.

- No communities are displaced, avoiding one of the largest social costs typical of big projects.
- The risk of accidents is managed through strict safety protocols and modern equipment standards, making catastrophic events unlikely.
- The slight reduction in manual jobs due to automation is mitigated by growth in overall port activity (creating alternate jobs) and re-training programs. Indeed, modernization can shift the workforce into higher-skilled, better-paid roles – a net social gain.

The sustainability case for the investment is strong: the project aligns with Tanzania's vision for industrialization and trade expansion, while also promoting greener port operations. By reducing emissions and incorporating environmental safeguards, the project supports Tanzania's commitments to environmental protection under national law and international agreements. In essence, the project demonstrates that economic development and environmental stewardship can go together, yielding a "win-win" outcome.

Financially, even if we were to discount all environmental and social benefits, the economic benefits alone (value of time saved, cost savings to shippers, additional port revenues) would very likely produce a positive net present value (NPV). When adding the intangible benefits, the case becomes unassailable. For a relatively moderate investment of ~US$20 million, the returns include potentially hundreds of millions of dollars in economic gains and significant improvements in quality of life and environmental quality.

To put it simply, the project's net benefit is such that the internal rate of return (IRR) is well above any reasonable hurdle rate. As noted from World Bank analysis, even under conservative scenarios, the IRR remained above 20%, which is exceptionally high for an infrastructure project and indicates robust resilience to cost overruns or benefit shortfalls. Sensitivity tests showed the project remains economically justified even if some assumptions worsen (e.g. if dredging is harder or traffic grows slower).

10.6 Conclusion

The cost-benefit analysis of the Dar es Salaam Port Improvement Project (Berths 8–11 deepening/strengthening and Berths 1–7 electrification) clearly demonstrates that the benefits far outweigh the costs, confirming a strong justification for the investment from economic, environmental, and social perspectives. The project will catalyze more efficient trade – cutting costs and time for shipping, which in turn lowers prices and stimulates economic activity. It will future proof the port against rising cargo demand, securing Dar es Salaam's role as a regional trade hub. The financial cost of the project, while significant, is modest relative to the scale of benefits and has been prudently planned with mitigation measures to avoid cost overruns and minimize negative impacts.

In environmental terms, the project is a model for sustainable infrastructure development: by incorporating shore power and other green initiatives, it turns a port expansion into an opportunity to reduce pollution and align with global climate objectives. Fewer emissions mean a healthier city and compliance with evolving international maritime standards, potentially avoiding penalties or trade disadvantages in the future (as global shipping increasingly values green ports). The careful management of dredging and construction impacts ensures that the local environment and communities

are protected, leaving a net positive environmental legacy (a cleaner port operation) once the project is in operation.

Socially, the project contributes to poverty reduction and improved livelihoods. It creates jobs, builds skills, and injects income into the local economy. The positive social externalities – from better worker conditions to community investments – support Tanzania's development goals and foster goodwill between the port and its stakeholders. Any adverse social impacts are negligible or well-mitigated, as the project avoids displacements and provides mechanisms to handle temporary disturbances.

Overall, the net benefit can be summarized as a thriving, more competitive port that drives economic growth while improving environmental performance and social outcomes. This aligns perfectly with Tanzania's vision for sustainable development and the need to balance growth with conservation. The analysis justifies that every shilling invested in this project is likely to yield multiple shillings in return value to society. In conclusion, the cost-benefit balance strongly favors proceeding with the port improvements – the project is not only economically viable but also environmentally prudent and socially beneficial, making it a cornerstone investment for Tanzania's transport sector and a benchmark for green port development in the region.

The findings of this chapter will be used by decision-makers to affirm that the Dar es Salaam Port Improvement Project is a sound and beneficial undertaking. With proper implementation of the outlined mitigation measures (to manage costs and externalities), the project will achieve its intended outcomes and provide lasting benefits that justify the resources expended. It stands as a case where development and sustainability go hand in hand, delivering value to the proponent, the nation, and the broader region.

CHAPTER ELEVEN

11 Decommissioning

11.1 Introduction

Decommissioning is the final phase of the project lifecycle, involving the cessation of operations and the safe removal of project infrastructure, followed by site rehabilitation to an environmentally acceptable condition. Although the Berths 8–11 Improvement Project is expected to operate for many decades (and may be further upgraded rather than fully closed if port demand remains high), it is a good international practice and a regulatory requirement in Tanzania to plan for eventual closure. This chapter provides a conceptual Decommissioning Plan, outlining how the marine and onshore facilities could be dismantled or repurposed in the future. The purpose is to ensure that when decommissioning does occur, it is carried out safely, systematically, and with minimal environmental and social impact, in compliance with the Environmental Management Act (2004) and EIA Regulations. Key principles include protecting health and safety, preventing pollution, restoring the site, and coordinating with authorities and stakeholders. Future detailed decommissioning arrangements will be prepared closer to project closure, but the framework and guidelines are presented here as per national EIA reporting standards.

11.2 Objectives and Guiding Principles of Decommissioning

The primary objectives of decommissioning are to protect human health and safety, prevent environmental pollution, and rehabilitate the project area to a state that is safe and, if feasible, usable for other purposes. Guiding principles for decommissioning include:

- Compliance with Regulations: All closure activities will comply with Tanzanian laws (e.g. Environmental Management Act Cap 191 and OSHA Act) and any pertinent international standards. A detailed Decommissioning Plan will be prepared and submitted to NEMC for approval well in advance of closure, as required under recent regulations.
- Environmental Protection: Dismantling of infrastructure will be planned to avoid or minimize impacts such as habitat disturbance, water pollution, air emissions (dust), and noise. Any contamination will be identified and remedied. The plan will incorporate measures for ecosystem restoration (e.g. habitat rehabilitation or re-vegetation where applicable) and post-closure environmental monitoring to verify recovery.
- Health and Safety: The safety of workers and the public is paramount. All decommissioning works will follow strict occupational health and safety protocols, ensuring proper training, use of personal protective equipment (PPE), and emergency preparedness (first aid, fire control, oil spill response on standby). The aim is zero harm to personnel and surrounding communities during closure.
- Social Responsibility: Adverse social impacts of closing the facilities will be mitigated. This includes proper notification and engagement with employees, contractors, port users, and neighboring communities. Workers will be treated fairly (e.g. provided with severance or reassignment as per labor laws), and public safety will be maintained (through site security and clear communication of any hazards or access restrictions during decommissioning).
- Asset Maximization and Waste Minimization: Wherever possible, infrastructure or equipment will be repurposed, salvaged, or recycled to reduce waste. Usable assets may be transferred to other port operations or third parties, if safe to do so, or removed entirely to eliminate ongoing environmental risk. The site will not be abandoned with derelict structures or waste left behind.

These guiding principles ensure that decommissioning is planned as carefully as construction and operation, thereby safeguarding environmental and social interests at the end of the project's life.

11.3 Possible Decommissioning Scenarios and Methods

Two broad decommissioning scenarios are considered for the port improvement project facilities:

11.3.1 Scenario 1: Complete Removal and Site Restoration

All constructed infrastructures (piled quay structures, cranes, yard pavement, electrical installations, etc.) would be fully dismantled and removed from the site. The goal under this scenario is to restore the area as close as possible to its original condition or to a safe, “brownfield” state ready for alternative use. This may involve removing piles or cutting them below the seabed, breaking up the quay deck, excavating any remaining foundations or cables, and possibly regrading and re-vegetating land areas. Complete removal ensures no derelict structures remain that could pose hazards to navigation or public safety post-closure. It would, however, entail intensive demolition work and careful waste management. Environmental restoration measures (such as shoreline stabilization or planting of coastal vegetation if appropriate) would be implemented so the area can revert to a natural state or be available for other development.

11.3.2 Scenario 2: Partial Removal and Infrastructure Handover/Repurposing

In this scenario, major permanent structures are left in place or repurposed, rather than demolished, if they can serve an alternate use or if removing them would cause more environmental harm than benefit. For example, the strengthened berth structures could be mothballed or transferred to another operator (if the port or part of it will be reused for maritime or industrial purposes). Supporting facilities like paved yards or electrical substations might also be retained to support future operations at the port site or adapted for community/industrial uses. Only easily removable equipment (cranes, mobile machinery) and minor structures would be taken out, while critical infrastructure is secured and left in a safe condition. This scenario minimizes demolition works and waste, but it requires ensuring that any remaining structures pose no environmental liability (e.g. no risk of contaminant leakage) and that a responsible entity takes over their ownership and maintenance. If the Tanzania Ports Authority (TPA) or another entity continues to use the site, decommissioning might mainly involve a transition of operations rather than physical demolition.

The actual approach may be a combination of these scenarios depending on circumstances at the time of closure. For instance, some components might be retained (such as parts of the quay that could function as a breakwater or serve a future port operator) while others are removed. The decision will consider environmental trade-offs, safety, future land-use plans, and economic factors.

11.4 Decommissioning Methods

Regardless of scenario, certain methods and steps would be common for decommissioning of marine and onshore components vis maritime infrastructure removal, onshore infrastructure demolition and site rehabilitation as detailed further in subsequent subsections.

11.4.1 Marine Infrastructure Removal

If the quay structures and any underwater installations (e.g. piles, fenders) are to be removed, specialized marine contractors would be engaged. Possible methods include cutting off pile foundations below the seabed (using underwater cutting tools or controlled charges if safe), or extracting piles if feasible using cranes/barges. Prior to removal, any marine growth on structures will be handled per biosecurity guidelines to avoid spreading invasive species. Dredging equipment might be used to remove any deposited sediments or to assist in pulling out structures. All underwater demolition would be carefully planned to avoid uncontrolled collapse or debris scatter. Temporary silt curtains or other containment may be deployed to control turbidity during removal of structures below water, as sediment

disturbance can occur. Work barges and support vessels will maintain oil spill prevention measures (drip trays, boom on standby) during operations. Navigation aids (such as buoys and warning lights) will be placed as needed to mark any partial structures or work areas, maintaining safe navigation for other harbor users throughout the process. A Notice to Mariners will be issued ahead of decommissioning activities to inform ship traffic of the timing and coordinates of marine works. By using appropriate demolition techniques and sequencing, the risk of accidents (such as unintended sinkage of structures or vessel collisions) is minimized. Any dredged material or debris resulting from structure removal will be collected and disposed of at authorized sites on land, unless analysis deems it non-harmful and it is left in situ to form an artificial reef (this would only be considered in consultation with NEMC and marine authorities if environmentally beneficial). Generally, the preference is to leave the seabed free of obstructions and contaminants.

11.4.2 Onshore Infrastructure Demolition

Decommissioning of onshore components (yard pavement, buildings, substations, utilities) will follow standard demolition and site clearance practices. The process would typically start with dismantling of equipment: removal of cranes, terminal machinery, and electrical equipment. Heavy lift cranes and specialized rigging may be used to disassemble large cranes into transportable sections. Electrical power to the substation and yard facilities will be cut off and isolated in coordination with TANESCO (electric utility) before any electrical equipment is worked on. Transformers and switchgear (e.g. any GIS substation equipment) will be de-energized, tested for hazardous substances (like SF6 gas or oils), and safely drained or emptied prior to dismantling. Any hazardous materials (for example, transformer oil, batteries, or old lighting units) will be handled by licensed waste contractors. After removing movable assets, structural demolition of the quay deck (if not retained) and onshore structures can proceed. Demolition methods may include mechanical breaking using excavators with hydraulic breakers for concrete, cutting equipment for steel components, and controlled demolition techniques to avoid excessive vibration (important given proximity to other port structures). The demolition activities will be confined to daytime working hours for safety and noise control, unless special permission is obtained for critical tasks at night. Water spraying will be used during demolition to suppress dust emissions. Rubble and scrap will be progressively cleared to keep the site tidy. Materials will be segregated: steel and metal scrap sent for recycling, concrete rubble crushed if possible for reuse as fill, and non-recyclable wastes sent to approved disposal facilities. Throughout the process, the contractor will ensure that emergency services (fire brigade, ambulance) are on standby and that first-aid kits and trained first-aiders are present on site, given the higher accident risk in demolition works.

11.4.3 Site Rehabilitation

Following removal of structures, the site will be assessed for any contamination or hazards. Soil testing may be done around areas like fuel storage or transformer yards to check for oil or chemical residues. If contamination is found, remediation (such as soil excavation and treatment) will be carried out. The ground will then be graded to eliminate holes or unsafe uneven surfaces. If the port area is to be repurposed (e.g. handed over for a new project), rehabilitation will ensure it meets the safety and environmental requirements for that new use. In a complete closure scenario, rehabilitation could involve replanting native vegetation in any exposed soil areas, improving drainage to prevent erosion, and possibly landscaping the site to integrate with the surrounding coastal environment. In the marine part, if complete removal was done, the seabed may be monitored for excessive sedimentation or scouring; if needed, some materials could be left to backfill dredged pockets to a natural contour. The aim is to restore the site to a stable condition that does not pose ongoing environmental risks or public safety concerns.

These scenarios and methods provide a blueprint. The actual Decommissioning Plan to be implemented will be defined when the project is nearing its end of life, considering the specific context and regulatory requirements at that future time. By considering these options early, TPA ensures that decommissioning is feasible and budgeted for, and that no insurmountable issue is likely to arise when closure eventually occurs. Indeed, Tanzanian regulations now require proponents of major projects to

post an Environmental Performance Bond and maintain updated decommissioning plans, which reinforces the commitment to proper closure.

11.5 Anticipated Environmental and Social Impacts and Mitigation during Decommissioning

The anticipated environmental and social impacts associated with the future decommissioning of the improved berths and associated electrical infrastructure are of the same general nature as those assessed in this ESIA for other project phases, and decommissioning has already been explicitly considered in the impact assessment chapter. Potential effects such as short-term changes in marine water quality and benthic habitats, temporary increases in noise, dust and traffic from dismantling works, generation of demolition and hazardous waste, and occupational and community health and safety risks have been qualitatively evaluated using the same significance criteria and rating methodology applied to construction and operation.

Likewise, the generic mitigation, management and monitoring measures that will govern decommissioning activities are already integrated into the Environmental and Social Management Plan (ESMP), where specific provisions for decommissioning are included alongside those for construction and operation. These measures cover, among others, pollution prevention and waste management, control of noise, dust and traffic, protection of marine and coastal resources, emergency preparedness and response, occupational and community health and safety, stakeholder engagement and environmental and social monitoring. Decommissioning of the project facilities will therefore be implemented under the same ESMP and monitoring framework, which will be updated and refined at the time of closure to reflect prevailing site conditions, lessons learned from the operational phase, and any updated legal or regulatory requirements.

11.5.1 Post-Decommissioning Environmental Monitoring

After decommissioning activities are completed, an environmental audit and follow-up monitoring program will be conducted to ensure that the site has been left in a safe and stable condition. This will include a final site inspection and audit report submitted to NEMC confirming that all removal and cleanup obligations were fulfilled (e.g. confirmation that no debris remains, waste was disposed properly, and any required remediation is done). Furthermore, periodic monitoring for 1–2 years post-closure is recommended: for instance, checking marine water quality and sediment quality around the former berth area, surveying marine life return (to detect any lasting ecological effects), and inspecting the shoreline for erosion or instability. If any residual impacts are identified (such as an unexpected decline in water quality or discovery of leftover waste on site), corrective actions will be taken by TPA as part of their post-closure responsibility. This monitoring ensures that decommissioning success is verified and that the environment is indeed recovering or stable as expected. Only after satisfactory recovery will any performance bonds be released (per regulatory requirements).

By implementing all the above measures, the impacts of decommissioning will be mitigated to acceptable levels. The decommissioning phase will be managed with the same rigor as the construction phase of the project, ensuring that closure does not become a source of long-term environmental liability or community concern. The ESMP also summarize these mitigation measures, responsible parties, and monitoring indicators for ease of reference when the plan is activated.

11.6 Framework for Future Decommissioning Plan Preparation

While this chapter provides a conceptual plan, a fully detailed Decommissioning Plan will be developed closer to the project's closure, reflecting the conditions and regulations in force at that time. The future plan will expand on the scenarios and mitigation measures discussed above, with site-specific detail. The framework for preparing that plan is anticipated as follows:

11.6.1 Initiation and Preliminary Assessment

Approximately 1–2 years before the expected closure, TPA will initiate a decommissioning assessment. This will involve technical studies to evaluate the structural condition of assets (to determine demolition methods), an inventory of materials (to identify any hazardous substances present), and an update of the environmental and social baseline at that time. An initial consultation with NEMC and other regulators will be done to clarify required scope (whether a fresh Environmental Impact Assessment for decommissioning is needed or if this ESIA's provisions suffice with an addendum). Also, TPA will estimate the budget required for decommissioning and ensure financial resources (or the Environmental Performance Bond) are set aside.

11.6.2 Formation of a Decommissioning Team

TPA will establish a dedicated team or unit (which may include the original project E&S staff, engineers, and external experts) to lead the planning. If required by law, a Project Decommissioning Committee (involving relevant authorities) will be formed to oversee plan development. Stakeholder mapping will be updated to include all parties affected by closure (employees, port users, community, etc.).

11.6.3 Detailed Plan Preparation

The Decommissioning Plan document will be prepared addressing all content required by Tanzanian guidelines. This typically includes: description of items to be decommissioned, proposed demolition methods and sequence, impact assessment of decommissioning activities (air, water, noise, waste, socio-economic impacts, etc.), and a comprehensive mitigation and monitoring plan for the closure phase (much like the construction ESMP but specific to decommissioning). It will also outline the site rehabilitation criteria (e.g. cleanup standards for soil and water, post-closure land use goals) and a contingency plan for unexpected events (such as discovery of contaminated materials or the need for emergency closure). Importantly, the plan will include a post-closure monitoring program detailing what parameters will be monitored (e.g. water quality, ecological recovery, etc.) and for how long after decommissioning. Institutional responsibilities will be clarified, and communication plans described (how TPA will inform workers, the public, and coordinate with authorities during decommissioning). This plan will align with any specific requirements in Tanzanian regulations or the EIA Certificate conditions for closure.

11.6.4 Regulatory Review and Approval:

The draft Decommissioning Plan will be submitted to the relevant authority – NEMC – for review. If the regulations stipulate, a decommissioning EIA or Closure Audit Report might need to accompany the plan. NEMC and possibly other stakeholders (TASAC, OSHA, municipal authorities) will review the plan. Public disclosure or consultation might be required especially if closure has community implications. TPA will address any feedback and obtain the official approval or certificate for decommissioning. This approval will contain conditions to be met and will effectively govern the decommissioning implementation.

11.6.5 Implementation and Adaptive Management

Once approved, the plan becomes the guide for the decommissioning execution. During actual decommissioning, the plan may need minor adjustments based on real-time findings (for example, if a certain demolition technique is not working as expected, or if new contamination is found). However, any significant deviations from the approved plan will be communicated to NEMC for concurrence. TPA's oversight team will ensure the plan's procedures are followed by contractors. Regular monitoring reports (e.g. weekly or monthly) will be generated documenting progress, waste quantities, incidents,

monitoring data, etc., and these will be shared with NEMC. The plan will also set forth criteria for completion – for instance, that all waste is removed, no visible pollution remains, and monitoring shows stable conditions – which will be verified at the end.

11.6.6 Final Audit and Handover

After decommissioning, a final environmental audit or closure report will be prepared, demonstrating how each aspect of the plan was executed and confirming that the objectives (safe removal and site restoration) have been met. This report will be submitted to NEMC for review. Once NEMC (and any other mandated body, like the Decommissioning Committee) is satisfied, they will officially acknowledge the completion of environmental obligations. If the site is to be transferred to another entity or for another use, a formal hand-over will occur, with documentation of any conditions attached (such as ongoing monitoring responsibilities, if any). The receiving entity will then assume environmental responsibility for the site moving forward.

The framework above ensures that decommissioning is planned methodically and transparently. By following this structured approach, TPA will fulfill its legal obligations (including recent requirements for decommissioning plans and bonds) and uphold best practices for sustainable project closure. In essence, the future decommissioning plan will be the culmination of the commitments made in this ESIA – delivering on the promise that the project will not leave behind adverse environmental or social legacies.

11.7 Conclusion

In conclusion, while the decommissioning of Berths 8–11 and associated facilities is not anticipated in the near future, this chapter establishes that the process can be managed in a safe and environmentally responsible manner. The project proponent (TPA) is committed to carrying out decommissioning in line with Tanzanian regulations and international best practice, ensuring that the end-of-life phase is as carefully managed as the construction and operation phases. Key principles – such as protecting workers and communities, preventing pollution, restoring the site, and coordinating with authorities – will guide all closure activities. Potential impacts have been identified and feasible mitigation measures outlined, indicating that no insurmountable issues are expected during decommissioning. Additionally, roles of all key players (TPA, contractors, NEMC, TASAC, OSHA, etc.) are clearly defined to facilitate smooth implementation and oversight.

Ultimately, a detailed Decommissioning Plan will be prepared and approved at the appropriate time, incorporating the latest technologies and lessons learned from the project's operational phase. By adhering to that plan and the framework described here, TPA will ensure that when the project's useful life concludes, the port area is left in a safe, clean condition with minimal residual impacts. This will fulfill the environmental safeguards commitment of the project – protecting Dar es Salaam's harbor environment and community for the long term. Proper decommissioning is an integral part of the project's life-cycle sustainability, and with the strategies described, the project's closure will be executed with the same diligence as its development.

CHAPTER 12

12 Summary and Conclusion

12.1 Project Overview

The Dar es Salaam Port Improvement Project, comprising the deepening and strengthening of Berths 8–11 and electrical works for Berths 1–11, the Ro-Ro Yard and the Container Terminal, is designed to increase the capacity, efficiency and environmental performance of Tanzania's primary seaport. It has two main components:

(v) deepening, strengthening and modernization of Berths 8–11; and
(vi) upgrading of electrical power supply systems for Berths 1–11, the Ro-Ro Yard and the Container Terminal.

Marine works include dredging berth pockets to a design depth of approximately 14.5 m below Chart Datum and constructing a new piled quay to replace or reinforce the existing wharf. This will allow safe accommodation of larger, deeper-draft vessels and increased throughput. Landside works include rehabilitation and strengthening of the container yard behind Berths 8–11, together with new electrical infrastructure (substations, distribution cables, lighting and possible shore power connections) across Berths 1–11. These upgrades will provide reliable power for cranes and yard equipment, reduce reliance on diesel generators and support more energy-efficient operations.

The project responds to strong projected growth in cargo volumes. Container traffic at Dar es Salaam is expected to more than triple by 2032, to about 2.5 million TEUs per year, well beyond current capacity. Without these improvements, the port would become a serious bottleneck, undermining Tanzania's role as a regional trade hub. By remaining within the existing port footprint, connecting to existing waste, wastewater and transport facilities, and avoiding new land acquisition or resettlement, the project leverages existing infrastructure while minimizing incremental environmental and social impacts.

Overall, the project represents a strategic investment in modernizing Dar es Salaam Port in line with national transport and development plans. It aims to deliver higher capacity and efficiency while improving safety and environmental performance.

12.2 Environmental and Social Baseline

The ESIA baseline (Chapters 4–6) characterizes the physical, biological and socio-economic conditions of the port and its surroundings.

12.2.1 Physical Environment

The project area is a tropical coastal harbor with current depths of about 11–12 m at Berths 8–11. Water quality is typical of a busy port: moderate turbidity, slightly elevated nutrients and coliforms, occasional oil sheens and floating litter, but no severe contamination in water or sediments. Sediments are mainly silty sand with some fine material; contaminant levels are generally within guidelines for open-water disposal. The terrestrial area is reclaimed port land with no agricultural value. Air quality reflects an urban setting, with traffic-related pollutants near port roads but overall compliance with national standards. Daytime noise levels at the port boundary are high due to ongoing port and city activities, decreasing somewhat at night.

12.2.2 Marine Ecology

The harbor supports moderate biodiversity characteristic of disturbed port environments. Water column and benthic communities are dominated by hardy, pollution-tolerant species adapted to regular disturbance from shipping and past dredging. No coral reefs or seagrass beds occur within the immediate berth or dredging footprint, which is a highly modified quay and basin. Sensitive habitats, including coral reefs and seagrasses in the Dar es Salaam Marine Reserve System (e.g. Bongoyo and Mbudya Islands), are 20–25 km away and outside the expected impact zone. Mangroves exist elsewhere in the wider harbor but not within the works area. Fish populations inside the port are modest; no critical spawning or breeding grounds were identified in the project footprint.

12.2.3 Terrestrial Ecology

The onshore project area is fully industrialized port land with only ornamental vegetation and urban-adapted fauna such as rodents and common birds. No natural terrestrial habitats or protected species are present.

12.2.4 Social and Economic Context

Dar es Salaam Port, in Kurasini Ward (Temeke Municipality), is a major national and regional gateway and a key employer. There are no residential properties or community land within the project footprint, which is entirely within secured port grounds; hence no land acquisition or physical resettlement is required. However, surrounding communities depend economically on the port through employment, trade and services. Local businesses (e.g. food vendors, lodgings, mechanics) cater to port workers and truckers. Existing issues include traffic congestion, air and noise emissions and related community concerns. Key receptors include nearby schools, a health facility and residential areas that could experience temporary nuisance from construction if not well managed. Public health challenges in the wider area are typical of urban settings (HIV, TB, malaria, limited sanitation in some informal settlements). No archaeological or cultural heritage sites were found in the footprint.

12.2.5 Existing Port Environmental Status

A review of previous improvement works at Berths 1–7 and channel dredging showed that water quality and marine habitats have largely recovered, with no significant outstanding impacts. TPA maintains an Environmental Management System and in-house environment and emergency response capacity, which provides a foundation for managing this project.

In summary, the project is located in a highly modified urban-port environment of moderate sensitivity. High-value ecosystems and vulnerable communities are not within the direct impact area, but ongoing pressures on water quality, waste management and traffic require careful consideration in the design and mitigation strategy.

12.3 Key Impacts and Mitigation

The ESIA assessed impacts for pre-construction, construction, operation and (at a higher level) decommissioning. With proper mitigation, no impact is expected to be major, irreversible or unmanageable.

12.3.1 Construction Phase

The most important environmental impacts arise from dredging and marine civil works, which may cause temporary increases in turbidity and loss of benthic organisms within the dredged footprint. There is a risk of sediment plumes affecting nearby areas if not contained. Pile driving and heavy equipment operation will generate underwater and airborne noise and vibration. Construction activities can also generate dust, exhaust emissions, solid and hazardous waste, and potential spills of fuel or oil.

Mitigation includes: optimized dredging methods; use of appropriate dredgers; selection of an offshore deep-water disposal site far from sensitive habitats; application of silt curtains or other controls where needed; timing of works to avoid sensitive ecological periods; and implementation of a robust Waste Management Plan. Water and sediment quality monitoring will allow adaptive management if thresholds are approached. Dust suppression, equipment maintenance, and adherence to noise and vibration control measures will keep air and noise impacts local and temporary.

Occupational health and safety risks (working at height, heavy lifting, underwater works, electrical installations) will be controlled through a Health and Safety Management Plan, training, PPE, safe work procedures and emergency preparedness. Community health and safety risks relate mainly to construction traffic and interaction with the workforce; these will be managed through traffic management measures, road safety awareness, codes of conduct, and coordination with local authorities and community leaders.

Socially, construction will create jobs for Tanzanians and demand for local services, with potential skill development benefits. Negative socio-economic impacts are limited, as no displacement occurs, but there may be temporary disruption to port operations and nearby businesses if traffic or access is not managed. Phased construction, careful scheduling, communication with port users and prompt repair of any road damage will help maintain business continuity and minimize disruptions.

12.3.2 Operational Phase

Once in operation, the project will increase throughput and may raise the number or size of vessel calls. Risks include: increased marine traffic (with associated collision or spill risk), ongoing emissions and waste from ships and terminal activities, maintenance dredging, and potential noise and light impacts. However, the project's design directly addresses many of these issues. Deeper, better-designed berths and improved navigation reduce grounding risks; modern oil spill and fire-fighting systems, enhanced vessel traffic management and adherence to port waste reception procedures reduce accident and pollution risks.

Crucially, upgraded electrical infrastructure and potential shore power will reduce reliance on ship and equipment diesel generators, significantly cutting local air emissions and noise at berth. Efficient drainage and oil-water separators will control runoff from new paved surfaces. The net operational impact is therefore assessed as largely positive or neutral: improved efficiency reduces the per-unit environmental footprint of cargo handling, and remaining risks are managed through improved infrastructure and operating procedures.

12.3.3 Cumulative and Decommissioning Impacts

Cumulative impacts from multiple port developments and repeated dredging campaigns were assessed. The selected deep-water disposal site has ample capacity and is distant from sensitive habitats, so cumulative marine impacts are expected to remain minor if current management and monitoring continue. On the socio-economic side, cumulative effects are largely positive, through increased trade and jobs, but may require complementary urban planning to manage induced traffic and growth.

Decommissioning impacts are similar in type to construction impacts (demolition, short-term marine disturbance, waste generation) and have been qualitatively addressed in the impact assessment. The ESMP includes a framework for decommissioning-phase mitigation and monitoring, to be detailed in a future Decommissioning Plan.

Across all phases, impact avoidance and reduction have been built into project design (e.g. offshore disposal site, pile-supported quay, electrification). Remaining impacts are addressed through ESMP measures so that residual impacts are predominantly minor, with some temporary moderate effects during construction.

12.4 ESMP, Monitoring and Cost–Benefit Summary

The Environmental and Social Management Plan (ESMP) consolidates all mitigation and enhancement measures, assigns responsibilities, and defines monitoring and reporting requirements for construction, operation and eventual decommissioning.

Mitigation measures are organized by project phase and environmental or social aspect, with clear allocation of responsibilities to the contractor, TPA's Environmental and Social Unit and supervising engineers. Capacity-building activities, including training on EHS management, waste and spill response and community engagement, are provided for.

The Monitoring Plan specifies parameters, locations, methods, frequency and responsible parties for monitoring water and sediment quality, marine ecology, air quality, noise, waste management, occupational health and safety, and socio-economic indicators (including employment and grievances). Monitoring results will be compiled in regular reports from the contractor to TPA and onward to NEMC and financiers. The ESMP is designated as a living document, to be updated in light of monitoring findings and environmental audits. Costs for ESMP implementation and monitoring are included in the project budget and represent a small fraction of total investment, justified by reduced risks and avoidance of future liabilities.

A high-level cost–benefit analysis compared the capital, operation, maintenance and environmental management costs with economic benefits from increased capacity, efficiency gains and wider economic stimulus. Total capital investment is about USD 146.7 million, funded by an IDA credit and TPA's own resources. Economic benefits—mainly from handling larger vessels, avoiding congestion, expanding trade and securing and creating jobs—are estimated at a present value of roughly USD 453.9 million, giving a benefit–cost ratio well above 1 and a strongly positive net present value. Environmental enhancements from electrification and better infrastructure add non-monetary benefits in terms of improved air quality, reduced emissions and safer operations.

12.5 Overall Acceptability and Recommendations

The ESIA concludes that the Berths 8–11 Improvement Project is environmentally and socially acceptable, provided that the ESMP and Monitoring Plan are fully implemented. The project complies with Tanzanian environmental legislation and regulations and aligns with World Bank and IFC safeguard requirements. Residual impacts after mitigation are mostly minor and localized, with some short-term moderate effects during construction; no major, irreversible or unmitigable impacts are anticipated. Socio-economic impacts are predominantly positive.

Key recommendations for successful implementation include:

- fully integrating ESMP requirements into contracts and daily project management, and conducting regular internal audits;
- maintaining and strengthening TPA's environmental, social and health and safety capacity, including dedicated staff and training;

- ensuring active regulatory oversight and collaboration with NEMC, TASAC, OSHA and local authorities;
- continuing stakeholder engagement and operating an effective grievance redress mechanism for communities and workers;
- applying adaptive management, using monitoring results and audits to refine mitigation and operations;
- carrying out post-construction environmental audits and documenting lessons learned; and
- institutionalizing improved environmental and social practices into routine port operations, and preparing a detailed Decommissioning Plan at the end of the asset life.

With these measures and commitments, the project is expected to significantly enhance port performance and economic growth while maintaining high standards of environmental protection and social responsibility. The ESIA therefore recommends that the project be approved and implemented under the conditions set out in the ESMP and related management plans.

REFERENCES

Tanzanian Legislation and Regulations

United Republic of Tanzania (URT) (1967). Land Acquisition Act, 1967 (Cap. 118). Government Printer, Dar es Salaam.

URT (1999). Land Act, 1999 (Cap. 113). Government Printer, Dar es Salaam.

URT (1999). Village Land Act, 1999 (Cap. 114). Government Printer, Dar es Salaam.

URT (2003). Occupational Health and Safety Act, 2003 (Act No. 5 of 2003; Cap. 297). Government Printer, Dar es Salaam.

URT (2003). Fisheries Act, 2003 (Act No. 22 of 2003; Cap. 279). Government Printer, Dar es Salaam.

URT (2004). Environmental Management Act, 2004 (Act No. 20 of 2004; Cap. 191). Government Printer, Dar es Salaam.

URT (2004). Ports Act, 2004 (Act No. 17 of 2004; Cap. 166). Government Printer, Dar es Salaam.

URT (2005). Environmental Impact Assessment and Audit Regulations, 2005 (Government Notice No. 349 of 2005). Vice President's Office, Dar es Salaam.

URT (2007). Urban Planning Act, 2007 (Act No. 8 of 2007; Cap. 355). Government Printer, Dar es Salaam.

URT (2009). Water Resources Management Act, 2009 (Act No. 11 of 2009; Cap. 331). Government Printer, Dar es Salaam.

National Policies and Strategy Documents

URT (1997). National Environmental Policy (NEP), 1997. Vice President's Office, Dar es Salaam.

URT (2002). National Water Policy, 2002 (NAWAPO). Ministry of Water, Dar es Salaam.

URT (2003). National Transport Policy, 2003. Ministry of Communications and Transport, Dar es Salaam.

URT (2021). National Environmental Policy, 2021 (Revised). Vice President's Office, Dar es Salaam.

International Safeguard Policies and Standards

International Finance Corporation (IFC) (2012; updated 2021). IFC Performance Standards on Environmental and Social Sustainability. World Bank Group, Washington, D.C.

IFC (2007; updated 2017). Environmental, Health, and Safety Guidelines: General EHS Guidelines. World Bank Group, Washington, D.C.

IFC (2017). Environmental, Health, and Safety Guidelines for Ports, Harbors and Terminals. World Bank Group, Washington, D.C.

World Bank (1999; revised 2013). Operational Policy (OP) 4.01: Environmental Assessment. World Bank, Washington, D.C.

World Bank (2001; revised 2013). Operational Policy (OP) 4.12: Involuntary Resettlement. World Bank, Washington, D.C.

World Bank (2004–2013). Operational Manual for Safeguard Policies and Associated Bank Procedures. World Bank, Washington, D.C.

World Bank (2004). Involuntary Resettlement Sourcebook: Planning and Implementation in Development Projects. World Bank, Washington, D.C.

Industry Guidelines and Technical References

International Association of Oil & Gas Producers (IOGP) and IPIECA (2016). Environmental Management in the Upstream Oil and Gas Industry. IOGP Report 254. London.

IFC (undated; reprinted).Environmental Guidelines for Port and Harbour Facilities. International Finance Corporation, Washington, D.C.

National Statistical, Socio-Economic and Demographic Sources

National Bureau of Statistics (NBS) and Office of Chief Government Statistician (OCGS) (2023). 2022 Population and Housing Census: Population Distribution by Administrative Areas. National Bureau of Statistics, Ministry of Finance, Dar es Salaam, and Office of Chief Government Statistician, Zanzibar, United Republic of Tanzania.

National Bureau of Statistics (NBS) (2023). 2022 Population and Housing Census: Population Distribution by Administrative Areas – Summary Tables. National Bureau of Statistics, Dar es Salaam, United Republic of Tanzania.

National Bureau of Statistics (NBS) (2019). 2017–18 Household Budget Survey: Key Indicators Report – Tanzania Mainland. National Bureau of Statistics, Ministry of Finance and Planning, Dodoma, United Republic of Tanzania.

National Bureau of Statistics (NBS) and Office of the Chief Government Statistician, Zanzibar (year). Dar es Salaam Region: Basic Demographic and Socio-Economic Profile Report. National Bureau of Statistics, Ministry of Finance and Planning, Dodoma, and Office of the Chief Government Statistician, Zanzibar, United Republic of Tanzania.

UN-Habitat (2010). Tanzania: Dar es Salaam City Urban Profile. United Nations Human Settlements Programme (UN-Habitat), Nairobi, Kenya.

Sheposh, R. (2024). Dar es Salaam, Tanzania – Research Starter. EBSCO Information Services, Ipswich, MA, USA.

Climate and Meteorological Data Sources

Tanzania Meteorological Authority (TMA) (2025). Statement on the Status of Tanzania Climate in 2024. Tanzania Meteorological Authority, Dar es Salaam, United Republic of Tanzania.

Climate Change Knowledge Portal (World Bank Group) (2025). Tanzania – Climatology 1991–2020 (CRU Data). World Bank Group, Washington, D.C.

Climate Action Network Tanzania (CAN-TZ) (2021). Data on Climate Change and Weather in Tanzania. CAN-TZ, Dar es Salaam, United Republic of Tanzania.

WorldData.info (accessed 2025). Climate and Temperatures in Tanzania – Monthly Averages for Temperature, Rainfall and Sunshine.

Long-term rainfall or temperature data from TMA

Oceanographic, Nautical and Port Data Sources

United Kingdom Hydrographic Office (UKHO) (2019). British Admiralty Nautical Chart 693: Dar es Salaam (INT 7692). 7 November 2019 edition. United Kingdom Hydrographic Office, Taunton, UK.

Tanzania Ports Authority (TPA) (2002). Port of Dar es Salaam – Port Profile and Traffic Statistics 1997–2002. Tanzania Harbours Authority (now TPA), Dar es Salaam, United Republic of Tanzania.

Tanzania Ports Authority (TPA) (various years). Dar es Salaam Port – Port Characteristics, Operational Information and Annual Statistics. Tanzania Ports Authority, Dar es Salaam, United Republic of Tanzania.

Tide-Forecast.com (accessed 2025). Tide Times and Tide Charts for Dar es Salaam, Tanzania.

VesselFinder (accessed 2025). Port of Dar es Salaam (TZDAR) – Port Position, AIS Shipping Statistics and Vessel Traffic.

Tanzania Ports Authority (TPA) (2025). Environmental and Social Impact Assessment (ESIA) for the Deepening and Strengthening of Berths 8–11 and Electrical Works at Berths 1–7, Dar es Salaam Port. Draft ESIA Report, Dar es Salaam, United Republic of Tanzania.

Tanzania Ports Authority (TPA) (various years). Dar es Salaam Port Operational Statistics, Annual Reports and Traffic Projections. TPA, Dar es Salaam, United Republic of Tanzania.

TECHNITAL (2017). Feasibility Study and Detailed Design for Dar es Salaam Maritime Gateway Project – Berths 8–11 and Associated Works. Report prepared for Tanzania Ports Authority and the World Bank.

World Bank (2017). Tanzania – Dar es Salaam Maritime Gateway Project (DSMGP): Project Appraisal Document (Report No. PAD1462). World Bank, Washington, D.C.

World Bank (2014–2024). Implementation Status and Results Reports and related monitoring documents for Dar es Salaam Maritime Gateway Project (P150496). World Bank, Washington, D.C.

(Insert any additional engineering design reports, geotechnical reports, dredging method statements, or contractor CEMPs that are explicitly cited in the ESIA.)

Glasson, J., Therivel, R. and Chadwick, A. (2012). Introduction to Environmental Impact Assessment (4th ed.). Routledge, London and New York.

PIANC (various years). Guidelines and technical reports on dredging, sediment management and environmental aspects of navigation infrastructure. Permanent International Association of Navigation Congresses, Brussels.

Marine Ecology Sources

APHA (2017). *Standard Methods for the Examination of Water and Wastewater, 23rd Edition*biochemjournal.com.

ATTA. (2024, September 25). *Innovative coral transplants restore Tanzania's damaged reefs*. https://atta.travel/resource/innovative-coral-transplants-restore-tanzania-s-damaged-reefs.html

BirdLife International. (2023). *Important Bird Areas factsheet: Dar es Salaam Marine Reserve System*. Retrieved from https://www.(BirdLife International, 2023)

BirdLife International. (2025). *Dar es Salaam coast*. BirdLife DataZone. https://datazone.birdlife.org/site/factsheet/dar-es-salaam-coast

Dugong & Seagrass Hub. (n.d.). *Tanzania*. https://www.dugongseagrass.org/where-we-work/tanzania/

English, S., Wilkinson, C., & Baker, V. (1994). *Survey manual for tropical marine resources* (2nd ed.). Australian Institute of Marine Science.

fish and benthic cover of the North and South Dar es Salaam Marine Reserves system before the 2016 El Niño. **WIO Journal of Marine Science** 20 (2:) 2021 1-10. https://www.researchgate.net/publication/359084693_Assessment_of_reef_fish_and_benthic_cover_of_the_North_and_South_Dar_es_Salaam_Marine_Reserves_system_before_the_2016_El_Nino

Food and Agriculture Organization of the United Nations (FAO). (2023). *Kigamboni mangrove ecosystem being restored through FAO EU-funded project*. https://www.fao.org/in-action/building-capacity-environmental-agreements/resources-news/news/news-details/en/c/1639246/

Food and Agriculture Organization of the United Nations (FAO. (2021). *The State of World Fisheries and Aquaculture*. Rome: Food and Agriculture Organization of the United Nations.

Global Seagrass Watch. (2023). *Global Seagrass Distribution and Conservation Report*. Queensland: James Cook University.

Google. (2025). *Google Maps Location Services*. Retrieved from https://www.(Google Maps, 2025)

Harvey, W. G., & Howell, K. M. (1987). The birds of the Dar es Salaam area, Tanzania. *Le Gerfaut*, *77*, 205–258. https://sora.unm.edu/node/151063

International Union for Conservation of Nature (IUCN). (2023). *The IUCN Red List of Threatened Species*. Retrieved from https://www.(IUCN, 2023)

Lugendo, B. R., George, R., Wegoro, J., Pamba, S., Shaghude, Y., Shalli, M., & Hollander, J. (2024). *Seagrass in Tanzania: Guidelines to support restoration* (WIOMSA Book Series No. 19). Western Indian Ocean Marine Science Association (WIOMSA). https://www.wiomsa.org

Lugendo, B., Wegoro, J., Shaghude, Y., Pamba, S., Makemie, M., & Hollander, J. (2023). *Spatially seagrass mapping across the entire coast of Tanzania* [Preprint]. SSRN. https://ssrn.com/abstract=4643833

Mafia Ornithological and Research Centre. (n.d.). *Enhancing community participation in Birds Without Borders conservation and birds watching tourism promotion in Mafia Islands of Tanzania*. Roots & Shoots. Retrieved May 19, 2025, from https://rootsandshoots.org/projects/enhancing-community-participation-in-birds-without-borders-conservation-and-birds-watching-tourism-promotion-in-mafia-islands-of-tanzania/

Marine Parks and Reserves Unit. (2022). *Coral reef status report for the Dar es Salaam Marine Reserves system*. Ministry of Livestock and Fisheries, Board of Trustees for Marine Parks and Reserves Unit. https://marineparks.go.tz

Micklem, J. M., Griffiths, C. L., Ntuli, N., & Mwale, M. (2016). The invasive Asian green mussel *Perna viridis* in South Africa: All that is green is not *viridis*. *African Journal of Marine Science*, 38(2), 171–177. https://www.ajol.info/index.php/ajms/article/view/143554

Muhando, C. A., & Mohammed, M. S. (2002). Coral reef benthos and fisheries in Tanzania before and after the 1998 bleaching and mortality event. *Western Indian Ocean Journal of Marine Science*, *1*(1), 43–52. https://www.researchgate.net/publication/228636488

National Environment Management Council. (2023). *Tanzania country report to ICRI GM37, 2023*. International Coral Reef Initiative (ICRI). https://icriforum.org/events/37th-icri-general-meeting/

National Oceanic and Atmospheric Administration (NOAA). (2025). National Coral Reef Monitoring Program: Survey protocols and site selection methods. Retrieved from https://www.(NOAA Fisheries, 2025)

Natural Resources Wales (2021). *Benthic habitat assessment guidance: Over-arching principles and methods for benthic marine habitat survey in Ecological Impact Assessment*.

NMBAQC (2010). *Quality Assurance in Marine Biological Monitoring* – Guidelines by the National Marine Biological Analytical Quality Control Schemenmbaqcs.org.

NOAA National Coral Reef Monitoring Program (2025). *Methodology updates for integrated coral reef fish and benthic surveys in Florida and Caribbean* (NOAA Fisheries, 2025) (NCCOS & SEFSC, 2024).

NOAA NCCOS & Partners (2025). *Coral Reef Benthic Community Survey Data (Line Point-Intercept method) – Puerto Rico*, National Coral Reef Monitoring Program https://catalog.data.gov.

NOAA Southeast Fisheries Science Center (2025). *National Coral Reef Monitoring Program: Assessment of fish communities (stationary point count method)* (NOAA Fisheries, 2025).

Nungunungu. (2024, November 25). *Recap: A day of shorebird watching in Dar es Salaam*. https://www.nungunungu.com/journal/shorebird-watching-in-dar-es-salaam

Nyangoko, B. P., Berg, H., Mangora, M. M., Gullström, M., & Shalli, M. S. (2021). Community perceptions of mangrove ecosystem services and their determinants in the Rufiji Delta, Tanzania. *Sustainability, 13*(1), 63. https://doi.org/10.3390/su13010063

Pagu, J., Ngoile, M., Benno, B., Machumu, M., **Mbije, N.** (2021) Assessment of reef

Patil, S. C. K., Lingadhal, C., Atanur, V. S., Padmanabha, A., Adil, M., & Vijayakumar, S. (2024). *Spatial and temporal variations in physico-chemical characteristics of water in Gangavali and Aghanashini mangroves, Southwest coast, Karnataka*. International Journal of Advanced Biochemistry Research, 8(4), 603–614. https://doi.org/10.33545/26174693.2024.v8.i4h.1021

President's Office – Regional Administration and Local Government. (2021). *Environmental and Social Management Framework (ESMF): Msimbazi Basin Development Project (Draft Report)*. The United Republic of Tanzania.

Richmond, M. D. (2002). *A field guide to the seashores of Eastern Africa and the Western Indian Ocean islands*(2nd ed.). Sida/SAREC–WIOMSA.

SeaLifeBase. (n.d.). *Birgus latro* (Coconut crab). Retrieved May 19, 2025, from https://www.sealifebase.se/summary/Birgus-latro.html

Sosovele, E. M., & Hosea, K. M. (2013). Impact of anthropogenic activities on genetic variability of yeasts inhabiting mangrove sediments of Dar es Salaam, Tanzania. *Journal of Environment and Ecology, 4*(1), 1–13. https://doi.org/10.5296/jee.v4i1.3902

Stevenson, T., & Fanshawe, J. (2002). *Field guide to the birds of East Africa: Kenya, Tanzania, Uganda, Rwanda, Burundi*. T & AD Poyser.

Stimson Center. (2021, October 27). *CORVI risk assessment: Dar es Salaam, Tanzania*. https://www.stimson.org/2021/corvi-risk-profile-dar-es-salaam-tanzania/

Sustainable Ocean Alliance Tanzania. (2023). *SOA Tanzania 2023 annual report*. https://www.soatanzania.or.tz

Tansheq Limited. (2022). *Marine Field Survey Report – Dar es Salaam Marine Reserve System*. Internal Unpublished Report.

Tanzania Meteorological Authority. (2022). *Annual Oceanographic and Meteorological Summary for Coastal Waters – Dar es Salaam Region*. Dar es Salaam: TMA.

Tanzania Ports Authority. (2024). *Dar es Salaam Port Improvement Program – Phase II: Technical Project Documents*. TPA Archives.

U.S. Environmental Protection Agency (2020). *Standard Operating Procedure for Zooplankton Sample Collection and Preservation*, Great Lakes National Program Officeepa.govepa.gov.

Ullah, H., Wahab, M. A., Rahman, M. J., Al Mamun, S. N., Kumar, U., Rahman, M. A., Souhardya, S. M., Kabir, I. E., Hussain, M., Rahman, M. B., & Chishty, S. M. S. U. H. (2023). Local ecological knowledge can support improved management of small-scale fisheries in the Bay of Bengal. *Frontiers in Marine Science*, *10*, 974591. https://doi.org/10.3389/fmars.2023.974591

Umudi, E. Q., & Umudi, O. P. (2024). *Evaluating ballast water quality at Forcados Terminal, Southern Delta, Nigeria*. FNAS Journal of Basic and Environmental Research, 1(1), 17–25. https://www.fnasjournals.com

United Nations Environment Programme (UNEP). (2022). *Status of Coral Reefs of the World: 2020 Report*. Retrieved from https://www.(UNEP, 2022)

United Republic of Tanzania. (2021). *Environmental Management Act, 2004 and Regulations*. Retrieved from https://www.(United Republic of Tanzania, 2021)

United Republic of Tanzania. (2024). *National action plan for conservation of marine turtles: 2024–2029*. Ministry of Livestock and Fisheries & Ministry of Blue Economy and Fisheries. https://www.seasense.org/publications

United Republic of Tanzania – Vice President's Office. (2021). *State of the Coast Report: Tanzania Mainland*. Division of Environment.

Wagner, G. M., & Sallema-Mtui, R. (2016). *Tanzania Mangrove Ecosystems: Distribution, Composition and Status*. WWF Tanzania Country Office.

Western Indian Ocean Marine Science Association. (2024, October 31). *Seagrass in Tanzania: Guidelines to support restoration*. https://blog.wiomsa.net/2024/10/31/wiomsa-launches-new-publication-seagrass-in-tanzania-guidelines-to-support-restoration/

World Care–Tanzania. (n.d.). *Dar es Salaam Marine Ecology Conservation Project: Concept paper*. Artificial Reefs. Retrieved May 19, 2025, from https://www.artificialreefs.org/ScientificReports/Dar%20es%20Salaam%20Marine%20Ecology%20Conservation%20project.htm

World Wide Fund for Nature (WWF). (2022). *Reef resilience and community engagement around Dar es Salaam Marine Parks*. Retrieved from https://(WWF, 2022)

Yona, G. (2011). *Analysis of Tanzania's legislation in the context of the international law relating to the protection and preservation of endangered marine species* [PowerPoint presentation]. UN–Nippon Fellowship Programme 2010–2011.

APPENDIX I: TERMS OF REFERENCE

TERMS OF REFERENCES (TOR) FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR REHABILITATION OF BERTHS 8-11 AT DAR ES SALAAM PORT

1.0. INTRODUCTION

During scoping, several key environmental issues were identified after completing a site reconnaissance, holding consultations with stakeholders of the project and reviewing various literatures related to the project. Similarly, expert opinions were sought on various key issues identified as requiring specialized knowledge.

The purpose for developing the Terms of Reference (TOR), is to provide formal guidance to the project proponent and contracted Consultant for carrying out the EIA of the proposed project on the range of issues that must be addressed in the EIA process. In these ToR, strategies for addressing the issues identified during scoping have been incorporated to make the EIA focused,

However, the identified issues during scoping were addressed in the scoping report as the the impact of the proposed project is relative insignificant to go further in the EIA study.

1.1. OBJECTIVES OF EIA STUDY

The EIA shall be conducted in accordance with the guidelines laid down by the Environment Management Act (EMA, 2004). Part IV of the EIA Regulations GN No. 349 of 2005 as amended 2018 provides the general objectives for carrying EIA, among others a list includes the following:

- To ensure that environmental considerations are explicitly addressed and incorporated into the development of the decision making process;
- To anticipate and avoid, minimize or offset the adverse significant biophysical, social and relevant effects of developmental proposal;
- To protect the productivity and capacity of natural systems and ecological processes which maintain their functions;
- To promote development that is sustainable and optimizes resource use and management opportunities.

The specific objectives of the EIA are:

- To establish baseline information on both natural and built environments including socioeconomic conditions of the proposed project area;
- To identify, predict and evaluate foreseeable impacts, both beneficial and adverse, of the proposed investment;
- To develop mitigation measures that aim at eliminating or minimizing the potential negative impacts and promote positive ones; and
- To develop a management plan and monitoring plan for ease of reference during the project implementation.

1.2. Detailed Scope of Work for Undertaking an Environmental Impact Assessment (EIA) The detailed scope for undertaking Environmental Impact Assessment is intended to guide the Consultant to address relevant environmental and social issues during the assessment process. Among others, the EIA shall be conducted in accordance with the requirements of the National Environmental Impact Assessment Guidelines and Procedures. The Consultant shall carry out the following tasks:

1.2.1 Baseline Data and Information

Consultant collected information on Air quality data, vibration, nosie levels and dust-suspended particulate matters, marine ecology as well as aquatic life and socio economic information in the vicinity of Dar es Salaam Port as described in chapter 4 of this report.

1.2.2 Study area

In order to cover the assessment of all key issues related to the project, the study area shall be wider than that occupied by the proposed project's physical structures and will also cover the areas to dispose dredging materials.

1.2.3 Description of the project

The Consultant shall give details of:

- Location of all project related developments
- General Layout of proposed project showing berths 8-11 in relation to the components of the project;
- Description of the land use and ownership of the area
- Organizational relationships, mandates and interactions among the different users of the resources and managers,
- Means of transportation of construction materials to port
- Sources of construction materials
- Management of wastes, both liquid and solid waste
- Description of all project components and the activities in each component of the project development.

1.3. Description of the Environment

The Consultant shall:

i. Provide general description of the project environment and sources of information for anyone requiring a more extensive description

ii. Identify those features that are particularly important in the project area – i.e. Maps at appropriate scales to illustrate the surrounding areas likely to be environmentally and socially affected;

iii. Identify areas that require special attention in the project implementation

1.4. Stakeholders Consultations and Public Participation

Consultations of several key stakeholders will be carried out during the scoping stage of the EIA.

However, the Consultants shall carry this further during the impact study.

Public consultation is a mandatory process when conducting an ESIA and a particular focus of the IFC Performance Standard 1 and shall include the following: A list of stakeholders to be consulted together with a stakeholder analysis which include

- Project Affected People: Local Communities/ Residents nearby communities to the project
    - ✓ Kurasini Ward
    - ✓ Mivinjeni Mtaa

- ✓ Kigamboni ward
- ✓ Mchafukoge Mtaa
- ✓ Labour agencies (service providers within the Port)
- ✓ Food vendors (Mamalishe) along Bandari Road
- ✓ Fishermen (Kurasini landing site and Vijibweni)
- ✓ Motorcyclist (bodaboda) and taxi drivers
- ✓ Shipping Agents

- Businesses/Companies
  - ✓ Tanzania International Container Terminal Services (TICTS)
  - ✓ Miscellaneous service Company working with TICTS

- Municipalities
  - ✓ Temeke Municipal Council
  - ✓ Dar es Salaam City Council
  - ✓ Kigamboni Municipal Council

- Government Authorities
  - ✓ Tanzania Revenue Authority (TRA)
  - ✓ Tanzania National Roads Agency (TANROADS)
  - ✓ Marine Parks and Reserved Units (MPRU)
  - ✓ Tanzania Social Action Fund (TASAF)
  - ✓ Tanzania Railway Limited (TRL)
  - ✓ National Health Insurance Fund (NHIF)
  - ✓ Energy and Water Utilities Regulatory Authority (EWURA)
  - ✓ Reli Assets Holding Company (RAHCO)
  - ✓ Shipping Corporation of Zanzibar (SHIPCO)
  - ✓ Mwalimu Nyerere Memorial Academy
  - ✓ Tanzania Navy Base (Kigamboni)
  - ✓ Ferry Management

- Sectories Ministries
  - ✓ Ministry of Natural Resources and Tourism (MNRT)
  - ✓ Ministry of Agriculture, Livestock and Fisheries (MALF)
  - ✓ Ministries of Home Affairs (MOHA)
  - ✓ Ministry of Water and Irrigation (MOWI)
  - ✓ Ministry of Lands, Housing and Human Settlement Development (MLHHSD)

The methods used to get their views and issues of concern raised.

- The Environmental Management (EIA and Audits) (amendment) Regulations (2018) stipulate that A proponent or developer may use applicable electronic media to submit Scoping Report to the relevant authority and the Council or an agent of the Council, Relevant authorities shall, within seven days from the date of receipt of Scoping Report, submit their comments to the Council and The Council shall, within fourteen days of receipt of Scoping Report, whether comments have been received or not, scrutinize the Scoping Report and Terms of Reference and may approve or disapprove the Terms of Reference and communicate its decision to the proponent or developer.
- Stakeholder Engagement Plan (SEP)
- Should any public meetings be held, notice of the time and venue must be distributed at least one week prior to all affected parties.
- Should issues be raised, a register of these issues should be reported along with the way they will be addressed.
- The consultant shall keep and provide records of meetings, communications and comments for the stakeholders who will need a meeting with him.

At the onset of the project a Stakeholder Engagement Plan (was drawn up to:

- Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.
- Promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

The assessment shall establish the level of consultation of the affected stakeholders before designing the project and the level of involvement expected in the running, monitoring and maintenance of the project facilities, as this is an important aspect for both environmental and project sustainability.

The assessment will provide a framework:

- For coordinating the environmental impact assessment with other government agencies, local government authority; and
- For obtaining the views of affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition.

1.5. Legislative and Regulatory Considerations.

The Consultant shall:

Undertake a review of policies, legislation and administrative framework within which the environmental management of the proposed project will be carried out. The following and any other relevant policies and legislations shall be reviewed:

- National Environmental Policy (1997)
- National Land Policy (1995)
- The National Employment Policy (1997)
- National Policy on HIV/AIDS (2001)
- The Construction Industry Policy (URT, 2003)
- The National Transport Policy of 2003

- Human Settlement Development Policy, (2000)
- Environmental Management Act No. 20 of 2004
- The Land Act No. 4 of 1999
- Occupational Health and Safety Authority Act, 2003
- Water Resource Management Act of 2009
- The National Land Use Planning Act, 2007
- The Ports Act No. 17, 2004
- Tanzanian Harbours Regulations, 1991
- Surface and Marine Transport Regulatory Authority (SUMATRA) Act, 2001
- Merchant Shipping Act No. 21, 2003
- Public Health Act, 2009
- Local Government (District Authority) Act, Cap 287 of 1982
- Workers Compensation Act, 2008 - (Act No. 20/08)
- Employment and Labour Relations Act, 2004 - (Act No.6/2004)
- HIV and AIDS (Prevention and Control) Act of 2008
- Contractors Registration Act No. 17 of 1997
- Engineers Registration Act No. 15 of 1997
- The Land Acquisition Act R:E 2002
- The Port Service Charge Act, 2011

1.6. Impact Assessment

The proposed project consists of activities, which (based on the current available information) are apparently marine environment in nature. Because of its diversity, each activity and its subactivities and alternative shall be assessed on its merit and links established wherever appropriate or possible.

To avoid ambiguity in the impact assessment - identifying potential impacts, relevant environmental factors and mitigation measures, Consultants shall make use of the checklist covering the major areas of impact as provided for in the EIA guidelines.

Using baseline data and information the following tasks shall be carried out by the consultant.

Task 1. Identification and Prediction of Impacts

Under this activity the consultant shall:

i. Identify issues and concerns in order to find suitable remedies;

ii. Identify linkages among project components and the issues;

iii. Identify where project activities or elements interact with social and biophysical environment (direct impacts);

iv. Identify indirect impacts of the project on the environment;

v. Identify cumulative impacts that may be anticipated;

vi. Identify residual impacts if any;

vii. Identify solid waste and dredging materials management and disposal impacts

viii. Predict probability, magnitude, distribution and timing of expected impacts:

ix. Forecast what will happen to the affected environmental components if the project is implemented as is or if the alternatives (e.g. sites) are chosen.

Task 2: Estimation of the Significance of the Impacts.

The consultant shall:

i. Determine which environmental components are mostly affected by the project or its alternatives;

ii. List issues raised by the public and classify them according to the level and frequency of concern whenever possible;

iii. List regulatory standards, guidelines etc. that need to be met; and

iv. Rank predicted impacts in order of priority for avoidance, mitigation, compensation and monitoring.

Task 3: Development of Management Plan to Mitigate Negative Impacts, and Development of Monitoring Plan

The consultant shall:

i. Determine appropriate measures to avoid or mitigate undesirable impacts; assess and describe the anticipated effectiveness of proposed measures;

ii. Ascertain regulatory requirements and expected performance standards;

iii. Determine and assess methods to monitor impacts for prediction of accurate remedial measures for effectiveness;

iv. Determine and assess methods to monitor for early warning of unexpected effects;

v. Re-assess project plans, design and project management structure;

vi. Describe follow-up schemes and post-project action plans for achieving EIA objectives; and

vii. Assess the level of financial commitment by the project proponent for the management and monitoring plan, and follow up activities.

The consultant shall be guided by the cost-effectiveness principles in proposing amelioration measures. Estimation of costs of those measures shall be made. The assessment will provide a detailed plan to monitor the implementation of the mitigation measures and impacts of the project during operation.

Task 4: Identification of Institutional Needs to Implement Recommendations.

The Consultant shall review the institutional set-up, community, ward, District/ Regional and national levels - for implementation of the Management and Monitoring Plans recommended in the environmental assessment. The assessment shall identify who should be responsible for what and when.

Task 5: Drawing Recommendations.

The consultant shall:

i. Highlight key concerns and considerations associated with the acceptance and implementation of recommended actions;

ii. Determine resource requirements for implementing recommendations;

iii. Determine capacity and resourcefulness of the client in meeting such commitments;

iv. Explain rationale for proposed development and benefits and costs vis-à-vis the no-project option; and

v. Ascertain degree of public acceptance of or reaction to recommendations.

Task 6: Environmental Impact Statement (EIS)

The assessment shall result in an EIS focusing on findings of the assessment, conclusions and recommended actions, supported by summaries of data collected etc. This shall be a concise document limited to significant environmental issues. The EIS format will be as shown below:

Environmental Impact Assessment Report

- Executive Summary
- Introduction
- Description of the proposed project and
- Policy, Legal and Administrative Framework,
- Description of Environmental Setting
- Stakeholders consultation and Public participation
- Impact Identification, Assessment and Analysis of alternatives
- Mitigation measures
- Environmental Management Plan
- Environmental Monitoring Plan
- Cost benefit Analysis
- Decommissioning Plan
- Summary and Conclusions
- List of References
- Appendices
  - ✓ List of names of the Consultant team
  - ✓ Records and/or minutes of public consultations
  - ✓ Data used during the analysis
  - ✓ Any technical explanation of methods used (optional)
  - ✓ Terms of Reference of this study.

Task 7: Review

The review report from NEMC may require further input (data collection, consultation inputs etc.). The consultant shall undertake to provide extra information and inputs until the project review is satisfactorily concluded.

1.8. Study Team

The consultants shall deploy consultants/experts with the demonstrable practical experience in conducing EIA studies. Specific experience in environmental issues, hazardous waste, dredging and port management as well as sociologist shall be involved.

1.9. Reporting and Report Presentation

The final draft of the EIS document should be concise, following the report writing guidelines in the national Environment Impact Assessment and Audit Regulations, G.N. No. 349 of 2005 amended in 2018 for simplifying the review process.

1.10. Records of Meetings

The consultants shall provide records of the names of organizations, government and departments and individuals whose views they will obtain. The record will also provide descriptions of views and information that will be obtained.

1.11. Outputs

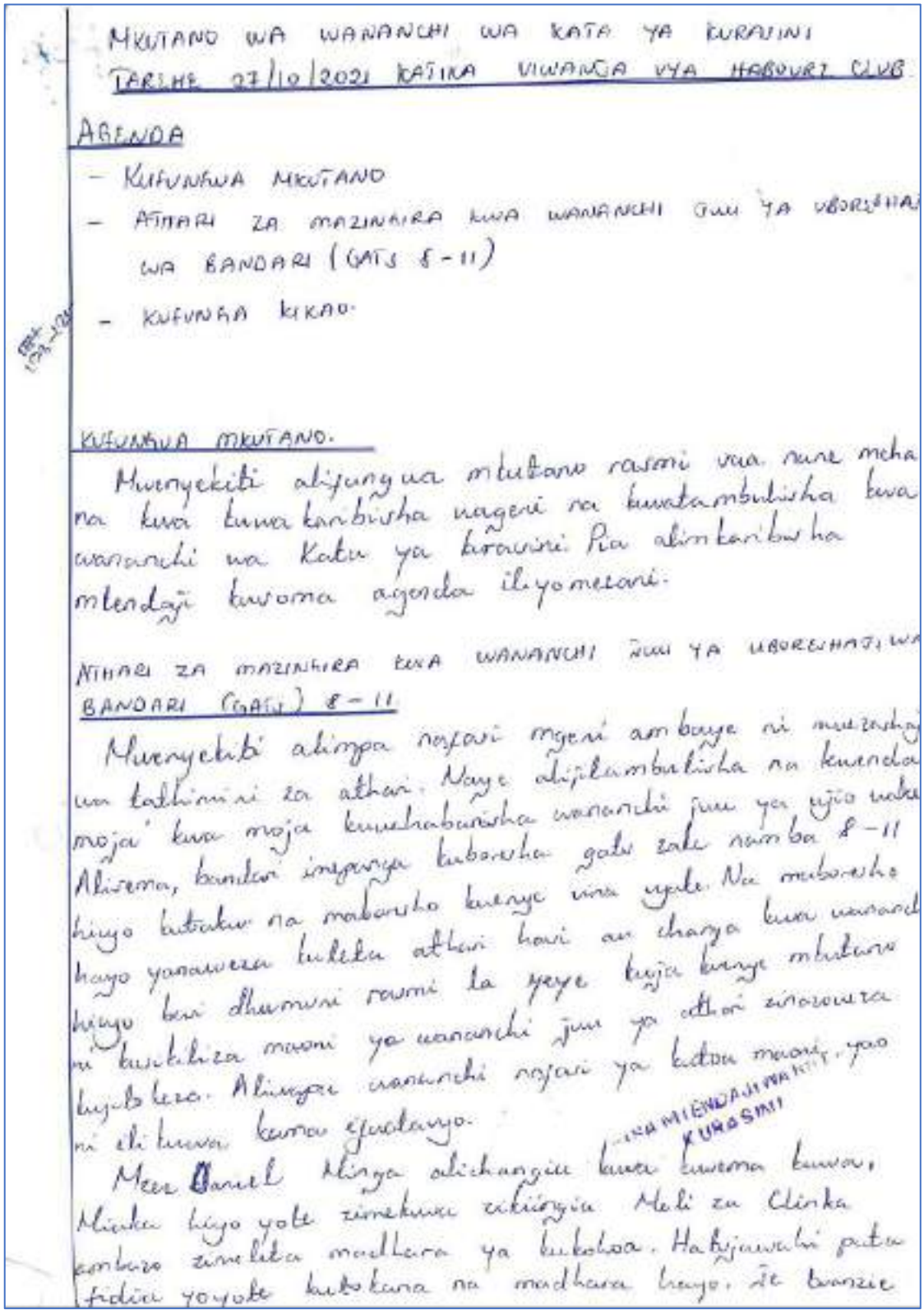
The consultant shall submit bound hard copies to NEMC plus an electronic copy of the EIS

1.12. Reference

The objective of this section is to identify and record the written materials used in the study. All materials both published and unpublished will be listed.

APPENDIX II: STAKEHOLDER CONSULTED

MINUTES OF MEETING WITH STAKEHOLDERS AT KURASINI WARD



MKUTANO WA WANANCHI WA KATA YA KURASINI
TAREHE 27/10/2021 KATIKA VIWANJA VYA HARBOUR CLUB

AGENDA
- KUFUNGUA MKUTANO
- ATHARI ZA MAZINGIRA KWA WANANCHI JUU YA UBORESHAJI WA BANDARI (GATI 8-11)
- KUFUNGA KIKAO.

KUFUNGUA MKUTANO.

Mwenyekiti alijungua mkutano rasmi wa nne mchana kwa kuwakaribisha wageni na kuwatambulisha kwa wananchi wa Kata ya Kurasini. Pia alimkaribisha mtendaji kuroma ajenda iliyomezani.

ATHARI ZA MAZINGIRA KWA WANANCHI JUU YA UBORESHAJI WA BANDARI (GATI) 8-11

Mwenyekiti alianza nyavi mgeni ambaye ni mwezeshaji wa kathimini za athari. Naye alijitambulisha na kuendelea mbele kwa mbele kuelezea wananchi juu ya ujio wake. Alisema, bandari inayoenda kuboresha gati zake namba 8-11 hivyo kutaka na mabasho kwenye wina yake. Na mabasho hayo yanaweza kuleta athari hasi au chanya kwa wananchi hivyo kwa dhumuni rasmi la yeye kuja kwenye mkutano ni kuchukua maoni ya wananchi juu ya athari zinazoweza kujitokeza. Alimyasi wananchi nyavi ya kutoa maoni yao ni ili kuwa kama ejudanyo.

KWA MIENDAJI WA KATA KURASINI

Mzee Daniel Alinya alichangia kwa kuroma kuwa, Mimba hiyo yote zimekuwa zikiongia Meli za Clinka zenye zimeleta madhara ya kukohoa. Hatujawahi pata fidia yoyote kutokana na madhara hayo. Je bandari

wapi?
Akandeleo ao wuali jingine kuu kuema kwamba. Je wate
pokiwa kubyanyia nini kutokana na madhara hayo. Je
kutakuwa na diwabanca allowance na nani atalipa.
Kubokana na wuali la kuanza mwezihaji alijibu kama
ifuatanyo. Tukuma kale yeye ni kyanda mwari ya vewa jua
ya adhai za maboresho na vi vinginevyo. Hayo kutita nayavi
yale kujibu mawala yaliyopita. Ila anyayopokea mwari na
alinyapeleka kwa kwakohwika.
Selemani Mkuyawa alivomu yeye kwelewi mwezihaji kuto-
kea wapi anatuka kwelewa agenda kuu ya mkutano ni nini.
Mwezihaji alindia kwa kwamkwevha.
Mwana kula alindiria kwa kwelo kujajua wahuzika kwa
wa mkutano huo ni aotiwa nani. Na adhai za vuwa wahuzika
wa wangapata kutokana na mli zenye kwahuvha kwinikati ni
la wuda mrefu - je nini dhumuni la mkutano huu.
Alijeuwa majibu na mkodaji kutu aombaye alijafanye kuwa
wawahuzika na mkutano huu ni wakazi wa kwaviini na
mitaa yale na vi vinginevyo.
Mwezihaji Pia alijibu swali la mama Mwana kula
kwa kwelewa kuwa dhumuni kuu la mkutano huu ni kukuza
nya mwari ya adhai utakawotokana na uboreshwaji na vi
vinginevyo.
Selemani Mkuyawa, je wakutubeba wapi kuenye adhai iwapo
kujia. Majibu aliyopewa ni kuwa ndio kwanza bado kuenye
awamu ya kujadili adhai ila kutakuwa na mwendelezo wa
mikutano idakuajadili mawala mengine. Ila kwa vwa ni kujua
ku adhai za uboreshaji.
Mzee Mlinga alichangia kuwa ni bora kuwa wawazi na
kubambia kuwa kwa mwezihaji aoekuja kuchukua mateso yake.
Majibu yalikuwa kama ifuatanyo. Dhumuni ni kyanda mwari ku-
ku kukuza mwekezaji yoyote pengine yanayekuwa kulukuyya na
agenda bayuti. Ila ikiyopo mezani na ya kujadiliwa ni "ISHI MTENDAJI WA KIJIJI" KUHUSIANA adhai za
uboreshaji barabari gati 8 - 11.

Milinga alaonyesha, mnato yake bandari inchini inayoitwa gati na tuboreshe gati zake tola neli ndogo mpaka kufikia ile kawajawachi kubwa mkubwa. Sawa kama yalivyoripiti bahari yaabu kwa nini sisi Majibu athari za mabadiliko ya bandari zinazoitwa kukuguwa kwa namna moja ama nyingine ndio maana ni muhimu kupata maoni yenu.

Mjumbe ambaye hakutaja jina lake alisisitiza wawe makini gani tunaye ikitokea athari. Majibu hayakupatikana.

Mama ambaye naye hakutaja jina lake alichangia kwa kusema kwa sisyanua elimu ikiwe kwanza ndogo wananchi wake maoni yao juu ya athari. Walalaboje maoni na athari zinge ni kuwaziwa.

Bwana Ramadhani alichangia kwa kusema kama kuna athari kwa wanakijiji wake kwa mudawa au kuhamishwa.

Mjumbe mwingine ambaye naye hakutaja jina alisema kwa ukaribu wa sisi. kabla gati kwanzishwa pasha kunge maji ya bahari na pia kwa ule neli zenge umeo mkubwa zinazoza kupika kiyo bandari ikakuguwa. Kwa hiyo wawe wawaeleze na sisi kuwa makini.

Mwenyekiti alisema mwisho yake na kuwakumbusha wananchi kwa kuchangia na kupika.

KUFUNGA MKUTANO

Mwenyekiti alimshukuru wananchi kwa kupika na mkutano uliofungwa rasmi saa kumi jioni.

MKUTI

KATIBU

JINA MTENDAJI WA KATA KURASINI

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	EDITHA GABRIEL	WEO	KURASINI	0714-135520	22/10/2021	
	NOREEN CHEETHAM	WEO	KIGAMBONI	0714-349251	22/10/2021	
	CHARLES FRANCIS	MKAZI MANYIGU	MANYIGU	0655 296989	27/10/2021	
	ALPHONCE LYARUU	MGUMBE	MIVINJENI	0715 469941	27/10/2021	
	ADELITUS CHOMOLE	MGUMBE	MIVINJENI	0713-251576	27/10/2021	
	RASHIDI MATULU	MGUMBE	MIVINJENI	0654383717	27/10/2021	
	WELEMINA MUZO	CDO	KURASINI	0713687006	22/10/2021	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
8	AMAN HYERA	MKAZI	KURASINI	0715 123633	27/10/21	
9	JOE PAZAMBOYA	MKAZI	MGULANI	0718982534	27/10/21	
10	B. MSI			0769350268	27/10/21	
11	ABDUL KASHAGA	MKAZI	KURASINI	0713210559	27/10/21	
12	DANIEL P. MINDE	MINAZINI	KURASINI	0655-952814	27/10/2021	
13	RICHARD MBUNDE	MKAZI	KURASINI	0719-930775	27/10/2021	
14	AMAN BEGA	MKAZI	KURASINI	0783 265131	27/10/2021	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CREO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
15	AHMED I. [illegible]	MKAZI	MINAZINI	0786 752172	27/10/2021	
16	CHARLES [illegible]	MKAZI	MINAZINI	0715 749045 0784-749045	27/10/2021	
17	Prince Peter	M kazi	Minazini	0712 966425	27/10/2021	
18	FATU MTWIKU	MKAZI	MIVINGENI	0759461961	27/10/21	
19	C.K. Muamawacha	—11—	Minazini	0713 493176	27/10/2021	
20	R. Mwasahabuson	"	"	0713405885	27/10/2021	
21	A. Lifernandes	Mkazi	Minazini	0715607880	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CREO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
22	CLETUS J SELASINI	MKAZI	MINAZINI	0687-189370	27/10/2021	
23	[illegible]	MKAZI	MIVINGENI	0759457676	27/11/2021	
24	Abdallah A Hamisi	"	"	0655-060444	27/10/2021	
25	Bonifida Kahubaya	"	"	0785120079	"	
26	Calbert Massawe	"	MINAZINI	0754-009984	27/10/21	
27	MAIDA HASANI	"	MIVINGENI	0718469084	27/10/21	
28	SIKUJUAS SULTAN		SHIMOLANI	0714-035176	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	ALLY SALEHE	[illegible]	KURASINI	0659 108099	26/10	
	[illegible]	—11—	—11—	0684 702098	26/10/2021	
	WILBARD J [illegible]	Kitengi	KURASINI	0786 32 4680	27/10/202	
	STANLEY MBWILO	MKAZI	KURASINI	0718-399243	27/10/2021	
	AURELIAN M. SOKA	MKAZI	KURASINI	0638 899475	27/10/2021	
	Pius Sirio	Mkazi	Kurasini	0657468897	27/10/2021	
	[illegible]	—	—	0755-047162	27/10	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	[illegible] KAISI	MKUU WA MKAZI	KURASINI	0659 613465	27/10/21	
2)	BEDA [illegible]	BOSTA	KURASINI	0745-517066	27/10/21	
3	[illegible]	MKAZI	KURASINI	0765 21045	27/10/21	
4	[illegible]	MKAZI	KURASINI	0754599745	27/10/21	
5	SYLVESTER KUNDI	MKAZI	KURASINI	0755 070688	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	[illegible] Nyonge	Store Controller	TPA DRSL	0715-252619	27/10/21	
2	[illegible]	Carpenter	Kurasini	0655 052005	27/10/21	
3	FRANCESCA LUMO		KURASINI	0713 825922	—	
4	JOSEPHINE MAKAA		—11—	0788 862666	—11—	
5	MUHAMADI CHUMA		KURASINI	0765 545813	27/10/21	
6	TATU SAIDI		KURASINI	0784381287	27/10/21	T. Saidi

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	NELSON M LEKWASAH		TPA	0714596421	27/10/2021	
	HAYA FADHIL KORETH		TPA	0754-679250	27/10/2021	
	FAIZ KOMBO MSALE		KURASINI	0763888803	27/10/2021	
	JULIUS W KONDO		—11—	0683352346	27/10/2021	
	MAGRETH MHANDA		— 11 —	0717616339	27/10/2021	
	WINFRIDA JOSTHENES		— 11 —	0689762755	27/10/2021	
	William Anthony		1 —	0717-226449	27/10/2021	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1.	GADNIEL [illegible]		KURASINI	[illegible]	[illegible]	
2	SHABANI NZOTA		— " —	0767463772	[illegible]	
3.	[illegible]		— " —	0743265690	27/10/21	
4	MARY MMACHA		— " —	0713319309	27/10/21	
5.	JULIANA MARATHO		— " —	0716 453505	27/10/21	
6	STELLA MNGAZIJA		— " —	0715 628885		
7	UMMY YAKOB		— " —	0688 639009	27.10.21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	[illegible]		KURASINI	[illegible]	[illegible]	
2.	ANNA KABALO		— " —	0784 619253	27/10/2021	
3	ROSEMARY MANUEL		— " —	0713-229947	27/10/2021	
4	HILDA NZAJA		— " —	0655355808	27/10/2021	
5	SELEMANI		— " —	0713924515	27/10/2021	
6	SHABANI MKATI		— " —	0713261556	27/10/2021	
7	SUBI... MTAMBILA		— " —	0714047498	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAMEJINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	MODEST A HUNGEN	MUHANDISI	OFUNDI	0782 189334	27/10/2021	Modest Alays
2	DAVIS RICHARD	MKAZI	MIVINJENI	0684 300750	27/10/2021	
3	MATENGA S. SIMBA	MKAZI	MGULANI	0713227905	27/10/2021	
4	DISMAS CHILONGO	"	KURASINI	0717267112	"	
5	Prince Elias	-11-	KURASINI	0715859931	11	
6	Asha Muhamed	~~	UFUNDI	0713318324	~~	
7	IBRAHIM TINI	-11-	KURASINI	0752-104828	-11-	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAMEJINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	W. MKUMBA	MKAZI	MSTAAFU	0713421020	27/10/2021	
2	S. MKUYAWA	MKAZI	KURASINI	0716 546322	27/10/21	
3	H. KAJUGUSI	MKAZI	MSTAAFU	0713527442	27/10/021	
4	MOSSY LUDOVI	MKAZI	MSTAAFU	0713 857213	27/10/202	
5	E. A. MKAMBO	MKAZI	MSTAAFU	0713-309998	27/10/21	
6	H. ULIMA-EL	MKAZI	TRC	0762617075	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	PASCAL GONDI		KURASINI	0782155350		[illegible]
	Magretha Mwihambo		— " —	0776163344	27/10/21	[illegible]
	Frolence Kiondo		— " —	0752 969651	27/10/21	[illegible]
	ZAITONI R. KILEO		— " —	0715-124070	27/10/2021	[illegible]
	[illegible]		— " —	0686-263464	27/10/21	[illegible]
	JUDITH MALLE		— " —	0717-948558	27/10/2021	[illegible]
	ANGELINA NYALU		— " —	0715931757	27/10/2021	A. Nyalu

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	JOSEPH SEMGABA		KURASINI	0284-815418	27/10/21	[illegible]
	GABRIEL SALUM/MAMBWEKA		— " —	0784760834	— " —	[illegible]
	HAMISI ALLY	TEMBO	— " —	0747515432	— " —	[illegible]
	ANDREW B. LAURENT		— " —	0776491276	— " —	[illegible]
	JANETH BENDERA		— " —	0717659757		[illegible]
	REHEMA SAID		— " —	0711723563		[illegible]
	FRANCIS SADICK		— " —	0692929233		[illegible]

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	ABRAHAM CLAY		KURASINI	0673623609	27/10/2021	
	A/H JUMBE		— 11 —	0784 174100	27/10/21	
	MKOLOMAGA T.		— 11 —	0754961238	27/10/21	
	MONICA HERMAN		— 11 —	0756591957	27/10/21	
	[illegible] ALI		— 11 —	0692428409	27/10/21	
	MAGRETH MALLYA		— 11 —	0735 386566	27/10/21	
	ADILIAN kahakwa		— 11 —	0758230069	27/10/21	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	[illegible] MAHUA	MWAKILI	KURASINI	0678-954547	27/10/2021	
2	Fidel Maka	Mkazi	Kurasini	0753272692	27/10/202	
3	LOVENESS [illegible]	MUMA	KURASINI	0753-29CCR	27/10/202	
4	SINJIK	LEWA	KURASINI	07 12405566	27-10-21	
5	RAFIUNI L	MINAZINI	KILUNGANI	0714598354	27/10/202	
6	[illegible]	[illegible]	KILUNGANI	0655 110307	27/10/20	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	MSHAMU MKETO	M/KITI MTAA	KILUNGANI	0684770391	27/10/2021	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU/YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
01	Eng. Samuel Chibwana	MENEJA KIVUKO	MAGOGONI FERRY	0767429600	28/10/2024	
02	Eng Lukombe Kinyondo	MENEJA FERRIES	TEMESA HQ	0713509161	28/10/2024	
03	Nadaria Musa	HR-MAMA	MAMA-KIVUKO	0716324161	28/10/2024	

MINUTES OF MEETING WITH FISHERS AT MINAZI MIKINDA

KIKAO CHA MAMLAKA YA BANDARI
NA WAVUVI MINAZI KINDA
18/02/2022

AGENDA ZA KIKAO:

UTAMBULISHO:

UTOAJI ELIMU JUU YA MIANUZI KWA GATI/MAEGESHO MASWALI

- Kukutana na wadau na kujua changamoto/athari ambazo zinepatika kabla na baada ya mradi
- Athari chanya na hasi ambazo ni.

Uboreshwaji wa miundo mbinu kabla yani: huska yani miaendeleo. Kilevile kuna athari hasi ambazo ni chache tu, hasa ule kucheleweshea kazi/Shughuli za jamii, kilevile kwa vilumba hai ambayo vija. kahosi

MAONI MADAHI: 1) ALI SULEIMAN: Napendekeza muda wa utendaji kazi Shughuli zifafanuliwe kwa muda rafiki na tupewe taarifa mapema

KHAMIS RASHID: Taarifa zifike kwa wakati ela kuepuka uharibifu wa mali zetu, ila kili tunelipokea kwa wakati

IDDY ALI: Swali: Je endapo mmoja wa wa huska akasababishia uharibifu wa chombo chake atalipwa fidia.

(i) Na je kuna njia gani ambayo mahanga huyo kupata kwanza na wangapi wa kwa mda gani na kuli tatua tatizo huska.

(ii) Kwa nini tunapo pelekwa wakuniko ya yanepangwa.

SEIF ISMAIL: FATMA SHASARA: Uharibifu wa kinga za fukwe na mile ambayo inaeleka kusharibika kwa mmongonyoko, kwa basi tatizo hili mbadala ili kupunguza na majanga mbebni.

(ii) Kutoka kwa kuja mawi atapata wapi wakaze endapo atabaki na majanga, ili atpate kwenda polisi kwa kila tatizo, kwa kio tunaomba ushirikiano na bandari ila tuwe na jukwa moja la mawasiliano ili kuepuka mgogoro yoyo.

IDDY ALLY: Ujenzo wa usafirishaji mizigo usiku kuwajenga uyombo uyotu na bila kulipa wa kusimama kwenyalio wakazi wa kizimbi na kusababisha msafa na hasara kubwa.

MJANGA: MADAM: Kuna meli ambayo hufanya kuwaga
uhefa babaishi na kupeleka kwasiri afya zetu kwa hiyo tunaomba
hili lifanyiwe kazi, maana hapa mwanzo tarafa tulipeleka
sehemu kusika/kusafishia.

ii) Tunaomba ushirikishwaji wa kila halua ile tujue jinsi ya
kuishi maisha ambayo yatatokea katika jamii zetu, hapa kwadaa.

iii) Tunaomba utupelekee maoni yetu sehemu kusika ili uwe sauti
yetu na kuchagua ulio yaona hapa. Na vile vile sasi wanavi ni vita
ambao hatuna maeka mazuri wale kipata cha kuridhisha kazi
tunaomba mtusaidie kwa hili.

JUMA ALLY: Tunaomba bandari iboreshwe ili iweze kuchukua kwa
muda mrefu, kwani kunaongezeka watu 13 basi zaongezwe mpaka mita
15,

ii) Wale vile ningependa serikali ijanya jitihada ya kuzuia watoto kuogo
maana ya bandari ili kuepusha vifo hotela.

SEIF ISMAIL: Uhaba wa utaji ilionan kwa jamii kusika
naomba tushirikiane kwa pamoja ili tuwe elimu kwa jamii
tuepuke mabanga kwa wingi.

HUSSEIN MKUU: Uchimbaji kwa ya bandari umekua ni mmongoyo
oko ni kusalabisha kutokujua kina cha maji na kusabishia
athari nyingi, kwa ajo tunaomba tuekewe mabuyo yakutujulisha sehemu
hatarishi-kwani sehemu hizo huharabishia malatizo. Pia tuekewe mabanga
ya ukataji kwa malimuzi ya uogelaji au ubatizo.

ABDY MOHAMED: Tunaomba kio meli ambayo huniwaga sumu kila
baheri ikamuwage mbali sana tena kwa kuzingatia viumbe
hai ambayo vinaishi kaika eneo hilo, ili kuepusha malatizo
ambayo tunaweza kuyakabili.

Kutokana na haya yote tunaomba kufanyiwa kazi
maoni/maombi yetu sehemu husika ili tupate mfanda
wehu

UHURU NDIO MAISHA YETU. (20)

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	ALI SULEIMAN	NAHODHA	MINAZI MBUNDI	0675-943179	18/02/2022	
2	HAMADI JAN	NAHODHA	MAGOGONI	0715-948262	18/02/2022	
3	KHATIBU MWINYIZA	NAHODHA	MINAZI MBUNDA	0777-922260	18/02/2022	
4	MBUNDA MJAKA	NAHODHA	MINAZI MBUNDA	0716-982596	18/02/2022	
5	BAKARI KHAMIS	NAHODHA	MAGOGONI	0654-262638	18/02/2022	
6	MUSSA JUMA	NAHODHA	MINAZI MBUNDA	0776-816024	18/02/2022	
7	KOMBO MALIKI	NAHODHA	MINAZI MBUNDA		18/02/2022	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TARENE	SAHIHI/SIGNATURE
8	SEIF ISMAIL	M/KITI BAHARI	MINAZI KINDA	0796 300 202	18/2/2021	
9	IDDY ATIY	M/KITI BAHARI	MINAZI KINDA	0774 527558	18/2/2021	
10	ALI MOHAMED	M/KITI BAHARI	MINAZI MBUNDA	0655182834	18/02/2022	
11	NASSOR OTHMAN	KATIBU BAHARI	MINAZI MKINDA	0777 969662	18/02/2022	
12	AYOUB SEIF	NAHODHA	MINAZI MBUNDA	0714-059801	18/02/2022	
13	KHAMIS JUMA	TAJIRI	MINAZI MBUNDA	0658-219035	18/02/2022	
14	MATIDI ISSA	NAHODHA	MINAZI MBUNDA	0784-490488	18/02/2022	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
15	Nassoro Ali	Taxi	Magogoni	0654-506196	18/02/2022	
16	Mbwana Faki	Mhudumu	Mlango Mkuu	0657-309023	18/02/2022	
17	Ali Mtoka	Mhudumu	Magogoni	0785-375490	18/02/2022	
18	Mumini Bakari	Mhudumu	Magogoni	0713-612190	18/02/2022	
19	Mohd Ali	Mhudumu	Mlango Mkuu	0787-177016	18/02/2022	
20	Makame Hamadi	Mhudumu	Mlango Mkuu	0777-975932	18/02/2022	
21	Ali Hamadi	Mhudumu	Magogoni	0654-447486	18/02/2022	

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

SIN	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1	JOHN E. MASASI	Health & Safety Coordinator	0754 454 236		8/3/2022

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1	Maheza A. Maheza	Mkiti wa Soko	Ferry Soko ni Kigamboni	0718 934513	15/3/2022	
2	Ernesti Makahaba La	Katibu wa Soko	Ferry Soko ni Kigamboni	0654-127862 0655-952511	15/3/2022	
3	Isdori Emanuel	M/Hazina	Ferry Gokoni	0675391952	15/3/2022	
4	Massoud Omar	M/Fahari	Ferry Gokoni	0658-161824	15/3/2022	
5	Juma Ch. Nkanda	Mjumbe	Ferry	0737951817	15/3/2022	
6	Nassib Gamba	Mfanyabiashara	Ferry Gokoni	0769 864801	15/3/2022	
7	Mshelpan	Dereva Boti	Ferry Gokoni	0716195510	15/3/2022	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	MAJINA/NAME	CHEO/TITLE	SEHEMU/YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
8	MICHAEL STANISLAUS	MFANYAKAZI	FERRY SOKO LA SAMAKI	0743997779	15/3/2022	
9	AMANDA MTUNDU	MFANYAKAZI	KIGAMBONI	0656117693	15/3/2022	
10	MAULIDI J. MKERUKA	MFANYAKAZI	KIGAMBONI	0786-164493	15/3/2022	

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	MAJINA/NAME	CHEO/TITLE	SEHEMU/YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
	P. KAMUKAMUU	Ag OIM	FERRY FISH MARKET	0717445620	15/03/2022	

TASAC LETTER

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION
TANZANIA SHIPPING AGENCIES CORPORATION
TASAC

Ref No. AD.127/363/01A/29 1st April 2022

Biddinge/ Project Manager,
TANSHED Limited,
P. O. Box 31517,
Dar es Salaam.

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

Reference is made to your letter dated February 16, 2022 together with an introduction letter from Tanzania Port Authority of reference number AE.182/566/01/94 dates 26th October 2021 concerning the above heading.

2. TASAC is pleased to inform you the following area of consideration for the Environmental and Social Impact Assessment for the Rehabilitation and Strengthening of Berths 8-11 at Dar es Salaam Port.

i. The risk of destruction of submarine pipelines near Berth 8 (KOJ) that could lead to oil spills and destructions of infrastructure.
ii. Destruction and changing of Marine water quality from chemicals and heavy equipments during dredging or backfilling
iii. Destruction of Marine ecosystem and other aquatic environments due to disposal of the Ocean sediments and sands collected (disposal of dredged material from the project in the ocean.
iv. Congestions of vessels (increased shipping traffic) waiting for port services due to decelerated efficiency caused by this project.
v. Occupational risks and accidents from operations
vi. Increased marine pollution from improper disposal of waste from marine vessels waiting for shipping services and those which are executing the project.

3. Yours sincerely,

Kaimu Abdi Mkeyenge,

Director General

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WORKS AND TRANSPORT
TANZANIA SHIPPING AGENCIES CORPORATION
TASAC

In reply, please quote:

Ref No. AD.127/363/01A/27 14th March 2022

Biddings/ Project Manager,
TANSHEQ Limited,
P. O. Box 31517,
Dar es Salaam.

Re: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

Reference is made to your letter dated 18th February, 2022 together with a letter from Tanzania Port Authority with reference number AE.182/566/01/94 dated 26th October, 2021 concerning the above heading.

2. With respect to the Environmental and Social Impact Assessment for the Rehabilitation and Strengthening of Berths 8-11 at Dar es Salaam Port, TASAC would like to draw your attention to the following:

i. The risk of destruction of submarine pipelines near Berth 8 (KOJ) that could lead to oil spill and destructions of infrastructure.
ii. Destruction and changing of marine water quality due to chemicals and use of heavy equipment during dredging or backfilling
iii. Destruction of marine ecosystem and other aquatic environments due to disposal of Ocean sediments and sands collected (i.e disposal of dredged material from the project in the ocean).
iv. Congestion of vessels (increased shipping traffic) waiting for port services due to decelerated efficiency caused by the Project.
v. Occupational risks and accidents from operations
vi. Increased marine pollution from improper disposal of waste from marine vessels awaiting Port services and those which are executing the project.

3. Yours sincerely

NAHSON I. SIGALLA
ACTING DIRECTOR GENERAL

PSSSF Tower Building, 7th & 8th Floors, Plot No. 20/21, Garden Avenue/Ohio Street,
P. O. Box 969, Dar es Salaam - Tanzania, Tel: +255 222 127 314, Fax: +255 222 127 313,
Email: dg@tasac.go.tz, info@tasac.go.tz, Website: www.tasac.go.tz

FERRY FISH MARKET LETTER

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA JIJI LA DAR ES SALAAM

Kumb. Na. DCC/FFM/H.6/71/86 — 19 APRIL 2022

MWENYEKITI
KAMATI YA WADAU,
SOKO LA SAMAKI FERI.

YAH: TATHMINI YA ATHARI YA MAZINGIRA NA JAMII ZITOKANAZO NA MRADI WA UBORESHAJI WA BANDARI KWA KUPANUA NA KUIMARISHA GATI NAMBA NANE (8) HADI GATI NAMBA KUMI NA MOJA (11).

Tafadhali husika na kichwa cha habari hapo juu.

2. Nimepokea barua isyo kuwa na Kumbu Namba ya Tarehe 11 April 2022 kutoka Tansheq Limited ya kuomba kukutana na wadau wa Soko la Samaki Feri Siku ya Alhamisi tarehe 21 April 2022 Saa 5:00 asubuhi kama washauri elekezi wa maswala ya Mazingira na Jamii ili kufanya zoezi la tathmini ya athari kwa Mazingira na kijamii.

3. kwa barua hii nawaleta kwenu kuweza kuwapa ushirikiano kuandaa mazingira ya kukutana na Wadau bila kuathiri shughuli zao za Biashara.

Nawasilisha

Dennis N. Mrema
KAIMU MKUU WA SOKO
SOKO LA SAMAKI FERI

Nakala: Mwenyekiti wa Bodi
SOKO LA SAMAKI FERI

OFISI YA MKURUGENZI, 1 MTAA WA MISSION, S.L.P 20950, 11883 DAR ES SALAAM, SIMU NA 2128800, 2128805, Tovuti:www.dcc.go.tz, Barua Pepe: info@ilalamc.go.tz

MARINE POLICE UNIT CHECKLIST

CHECLIST FOR CONSULTATION

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	NO.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	Importance is to provide safe environment Sound and sustainable development by mitigating environmental impact likely to be caused by project Yes because: reduce the time taking time.
3.	How does this project relate and affect your daily operation? Elaborate
	Does not affect My daily operation because we have good Communication with TPA tower: when we want to go and come in port we make Communication so every thing we can do.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	opportunities • our citizen gets jobs on ther • our marine professional (engineers and navigators) gets job on this
5.	To what extent do your operation be affected by the project? (percentage)
	Zero percentage (0%) My daily operation not be affected by this project:
6.	What impact do you expect from this project (Negative and Positive)
	Positive Impact: this is because our port because large so increase the country economy.
7.	What are your concerns/comments on the undertaking
	Every one half year or two year the project must suppose to do berths (renew) because sand may come accumulated course of ship not passing properly when they go in port
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	This project employ more foreigners, so we suppose to employe and use our citzen in order to increase employment to our country

Name: H. A. NWAPILI Institution: POLISI MARINE ASP OFFICER IN MARINE Title:

Signature: Date: 21.4.2022

KANANDA WA POLISI
KIKOSI CHA WANAMAJI (T)
DAR ES SALAAM

TANSHEQ
TRAINING | RESEARCH | CONSULTING

P.O. Box [illegible] | Dar es Salaam, Tanzania | House No 83 | Wakulima/Ngono St Kinondoni Estate
Tel: +[illegible] | Email: [illegible] | Website: [illegible]

May 20, 2022

BRANCH MANAGER
TOWER BRANCH
P.O. BOX 2302
DAR-ES-SALAAM.

CRDB BANK PLC RECEIVED CUSTOMER EXPERIENCE TOWER BRANCH 20 JUN 2022

CRDB BANK PLC RECEIVED 20 MAY CUSTOMER EXPERIENCE TOWER BRANCH

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.5 m below CD, and constructing a new multipurpose berth at Gerezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of Berth 11 to 16.5 m below CD; improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11, to 14.5 m below CD.

The proposed activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentally friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task.

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anamary Philemon
Biddings/Projects Manager

CRDB BANK PLC RECEIVED 1- JUN CUSTOMER EXPERIENCE TOWER BRANCH

TANSHEQ
TRAINING | RESEARCH | CONSULTING
P.O. Box 2517 | Dar es Salaam, Tanzania | House No 83 | Wakulima /Ngano St Mwenge Estate
Tel: +255 755 100 105 | Email: info@tanshec.co.tz | Website: www.tanshec.co.tz

May 20, 2022

Managing Director
NMB PLC
P.O.Box 9213
DAR ES SALAAM.

NMB
NMB BANK PLC
Logistics Hosting - Head Office Dar es Salaam
20 MAY 2022
RECEIVED

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.5 m below CD, and constructing a new multipurpose berth at Gerezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of berth 11 to 15.5 m below CD; improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11, to 14.5 m below CD.

The projected activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentally friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task.

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anamary Philemon
Biddings/Projects Manager

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

NO.	NAME	TITLE	INSTITUTION	POSTAL ADDRESS AND CONTACTS	DATE	SIGNATURE
01	Deodatus Kwaiza	S. Engineer	TANROADS-HQ	0683981113	01/07/2022	

TANSHEQ
TRAINING RESEARCH CONSULTING

Plot No. 83, House No. RD 2/22, Wekulima Road, Hana
Estate, Kinondoni, P. O. Box 31517,
Dar es Salaam
Mobile
: +255735 100 105
E-mail: info@tansheq.co.tz;
Website: www.tansheq.co.tz

DATE: 25 May 2022

Manager
Marine Rail Repair Yard
P.O Box 1565
Dar es-Salaam

Received
A.E. Lema
25/05/2022

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.5 m below CD, and constructing a new multipurpose berth at Gerezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of Berth 11 to 15.5 m below CD; improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11, to 14.5 m below CD.

The proposed activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentaly friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anamary Philemon
Biddings/Projects Manager

TANSHEQ
TRAINING RESEARCH CONSULTING

Plot No. 83, House No. RD 2/22, Wakulima Road, Hanan
Estate, Kinondoni, P. O. Box 31517,
Dar es Salaam
Mobile
+255735 100 105
E-mail: info@tansheq.co.tz;
Website: www.tansheq.co.tz

DATE: 1 June 2022

REGIONAL MANAGER,
WHITE TEMEES,
P.O. BOX 15917,
DSM

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.6 m below CD, and constructing a new multipurpose berth at Gorezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of Berth 11 to 15.5 m below CD; Improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11, to 14.5 m below CD.

The proposed activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentally friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task.

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anemary Philemon
Biddings/Projects Manager

Received
Sands
01/06/2022

S/N	NAMEJINA	CHEOTITLE	CONTACTS/MAWASILIANO	SAHIHISIGNATURE	DATE/TAREHE
1	Eng Simon Sekuwa	Principal Civil Engineer	0784-292058 Simon.sekuwa@nhif.or.tz		9/6/2022

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF LANDS, HOUSING AND HUMAN SETTLEMENTS DEVELOPMENT

Tel.: +255 2629633/09/13/14
Fax :+255 262 963 316
E-Mail: km@ardhi.go.tz
Website: www.ardhi.go.tz



The Government City,
Mtumba ,
P.O. BOX 2908,
***40477*-DODOMA.**

In reply please quote:

06 th June, 2022

Ref. No. CB.176/351/02 A/7

Eng. Anamary Philemon,
Bidding/Projects Manager,
P.O Box 31517,
DAR ES SALAAM.

Re: **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 6-7 AT DAR ES SALAAM PORT**

Please refer to the above subject.

2. Reference is made to your letter without a Ref. No. dated 27th May, 2022.

3. As far as the Land Sector is concerned, what is important is to ensure that the client's ownership of land is clear as well as the use of the piece of land is in accordance with the site plan. (Both a title deed and a Master plan should be in place). Attached to this letter is checklist for consultation.

Thank you for your cooperation.

Immaculata M. Senje
For: **PERMANENT SECRETARY**

CONSULTATION REGISTER FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

S/NO	NAME/JINA	CHEO/TITLE	SEHEMU YA KAZI/WORK PLACE	CONTACTS/MAWASILIANO	DATE/TAREHE	SAHIHI/SIGNATURE
1.	ITUMACHILATA SENJE	ADPPD	MIN. OF LANDS HQ-DODOMA	07-84 844 976	6/6/2022	

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
	Maulid Nkorgolo	Economist	+255716669988		22/07/2022

TANSHEQ
TRAINING RESEARCH CONSULTING

Plot No. 83, House No. RD 2/22, Wakulima Road, Hananasif Estate, Kinondoni, P. O. Box 31517,
Dar es Salaam
Mobile : +255735 100 105
E-mail: info@tansheq.co.tz;
Website: www.tansheq.co.tz

DATE 22nd July 2022

Chief Executive,
Tanzania Forest Services (TFS) Agency,
P.O. Box 40832,
Nyerere Road, Mpingo House,
Dar es Salaam, Tanzania

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.5 m below CD, and constructing a new multipurpose berth at Gerezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of Berth 11 to 15.5 m below CD; improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11. to 14.5 m below CD.

The proposed activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentally friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anamary Philemon
Bids/Projects Manager

TANSHEQ LIMITED P.O.Box 31517 DAR-ES-SALAAM

CHIEF EXECUTIVE
TANZANIA FOREST SERVICES AGENCY (TFS)
25 JUL 2022
RECEIVED

TANSHEQ

CHECKLIST FOR CONSULTATION

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	YES I attended one of presentation of the project.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	YES. ESIA is a requirement by the Environmental Act 2004 and EIA act/ regulation 2005. so it is important to be undertaken, it is a management tool
3.	How does this project relate and affect your daily operation? Elaborate
	It does not affect TFS daily operation in any way.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	It is a positive project. and it will increase the intake of Large and bigger Ships hence improving the efficiency of the Port.
5.	To what extent do your operation be affected by the project? (percentage)
	Not at all there will be effect on TFS side.
6.	What impact do you expect from this project (Negative and Positive)
	It will contribute to the improvement of development of the Port hence increased income of the National at large.
7.	What are your concerns/comments on the undertaking
	It should be done accordingly and comply with the existing Laws and legislations.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	Adhere to the Laws and legislations.

Name: John E. Rulaguaba Institution: TFS Title: PCO

Signature: Rulaguaba Date: 1/08/2022

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1.	John E. Rwitagwaka	PCO	0752-904808		01/03/22

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1	ESTHER [illegible]	OHT	0755569697		04 AUG 2022

FILLED CHECKLIST KINONDONI MUNICIPAL COUNCIL

CHECKLIST FOR CONSULTATION

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how YES.
	It is for rehabilitation of the berth 8 - 11 at Dares salaam Port.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	-through mitigation measure will help to reduce the im pact of project on the environment.
3.	How does this project relate and affect your daily operation? Elaborate
	- It will make easier for Kigamboni municipal to work in that area after knowing the environmental issues around the project.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	- Employment opportunities.
5.	To what extent do your operation be affected by the project? (percentage)
	- Not affected by the project.
6.	What impact do you expect from this project (Negative and Positive)
	Negative: Accelerate Landslide Positive: Enhance recreation activities through construction of concrete wall. : Create employment opportunities.
7.	What are your concerns/comments on the undertaking
	- Concrete wall should be constructed in order to avoid landslide
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	- All mitigation measures should be followed in all pha ses of the project to make an environmental and social friendly.

Name: J. Mauno Institution: Kigamboni Mc Title: Municipal Env. Hx Offr

Signature: Date: 08/Dec/2022

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAINI/SIGNATURE	DATE/TAREHE
1	Juvenalis B. Maeura	MEMO	0716 240695	Mae	03/08/2022

FILLED CHECKLIST KIVUKONI STREET

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	Yes, I know it through my frequent inspections as I see them drilling.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	Yes, the study is important as it will help minimize impacts that would occur.
3.	How does this project relate and affect your daily operation? Elaborate
	My operations won't be affected by the project.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	It will provide income to the surrounding people mostly the food vendors as the workers will purchase food from them.
5.	To what extent do your operation be affected by the project? (percentage)
	My operations won't be affected by the project.
6.	What impact do you expect from this project (Negative and Positive)
	I expect short term impacts such as shifting of the fishes during project implementation.
7.	What are your concerns/comments on the undertaking
	How will they help us in development as in provision of working tools like printers in our offices and they should keep on seeking for our opinions on implementation of the project.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	They should help in improving surrounding environment for the community people.

Name: BLAWANDA LUCAS MLYA (A) Institution: KIVUKONI STREET Title: CHAIR PERSON

Signature: ..... Date: 04/08/2022

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
	BLANDINA L. MALLOYA	CHAIR PERSON	0713772823		04/08/2026
	CARDLIDE .R MEENDA	MEMBER	0713713483		04/08/2026

FILLED CHECKLIST MCHAFUKOGE WARD

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	Yes, I attended one of the project's presentation.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	Yes, It will help in minimizing impacts to the environment and community.
3.	How does this project relate and affect your daily operation? Elaborate
	It does not affect my daily operations.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	Large ships will be able to arrive thus the goods will also be arriving in time hence increase country's economy.
5.	To what extent do your operation be affected by the project? (percentage)
	The project won't affect my daily operations.
6.	What impact do you expect from this project (Negative and Positive)
	Positive impact as it will provide source of income to our people and mostly the food vendors.
7.	What are your concerns/comments on the undertaking
	The project should not take a long period of time and should be involved in ongoing projects.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	The project is of importance as it will help large ships to arrive and goods will be arriving on time.

Name: ZAINA MWASHITEE Institution: MCHAFUKOGE WARD Title: WEO

Signature: Rwenda Date: 4/8/2022.

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
	ZAINA MWASHITEB	~~ENE~~ O	0655-269080	Zuenda	4/8/2022
	MUHAT KYOBOHA	PCDO	0753-461016		4/8/2022

TEMEKE MUNICIPAL COUNCIL FILLED CHECKLIST

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	Yes, through an ESIA process
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	- through the mitigation measure will help to reduce the impacts.
3.	How does this project relate and affect your daily operation? Elaborate
	- It will make easier for the municipal to work in that area after knowing the environmental issues around the project area
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	- Create employment opportunities
5.	To what extent do your operation be affected by the project? (percentage)
	- Not affected by the project.
6.	What impact do you expect from this project (Negative and Positive)
	Positive: creates channel of works. Negative: Loss of biodiversity through dredging process.
7.	What are your concerns/comments on the undertaking
	- Projat should follow all the ESIA study instead of ending to ESIA certificate.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	- proponents should cooperate with all municipals - Mitigation measures should be followed during and after project implementation.

Name: Dominic Solomon Institution: TPA Title: MEMO

Signature: Date: 03/07/2026

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

S/N	NAME/JINA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1	[illegible]	MEMO-TRC	0713 94 27 20	[signature]	05/08/2022

TRC FILLED CHECKLIST

CHECKLIST FOR CONSULTATION

S/N	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	Yes, It's a project which improves the Tanzania's port & is conducted under TPA.
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	ESIA will identify the the anticipated specific impacts and propose the mitigation measures to be taken to offset or minimize the impacts caused by the project.
3.	How does this project relate and affect your daily operation? Elaborate
	TRC are transporting cargo from port to central area there are if the construction is carried out there might be some disturbance during the transportation of the freights.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	The ESIA provides input to the feasibility study and design assisist in development of mitigation measures of the identified risks, opportunities & impacts.
5.	To what extent do your operation be affected by the project? (percentage)
6.	What impact do you expect from this project (Negative and Positive)
	• The transportation of freights may decrease if disturbance occurs • After construction, massive cargo will be transported through our SGR Line.
7	What are your concerns/comments on the undertaking
	The undertaking will play a significant role to provide the guidance on how to comply with the provided ESMP as well as other environmental safeguard policies.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	Should comply with the proposed mitigation measures to enhance the foreseen benefits that the project will provide environmentally, socially & economically.

Name: ERKAEL MHURU Institution: E&S-Team Title: Environmentalist

Signature: [signature] Date: 5/8/2022

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

S/N	KAMILIWA	CHEO/TITLE	CONTACTS/MAKABILIANO	SAINI/SIGNATURE	DATE/TAREHE
1	ERICA EL MANUEL	HSE OFFICER	0759 149098		5/8/2022

DAR ES SALAAM CITY COUNCIL FILLED CHECKLIST

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	I don't know
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	- Yes - It will advice on how to handle/control negative social & environmental impact of the project
3.	How does this project relate and affect your daily operation? Elaborate
	- If the project will not well ~~workmanship~~ supervised could effect my daily operation ~~out~~ which based on environmental & Social Management.
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	- Is Good Project as it is going to provide employment to people, also will increase Government Revenue.
5.	To what extent do your operation be affected by the project? (percentage)
	~~Dust~> - Dust - Noise - Solid waste - Positive - Employment - Revenues (City Government)
6.	What impact do you expect from this project (Negative and Positive)
	- Improvement of Infrastructure
7.	What are your concerns/comments on the undertaking
	- You should consider all rules, laws and guidelines governing the project
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	- Adhere solid waste Management - PPE should be used accordingly

Name: SIKUOHAMA MAMARA Institution: DCC Title: EHO

Signature: [signature] Date: 16/8/2022

Eg: CITY DIRECTOR
DAR ES SALAAM CITY COUNCIL

S/N	NAME/JINA	CHEDITITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1.	Sikudhani Mwandoro	ESIA	0779616[illegible]		16/2/2022

TANSHEQ

TRAINING RESEARCH CONSULTING

Plot No. 83, House No. RD 2/22, Wakulima Road, Hanad Estate, Kinondoni, P. O. Box 31517,
Dar es Salaam
Mobile
: +255735 100 105
E-mail: info@tansheq.co.tz;
Website: www.tansheq.co.tz

DATE: 25 May 2022

Manager
Marine Park Reserve Unit
P.O. Box 7565
Dar es-Salaam

Received
M.E. Luna
25/05/2022

REF: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DARES SALAAM PORT

Refer to the mentioned heading above.

Tanzania Ports Authority (TPA) as an Implementing Agency of the Governmental of the United Republic of Tanzania, received a loan from the International Development Association (IDA) towards the cost of the Dar es Salaam Maritime Gateway Project (DMGP).

The DMGP has been developed as a multi-development partner initiative to improve the effectiveness and efficiency of the Port of Dar es Salaam. This improvement will be achieved by Deepening and strengthening of existing Berths 1 to 7 to 14.5 m below CD, and constructing a new multipurpose berth at Gerezani Creek; deepening and widening the entrance channel and turning basin in the port to the end of Berth 11 to 15.5 m below CD; improving the rail linkages and platform in the port; and deepening and strengthening of existing Berths 8-11, to 14.5 m below CD.

The proposed activities for the project may pose impacts to the environment and social set up. According Environmental Management Act of 2004 and its respective regulations of 2005 as amended in 2018 requires TPA to undertake the Environmental and Social Impact Assessment (ESIA) with the intention of collecting project baseline information, impact identification and development of mitigation measures and involving stakeholders so as to make the project environmentally friendly. With that regard TPA has hired Tansheq Limited a registered firm of Environmental Experts to carry out this task.

Tansheq has identified you among the key stakeholders and hence we are looking for your queries, comments, suggestions, concerns and any other input to the study we are conducting for the proposed project activities so as to make the project environmental viable.

Thank you in advance for your cooperation on this.

Yours truly,

Eng. Anamary Philemon
Biddings/Projects Manager

ENVIRONMENTAL AND SOCIAL ENVIRONMENTAL INPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENHENING OF BEATRHS 8-11 AT DAR ES SALAAM PORT

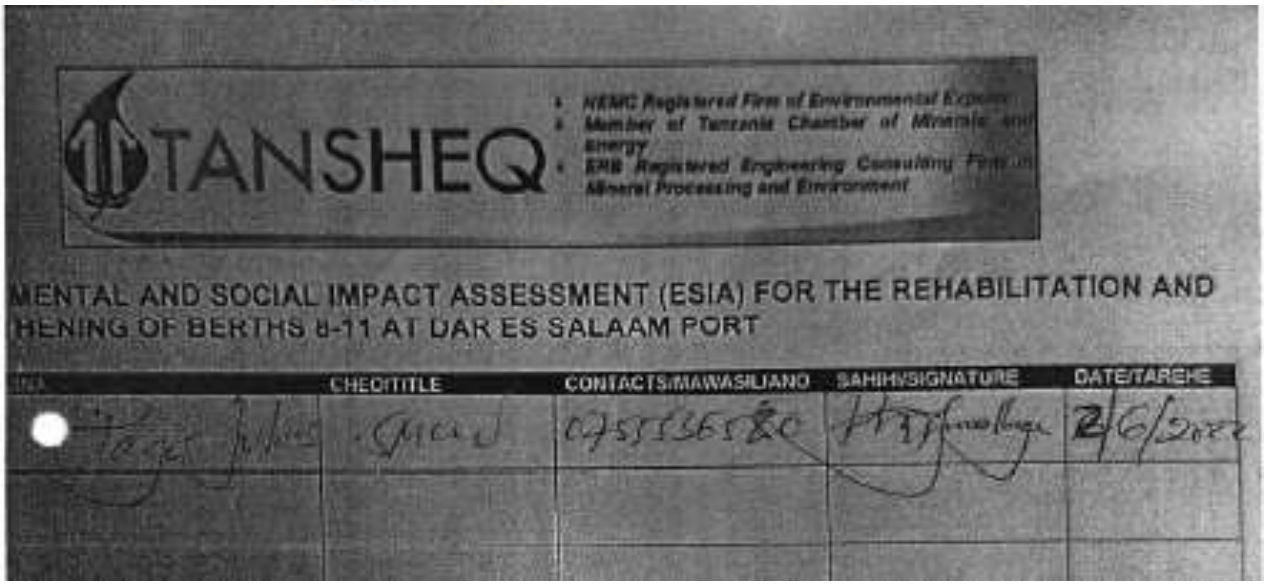
CHECKLIST FOR CONSULTATION-TANSHEQ

S/N	QUESTION AND RESPONCE
1	Do you know the proposed/undertaking project? If yes, how
	Yes, Marine Parks and Reserves Unit (MPRU) is aware on related project when was informed by NEMC Director general through letter date 10th January 2020. Letter with Reference No CB. 145/ 208/245/ titled "Comments in the Technical Advisory Committee for the Dredging of the Entrance Channel and Port Turning Basin at Dar Es Salaam Port, Tanzania". However, under this project MPRU was not consulted during Scoping stage.
2	What is the importance of Environmental and Social Impact assessment and do you think this study will help in reducing impacts of the projects to the environment? If yes, Elaborate
	The goal of impact assessment is to bring about a more ecologically, socio-culturally and economically sustainable and equitable environment. Impact assessment, therefore, promotes community development and empowerment, builds capacity, and develops social capital (social networks and trust). This study will help reducing impacts of the project if and only if its findings are exhaustive and its respective recommended mitigation measures are adequately implemented.
3	How does this project relate and affect your daily operation? Elaborate
	MPRU is responsible for management of the Dar es Salaam marine reserves which contains most sensitive and fragile ecosystem particularly coral reef which is in the influence of project area. The proposed dredging for harbour expansion activities possesses a serious risk to these organisms in terms of siltation, sedimentation and sediment re suspension emanating from dispersion of fine sediments. Scoping report pg 49 clearly account on some corals, benthic fauna, sea grasses and seaweeds have been cited about 800m from the dredging site as shown in Figure *5-3* therefore highly prone to effects of the activity
4	What do you think of this project? Mention any opportunities to be generated by executing this undertaking?
	Opportunities to be generated by executing this undertaking is employment to community/business promotion, direct employment in the activities to Tanzanian experts eg those in ESIA and income gain to the Nation through increased capacity of the Dae es Salaam port
5	To what extend do your operations be affected by the project? (Percentage)
	If the potential risk explained at number 3 will be under addressed. Project is likely to cause a detrimental effect by 100%. Disposal sites for dredged material should account for the sustainability of the marine ecosystem and option six remain best option in term of distance from the protected areas as well as its depth. Sediments resuspension is minimized.

6	What impact do you expect from this project (positive and negative)
	More on negative to the environment if EIA is not exhaustive. Scoping report does not exhaust on ecological part eg diversity to be assessed by snorkelling among methods. This is inadequate since the depth of the activity is much deeper over 10meter only SCUBA can be effective adopting Underwater Visual Census (UVC). Based on experience of the current similar project of the Dredging of The Entrance Channel and Port Turning Basin at Dar Es Salaam Port. Serious sedimentation has been witnessed causing to cancellation on monitoring programme at Makatube Island Marine Reserve due to poor visibility/water darity with less 1ft visibility which is caused by dredging activities. Subsequently it affects the ecosystem in totality where by coral reef are filter feeder their feeding mechanism in affected and photosynthesis process generally is affected due to limited light penetration in the water column
7	What are your concern/comments on the undertaking?
	1. ESIA should be exhaustive to account on mitigation of the sedimentation which is expected as explained above 2. Ecological baseline should be exhaustive on Diversity baseline supplementing with SCUBA in deeper water as well as adopting metabarcoding surveys for both flora and fauna 3. ESIA should indicate recommended concertation/status for the nutrients, physiochemical parameters, hydrocarbon etc against current status/ baseline
8	What are your suggestions and advice for the project implementation team in order to make it environmentally and social friendly the undertaking?
	Team should act professionally adhering to the above comments/concerns

Name Pagu Julius: Institution MPRU. Title Senior Marine Conservation Warden

Signature .....Date 2nd June 2022



OCCUPATIONAL HEALTH AND SAFETY AUTHORITY (OSHA)

CHECLIST FOR CONSULTATION

SN	QUESTION AND RESPONSE
1.	Do you know the proposed/undertaking project? If yes, how
	Yes - During consultation
2.	What is the importance of Environmental and Social Impact Assessment and do you think this study will help in reducing impacts of the project to the environment? If Yes, Elaborate
	Yes, It will help in reducing impacts to the environment
3.	How does this project relate and affect your daily operation? Elaborate
	- It will increase the section number of the area To be inspected
4.	What do you think of this project? Mention any opportunities to be generated by executing this undertaking
	- It will increase the national income
5.	To what extent do your operation be affected by the project? (percentage)
	- Not affected by the project
6.	What impact do you expect from this project (Negative and Positive)
	Positive: Employment opportunities, it will increase the quantity of ship Negative: Destruction of aquatic organism and culture.
7.	What are your concerns/comments on the undertaking
	- Must obey the Occupational Health and Safety Act.
8.	What are your suggestions and advice for the project implementation team in order to make it environmental and social friendly
	- Risk assessment should be well conducted so as to make environmental and social friendly.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE REHABILITATION AND STRENGTHENING OF BERTHS 8-11 AT DAR ES SALAAM PORT

S/N	MAWELEZA	CHEO/TITLE	CONTACTS/MAWASILIANO	SAHIHI/SIGNATURE	DATE/TAREHE
1	ESTHER G SHIUMA	DHI	0755563697		04 Aug 2025

FIRE AND RESCUE FORCE UNIT

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA MAMBO YA NDANI YA NCHI
JESHI LA ZIMAMOTO NA UOKOAJI

Simu Namba: 255-22-2861384
BaruaPepe: temeke@frf.go.tz

Ofisiya Kamanda (M) Temeke
Jeshi la Zimamoto na Uokoaji
15 Barabara ya Mchicha
S. L. P.45759
DAR ES SALAAM.

Unapojibu tafadhali taja:

Kumb Na. BCE 150/397/01/147 **06 Desemba, 2023**

Mkurugenzi Mkuu,
Tansheq,
S.L.P 31517,
DAR ES SALAAM.

YAH: MAELEKEZO YA JESHI LA ZIMAMOTO NA UOKOAJI KUHUSU USHAURI WA KIMAZINGIRA WA BANDARI YA DAR ES SALAAM

Tafadhali somo hapo juu na barua yako isiyokuwa na Kumbukumbu Namba ya **tarehe 06 Desemba, 2023** vyahusika.

2. Aidha, kwenye barua yako tajwa uliutambulisha mradi tajwa ambapo umeomba kupatiwa maoni yetu yahusuyo tahadhari na kinga dhidi ya majanga ya moto kwenye mradi huo.

3. Bandari ya Dar es Salaam imekaguliwa na kupatiwa Cheti cha Usalama wa Moto (Fire Safety Certificate), hivyo imekidhi matakwa ya usalama wa moto kwa kiasi kikubwa isipokuwa kuna mapungufu yafuatayo ambayo yanatakiwa kufanyiwa kazi:
    i. Wafanyakazi wote wa Bandari hiyo wanatakiwa wapatiwe mafunzo kutoka Jeshi la Zimamoto na Uokoaji ili waweze kukabiliana na majanga ya moto pindi yatakapotokea.

    ii. Miundombinu ya Zimamoto ya bandari inatakiwa kufanyiwa ukaguzi na ukarabati mara kwa mara ili iwe timamu wakati wote.

    iii. Njia za kupita zilizopo bandarini ziwe wazi wakati wote ili kuwezesha magari na mitambo ya kutoa huduma za dharura kuweza kupita kwa urahisi wakati wa dharura.

Wako katika ujenzi wa Taifa.

Maria D. Lusoga - **ASP.**
KAMANDA (M) TEMEKE
JESHI LA ZIMAMOTO NA UOKOAJI

APPENDIX III: OIL SPILL CONTINGENCY PLAN

1. INTRODUCTION

The Dar es Salaam Port is Tanzania's principal maritime gateway, handling petroleum products, bulk cargo, containers, and general cargo. Given the nature and scale of port operations, there is a risk of accidental oil spills from vessels, pipelines, bunkering activities, storage facilities, and construction or maintenance works. This Oil Spill Contingency Plan (OSCP) has been prepared for the Tanzania Ports Authority (TPA) to ensure timely, coordinated, and effective response to oil spill incidents within Dar es Salaam Port and adjacent marine environments.

This OSCP is aligned with national legislation, International Maritime Organization (IMO) conventions, and the IFC Environmental, Health and Safety (EHS) Guidelines for Ports, Harbors, and Terminals.

2. OBJECTIVES OF THE PLAN

The objectives of this Oil Spill Contingency Plan are to:

- Prevent oil spill incidents where possible;
- Minimize environmental, social, and economic impacts of oil spills;
- Define clear roles, responsibilities, and reporting lines;
- Ensure rapid and effective response to oil spill incidents;
- Protect sensitive marine and coastal environments;
- Comply with national and international regulatory requirements.

3. SCOPE AND APPLICABILITY

This plan applies to:

- All TPA-managed port areas within Dar es Salaam Port;
- Marine waters within port limits and immediate adjacent areas;
- All vessels, contractors, tenants, and service providers operating in the port;
- Construction, rehabilitation, dredging, and operational activities.

4. LEGAL AND REGULATORY FRAMEWORK

The OSCP is guided by the following instruments:

- Environmental Management Act, Cap. 191 (Tanzania);
- National Oil Spill Contingency Plan (Tanzania);
- Merchant Shipping Act;
- Occupational Safety and Health Act;
- MARPOL 73/78 (Annex I);
- OPRC Convention (1990);
- IFC EHS Guidelines for Ports, Harbors, and Terminals;
- Relevant TPA Environmental and Safety Policies.

5. POTENTIAL SOURCES AND SCENARIOS OF OIL SPILLS

Potential oil spill sources include:

- Vessel collision, grounding, or sinking;
- Bunkering and refueling operations;

- Pipeline or hose failure;
- Storage tank leaks;
- Loading and unloading operations;
- Construction and maintenance equipment;
- Illegal discharges or human error.

Spill scenarios are categorized as:

- Tier 1: Small, operational spills manageable with port resources;
- Tier 2: Medium spills requiring national support;
- Tier 3: Large spills requiring regional or international assistance.

6. SENSITIVE AREAS AND RESOURCES AT RISK

Sensitive receptors include:

- Coral reefs and seagrass beds;
- Mangroves along the coastline;
- Fish breeding and nursery areas;
- Beaches and recreational areas;
- Ferry routes and fishing grounds;
- Port infrastructure and navigation channels.

A sensitivity map shall be maintained and updated by TPA.

7. ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

7.1 Incident Command Structure

TPA shall implement an Incident Command System (ICS) for oil spill response.

Key Roles:

- Incident Commander: TPA Port Manager or designated senior officer;
- Operations Team: Spill containment and recovery;
- Planning Team: Situation assessment and response planning;
- Logistics Team: Equipment, personnel, and supplies;
- Safety Officer: Health and safety oversight;
- Liaison Officer: Coordination with authorities and stakeholders.

7.2 Responsibilities

- **TPA**: Overall coordination, notification, and reporting;
- **Contractors/Vessel Operators**: Immediate reporting and first response;
- **NEMC**: Regulatory oversight and compliance;
- **Marine Police / Navy**: Security and access control;
- **Local Authorities**: Community coordination if required.

8. OIL SPILL RESPONSE PROCEDURES

8.1 Detection and Reporting

All spills must be reported immediately to the TPA Control Room. Information to be provided includes:

- Location and time of spill;
- Type and estimated quantity of oil;
- Source of spill;
- Weather and sea conditions.

8.2 Initial Response Actions

- Ensure safety of personnel;
- Stop the source of spill if safe to do so;
- Deploy containment booms;
- Protect sensitive areas;
- Notify relevant authorities.

8.3 Containment and Recovery

- Use floating booms to contain spills;
- Apply skimmers for oil recovery;
- Use absorbent materials for small spills;
- Temporary storage of recovered oil in approved containers.

8.4 Use of Dispersants

Use of dispersants shall only be considered as a last resort and subject to approval by competent authorities.

9. HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION

- Mandatory use of PPE during response;
- Risk assessments before response actions;
- Waste management for recovered oil and contaminated materials;
- Prevention of secondary pollution.

10. COMMUNICATION AND NOTIFICATION

Notification shall be made to:

- NEMC;
- Marine Police;
- Port users and operators;
- Local government authorities (if shoreline impact is likely).

Public communication shall be managed by TPA's designated spokesperson.

11. TRAINING, DRILLS, AND AWARENESS

- Annual oil spill response training for TPA staff;
- Induction training for contractors and tenants;
- Table-top and field drills at least once per year;
- Lessons learned documented and integrated.

12. EQUIPMENT AND RESOURCES

TPA shall maintain:

- Oil containment booms;
- Skimmers;
- Absorbent materials;
- Storage containers;
- Personal protective equipment;
- Response vessels.

An inventory list shall be reviewed annually.

13. PLAN MAINTENANCE AND REVIEW

This OSCP shall be:

- Reviewed annually;
- Updated after major incidents or drills;
- Revised when port operations or risks change.

14. CONCLUSION

This Oil Spill Contingency Plan provides a structured and effective framework for preventing and responding to oil spills at Dar es Salaam Port. Effective implementation of this plan will protect the marine environment, port infrastructure, workers, and surrounding communities.

APPENDIX VII: SCREENING DECISION

THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE
UNION AND ENVIRONMENT

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL
(NEMC)

In reply please quote:

Ref: EC/EIA/2022/5138 **Date: 20/1/2022**

Director General,
Tanzania Ports Authority,
P. O. BOX 9184,
DAR ES SALAAM.

RE: TERMS OF REFERENCE (ToR) FOR THE PROPOSED REHABILITATION AND STRENGTHENING OF RERTHS 8-11 AT DAR ES SALAAM PORT MIVINJENI MTAA, KURASINI WARD IN TEMEKE MUNICIPALITY DAR ES SALAAM REGION

Reference is made to the heading above.

We acknowledge receipt of scoping report and Terms of References (ToR) for undertaking Environmental Impact Assessment (EIA) for the above-mentioned project.

The Council has reviewed the ToR and found that they are generally adequate and thus can be used to guide the EIA study. Therefore, we emphasize that you undertake the EIA study, prepare the EIA report and submit to the National Environment Management Council according to the requirements of EIA and Audit Regulations, 2005. Furthermore, the following should be taken into account to improve the ToR as well as the EIA report:

i. The submitted EIA report should be attached with land ownership documents with compatibility to the land use of the area;
ii. Detailed information of the solid, liquid, hazardous and storm water generated and its management;
iii. Describe all issues pertaining to occupational health and safety of workers during the project implementation;
iv. Detailed description on the impacts and management of marine and intertidal ecosystems

Headquarters, 35 Regent Street, P.O Box 63154, 11404 Dar es Salaam, Phone: +255 22 2774852; +255 22 2774869; +255 0713 608930/0735 608930 Fax: +255 22 2774901 Email Address: dg@nemc.or.tz
Website: www.nemc.or.tz

v. All Experts involved in the EIA study should sign the final EIA report with their original signatures and be indicated whether He/she is a registered or non-registered environmental expert, Failure to observe this requirement will constitute to an offense as per EMA, 2004 Cap 191;

vi. Detailed stakeholder consultations including but not limited to Ministry of works and Transport, Tanzania Shipping Agency Company (TASAC) Temeke Municipal Council, Kurasini Ward, Mivinjeni Mtaa, and project neighbors. Attach all letters that will be sent to the authorities for consultations, Pictures taken during consultation meetings, names and original signatures. Their views and concerns should be responded by the developer and included in the report.

vii. Provide the detailed site layout plan which shows the distribution of project components and proportion at the project site;

viii. The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project;

ix. Emergence preparedness and response plan to ensure the Health and safety of the workers and neighboring communities during the project life cycle and

In this regard, you will be required to submit ten (10) hard copies of EIA report and online soft copy for review. Upon submission of the EIA report, the Council will arrange for a Technical review of the documents by the Technical Advisory Committee (TAC) prior to this review, representative of the Council will visit the project site to inspect and verify the adequacy of the EIA with respect to the proposed project. As you submit the EIA report, you will be required to pay the Council a review cost as indicated in the Invoice which has been generated by the online system

We look forward to your cooperation on this matter.

H. T. Kissiwa

For: DIRECTOR GENERAL

Cc: Tansheq,

P.O. BOX 31517,

Dar es Salaam.

APPENDIX VIII: RELEVANT PERMITS

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF LANDS, HOUSING AND HUMAN SETTLEMENTS DEVELOPMENT

Telegrams: LANDS
Telephone: 2121241-9
In reply please quote:
Ref. No. LR/T 195970

LAND REGISTRY,
P.O Box 1191,
Dar es salaam.
Date: 19 Jan, 2024

TANZANIA PORTS AUTHORITY
P.O Box 9184 DAR ES SALAM
Dar-Es-Salaam

Sir/Gentlemen/Madam,

RE: TITLE NO: 195970 LAND OFFICE NO: 1072194
PLOT NO. 1/2 BLOCK – AT CENTRAL AREA

I have the honour to enclose herewith duplicate of the Certificate of Title Numbered as above please.

REGISTRAR OF TITLES

Copy to: Commissioner for Lands
Your LD File No: 312662 refers

Date Issue: .....
Title Number: 195970
Land Office Number: ~~180667~~ 1072194
Land: PLOT No. 1/2 CENTRAL AREA

Term: NINETY NINE YEARS

Land Form 23 A.*

TANZANIA

THE LAND ACT 1999
(NO. 4 OF 1999)

CERTIFICATE OF OCCUPANCY

(Under Section 29)

Date Issue: .....

Title Number: 195970

AVL **Land Office Number:** ~~180667~~ 107219 4

Land: PLOT No. 1/2 CENTRAL AREA

Term: NINETY NINE YEARS

TITLE No. 195970
REGISTERED ON 19/1/24
AT 10:50 A.M.
Senior Title Registrar

Land Form No. 22

TANGANYIKA STAMP DUTY ACT
Stamp Duty Shs: 9604501/= Paid
On Original Receipt No. 92400422459 6638
of 04/01/2024
Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA

TANGANYIKA STAMP DUTY ACT
Stamp Duty Shs: 100/= Paid
Receipt No: 92400422459 6638
of 04/01/2024
Stamp Duty Officer

THE LAND ACT, 1999
(NO. 4 OF 1999)

CERTIFICATE OF OCCUPANCY

(Under Section 29)

Title No. 195970
L. O. No. ~~98867~~ 1072194
L.D.312662

The 17th day of January Two thousand and Twenty Four

THIS IS TO CERTIFY that **TANZANIA PORTS AUTHORITY established under the Tanzania Authority Act No. 7 of 2004** of P.O. Box 9184, **DAR ES SALAAM** (hereinafter called "the Occupier") **is entitled to the Right of Occupancy** (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the Land") for a term of **Ninety nine (99)** years from the first day of **October, Two Thousand and Twelve** according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution thereof or amendment thereof and to the following special conditions:-

1. The Occupier having paid rent up to the thirtieth day of June, **2023**; shall hereafter pay rent of shillings **One Billion Nine Hundred Nineteen Seven Hundred Thousand And One, Three Hundred And Fifty (Tshs.1, 919,701,350/=) only** a year in advance on the first day of July in every year of the term without deduction PROVIDED that the rent may be revised by the Commissioner for Lands.

2. The Occupier shall: -

(i) Be responsible for the protection of all beacons on the land throughout the term of the Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Director responsible for Surveys and Mapping.

(ii) Do everything necessary to preserve the environment and protect the soil and prevent soil erosion on the land and do all things which may be required by the authorities responsible for environment and to achieve such objective.

(iii) Building to be in permanent materials.

(iv) Building plans to be submitted to the **Ilala Municipal Council** within six months from the commencement of the Right.

(v) Building construction to begin within six months after approval of the plans.

(vi) Building to be completed within thirty six (36) months from the day of commencement of the Right.

3. The shall further

(i) Make and Maintain of the land throughout the term adequate arrangement s for water supply, drainage and disposal of trade refuse and effluent to the satisfaction of the Authority.

(ii) Make and keep all buildings on the land rat-proof and carry out such measures as the Medical Officer of Health for the Authority may require for this purpose.

(iii) Provide and maintain on the land such ablution facilities and take and maintain such hygienic measures as may be required by the said Medical Officer of Health.

(iv) Fence the land with a good quality fencing, car parking spaces shall be provide as required by the Authority. Loading unloading facilities shall be provided within the boundaries of the land.

4. **USER:** The land shall be used for **Transportation, Communication and Microwave Towers** purposes only. Use Group **'P'** Use class **(d)** as defined in the **Town and Country Planning Act, No.8, 2007** (Use group and Use Class) Regulations **2018.**

5. The Occupier shall not assign the Right within three years of the date hereof without the prior approval of the Commissioner.

6. The Occupier shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of all premia, taxes and dues prescribed in connection with that disposition.

7. The President may revoke the right for good cause or in public interest.

DAR ES SALAAM CITY

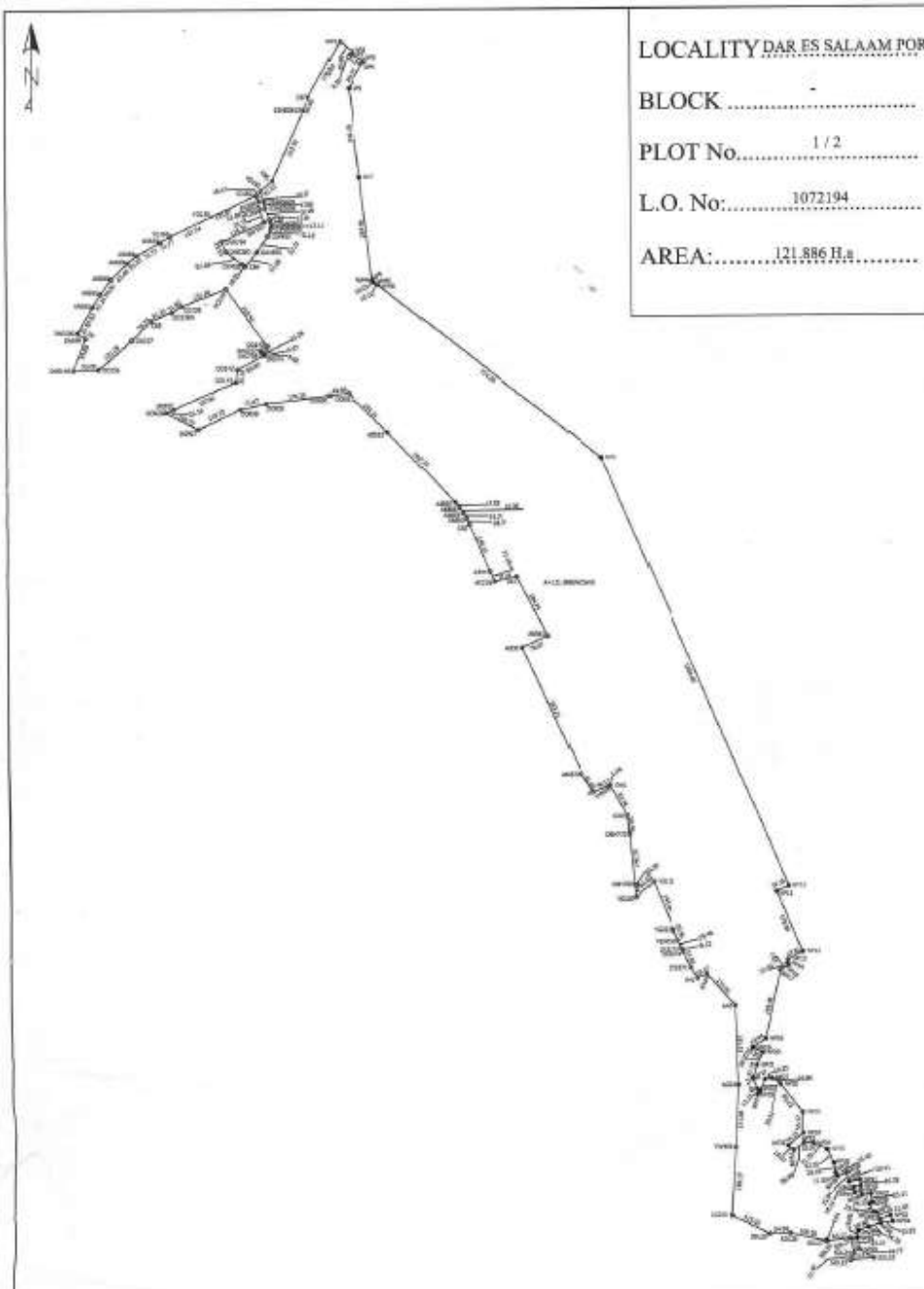
LOCALITY DAR ES SALAAM PORT(CENTRAL AREA)

BLOCK -

PLOT No. 1 / 2

L.O. No: 1072194

AREA: 121.886 H.a



The issue of this plan implies no gurantee or admission of tittle by the goverment

This plan is prepared in accordance with Registred Plan No. 71981

It is approved for purpose of the Land Registration Act 334

For Director of Surveys and Mapping ..... Date 17/07/2024

Ministry of Land, Housing and Human Settlements Development, Dar es Salaam

SCHEDULE

ALL that Land known as Plot No. **1/2** situated at **Central Area in Ilala Municipality** containing **One Million Two Hundred Eighteen Thousand Eight Hundred and Fifty Eight (1,218,858) square metres** shown for identification only edged **red** on the plan attached to this Certificate and defined on the registered Survey Plan Numbered **71981** deposited at the Office of the Director for Surveys and Mapping at Dar Es Salaam.

Given under my hand and my official seal the day and year first above written.

ASSISTANT COMMISSIONER FOR LANDS

The within named **TANZANIA PORTS AUTHORITY** accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SIGNED and **DELIVERED** by the said
TANZANIA PORTS AUTHORITY
who is known to me personally ~~identified to me by~~ .....

the latter being known to me personally in my presence this 17th day of JANUARY, 2024

Signature .....

Postal Address: P.O.Box 9184
DAR ES SALAAM

Qualification: BOARD CHAIRPERSON

Signature .....

Postal Address: P.O. Box 9184
DAR ES SALAAM

Qualification: DIRECTOR GENERAL

← Verification

TRA

CERTIFICATE OF TIN

Issued Date:	JAN 16, 2006
Issued To:	TANZANIA PORTS AUTHORITY
TIN:	104-311-946
Location:	Dar es Salaam
Tax Office:	Temeke
Plot No.	
Street:	ONE BANDARI ROAD-KURASINI
VRN:	40000463-W



APPENDIX X: DESIGN DRAWINGS FOR BERTHS 8-11