Bauan International Port, Inc.

An ICTSI Group Company

Bauan International Port Development Project

Environmental and Social Impact Assessment (ESIA)

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Version History

Version	Date	Subject of Amendment
V1.0	January 22, 2026	Initial disclosure of full draft
V2.0	April 8, 2026	Integration of post-disclosure comments and updates on permitting and implementation status
V3.0	May 11, 2026	Integration of additional stakeholder consultation summaries, clarifications on stakeholder concerns and Project scope, and updates on disclosure and stakeholder engagement mechanisms

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Acronyms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
AoI	Area of Influence
BAP	Biodiversity Action Plan
BIPI	Bauan International Port, Inc.
CBD	Convention on Biological Diversity
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRC	Convention on the Rights of the Child
DAO	DENR Administrative Order
DENR	Department of Environment and Natural Resources
DIA	Direct Impact Area
ECC	Environmental Compliance Certificate
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
E/NIPAS	Expanded / National Integrated Protected Areas System
EMB	Environmental Management Bureau
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
ESEL	Environmental and Social Exclusion List
FPIC	Free, Prior, and Informed Consent
GAD	Gender and Development
GHG	Greenhouse Gas

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GRM	Grievance Redress Mechanism
ICTSI	International Container Terminal Services, Inc.
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICCPR	International Covenant on Civil and Political Rights
IFC	International Finance Corporation
IIA	Indirect Impact Area
ILO	International Labor Organization
IMO	International Maritime Organization
LGU	Local Government Unit
MARPOL	International Convention for the Prevention of Pollution from Ships
NDC	Nationally Determined Contribution
OSHE	Occupational Safety, Health, and Environment
PD	Presidential Decree
PS	Performance Standard
RA	Republic Act
RP	Resettlement Plan
SDGs	Sustainable Development Goals
SEP	Stakeholder Engagement Plan
SPS	Safeguard Policy Statement
UDHR	Universal Declaration of Human Rights
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordinance

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1 Executive Summary

1.1 Project Scope and Coverage

The Bauan International Port Redevelopment Project involves the modernization and expansion of existing port facilities located in Barangays San Andres I, Municipality of Bauan, Province of Batangas. The Project is implemented by Bauan International Port, Inc. (BIPI) and is operated by International Container Terminal Services, Inc. (ICTSI).

The Environmental and Social Impact Assessment (ESIA) covers Phase 1 redevelopment activities that are already authorized under the existing Environmental Compliance Certificate (ECC No. 0002-047-215, as amended in August 2024) and for which financing support is being sought from the Asian Infrastructure Investment Bank (AIIB). The assessment is therefore limited to activities within the approved footprint and scope of the existing ECC and domestic regulatory approvals, including marine and landside port infrastructure, container yards, cargo handling areas, internal roads, utilities, dredging and backfilling works, and supporting facilities within the approved footprint.

Any future Phase 2 expansion is excluded from this ESIA and will be subject to separate regulatory review and safeguard assessment. Should any changes in design, alignment, or construction methodology arise within Phase 1, these shall be subject to reassessment following the local EIA process and AIIB Environmental and Social Framework (ESF), including potential additional baseline studies such as terrestrial and/or marine ecological surveys and social impact assessment. Management measures coming from the reassessment may be incorporated into the Environmental and Social Management Plan (ESMP) and/or Resettlement Plan (RP).

The Project is located within a long-established industrial port area in Batangas Bay, which is hydrologically connected to the Verde Island Passage. Baseline surveys confirm that no coral reefs, seagrass beds, mangroves, or natural terrestrial habitats occur within the Project footprint, which consists of highly modified port and marine substrates. Sensitive ecosystems of the Verde Island Passage and the Bauan Marine Protected Area are located outside the Project Area and its zone of direct influence.

1.2 AIIB Categorization

Based on the scale, complexity, and nature of the Project and its potential environmental and social risks, the Project is classified as Category A under the AIIB ESF. This classification reflects the presence of potentially significant but manageable risks associated with dredging, marine works, labor influx, land acquisition and resettlement, and port operations in a coastal and biodiversity-sensitive regional context. Accordingly, a full ESIA, ESMP, and a standalone RP have been prepared in accordance with AIIB Environmental and Social Standards (ESS1 - ESS3).

1.3 Key Environmental and Social Impacts

The ESIA identified, assessed, and evaluated direct, indirect, cumulative, and induced impacts across pre-construction, construction, operation, and decommissioning phases. The most material risks are summarized below.

1.3.1 Physical Environment

Across all project phases, key physical impacts relate to the intensification of industrial port activities within an existing footprint, modification of an already developed coastal frontage, and increased demand on environmental management systems. During pre-construction and construction, temporary impacts include localized disturbance of reclaimed land, increased turbidity and suspended sediments from dredging and marine works, construction-related air emissions and dust, elevated noise and vibration levels, and generation of solid, hazardous, and wastewater streams. During operation, ongoing impacts include emissions from vessels, cargo-handling equipment, trucks, and standby generators; operational noise; routine wastewater discharges; and the risk of accidental spills affecting soil, groundwater, and marine waters.

The Project will generate greenhouse gas (GHG) emissions primarily from diesel-powered equipment, vessels, and vehicles during construction and operations. While these emissions represent a localized and incremental contribution to climate change, they are not expected to be significant at regional or national scales. Mitigation measures embedded in Project design and operations—such as fuel-efficient equipment, optimized terminal layout, improved traffic flow, and reduced idling—are expected to lower emissions intensity per unit of cargo handled compared to baseline conditions. In addition, the assessment identifies climate-related physical risks, including exposure to extreme rainfall, flooding, storm surge, and sea-level rise, which may affect port infrastructure and operations over the Project lifetime and are addressed through climate-resilient design and adaptive management measures.

1.3.2 Biodiversity

The Project does not encroach on protected areas or critical habitats but is located within the broader Verde Island Passage marine corridor. Potential impacts span construction and operational phases and relate primarily to water quality changes, sedimentation, underwater noise, vessel movements, and altered coastal processes that may affect marine and freshwater biota in Batangas Bay and the Baliti (Tabok) River. Terrestrial biodiversity impacts are limited and confined to disturbance-tolerant species within a highly modified port environment. Any future design changes with potential biodiversity implications will trigger reassessment and, where necessary, additional baseline surveys and mitigation measures.

1.3.3 Social and Economic Impacts

Key social impacts occur mainly during pre-construction and construction, including land acquisition, physical displacement of informal settler households, acquisition from private landowners, temporary labor influx, increased traffic and community safety risks, and occupational health and safety exposures. These impacts may have differentiated effects on women and men, particularly within displaced households, where women may experience increased caregiving responsibilities, livelihood disruption, and heightened vulnerability during transition periods, as well as gender-based risks associated with labor influx.

During construction and operation, the Project is also expected to generate positive socio-economic impacts, including local employment, skills development, livelihood opportunities, improved logistics efficiency, and enhanced port services supporting regional economic growth. Gender-responsive measures embedded in the ESMP and Resettlement Plan aim to promote women’s participation in employment, training, consultation, and grievance mechanisms, while mitigating gender-related risks throughout the Project lifecycle.

1.4 Mitigation and Management Measures

All identified impacts are addressed through a comprehensive ESMP that applies the mitigation hierarchy (avoid, minimize, mitigate, compensate). Key measures include:

- Use of silt curtains, controlled dredging methods, and marine water quality monitoring to manage turbidity and sediment dispersion;
- Dust suppression, equipment emission controls, and noise management during construction;
- Waste, wastewater, and hazardous materials management systems consistent with DENR and international standards;
- Vessel traffic management, spill prevention, and emergency response systems;
- Biodiversity protection measures and ecological monitoring within Batangas Bay;
- Resettlement planning and implementation;
- Gender-responsive measures embedded into the ESMP and RP;
- Occupational health and safety systems for workers and contractors;
- Community health and safety measures, including traffic management and emergency preparedness;
- Labor management procedures, including worker grievance mechanisms and code of conduct;
- Ongoing stakeholder engagement and grievance redress for affected communities.

The ESMP establishes institutional responsibilities, monitoring indicators, reporting requirements, and adaptive management mechanisms consistent with AIIB ESS1 - ESS3. Any additional mitigation measures identified through the local EIA process or future reassessments shall be incorporated into the ESMP and reflected in the ESIA as appropriate.

1.5 Resettlement Plan

The Project requires clearance of land needed for the new container yard and quay. A standalone RP has been prepared in compliance with AIIB ESS 2 and Philippine law.

Project-Affected Persons

- 131 informal settler households
- 25 private landowners (15 coastal area; 10 Ilaya area)

Informal Settler Households will receive:

- A designated residential lot at the Aplaya Relocation Site in Barangay Aplaya, Bauan;
- Financial assistance per household in two tranches;
- Moving and logistical support; and

The relocation site is approximately 1.3 km from the existing community, enabling households—particularly fisherfolks—to maintain livelihoods, access schools and markets, and preserve social networks.

Private Landowners will receive:

- A fixed, non-negotiable fair compensation price (both Marine and Ilaya landowners);
- A designated residential lot within the Aplaya relocation site (Marine-side landowners).

Priority employment during construction and port operations will be provided to affected households where feasible.

1.6 Summary of Entitlement Matrix

Affected Group	Type of Loss	Entitlement
Informal settler households (131)	Loss of dwelling and use of land	A designated residential lot at Aplaya; financial assistance; relocation and logistics support; access to upgraded community facilities
Informal settler households	Loss of livelihood	Priority employment; livelihood restoration support
Vulnerable households	Transition risks	Additional facilitation and support through LGU and Barangay
Private landowners – Marine (15)	Loss of titled land	Fair compensation price plus residential lot at Aplaya
Private landowners – Ilaya (10)	Loss of titled land	Fair compensation price
Community facilities	Loss of communal assets	Reconstruction and upgrading at Aplaya

1.7 Consultation, Disclosure, and Grievance Redress

Stakeholder engagement has included LGU- and Barangay-led meetings (June 24–25, 2025), town hall meetings with private landowners (July 1 and 12, 2025), household-level engagements, and the distribution of the first tranche of financial assistance on July 22, 2025. In addition, public scoping and consultations were conducted as part of the Environmental Performance Report and Management Plan (EPRMP) process under the Philippine EIS System, covering ongoing and previously approved port operations and redevelopment activities. These EPRMP scoping consultations provided a platform for stakeholders to raise issues and concerns relevant to Phase 1 activities and informed the environmental and social management framework applicable to subsequent phases of port redevelopment.

A Grievance Redress Mechanism (GRM) is in place, allowing complaints to be raised through the LGU, Barangay, ICTSI/BIPI, and external counsel, with defined escalation levels and response times.

Project information, including the ESIA, ESMP, and RP, has been disclosed through LGU and Barangay channels and through direct engagement with affected households and landowners.

(Tagalog Version of the Executive Summary)

BUOD NG PROYEKTO

1. Saklaw ng Proyekto

Ang Bauan International Port Redevelopment Project ay isang proyekto para sa pagsasaayos at pagpapalawak ng kasalukuyang pantalan sa Barangay San Andres Uno, Lalawigan ng Batangas. Ang proyekto ay isinasagawa ng Bauan International Port, Inc. (BIPI) at pinamamahalaan ng International Container Terminal Services, Inc. (ICTSI).

Sinasaklaw ng Environmental and Social Impact Assessment (ESIA) ang Phase 1 ng proyekto, na may umiiral nang pahintulot sa ilalim ng Environmental Compliance Certificate (ECC No. 0002-047-215, na inamyendahan noong Agosto 2024). Ang Phase 1 ang kasalukuyang hinihingan ng financing support mula sa Asian Infrastructure Investment Bank (AIIB).

Kasama sa Phase 1 ang mga gawain sa loob ng aprubadong project footprint tulad ng marine at landside port infrastructure, container yards, cargo-handling areas, internal roads, utilities, pati dredging at backfilling works. Ang Phase 2 expansion ay hindi saklaw ng ESIA na ito at sasailalim sa hiwalay na pagsusuri at pahintulot sa hinaharap. Anumang pagbabago sa disenyo o pamamaraan sa loob ng Phase 1 ay rerepasuhin alinsunod sa lokal na EIA process at sa AIIB Environmental and Social Framework (ESF), at maaaring mangailangan ng karagdagang baseline studies at pag-update ng ESMP at/o Resettlement Plan.

Matatagpuan ang proyekto sa isang matagal nang industrial port area sa Batangas Bay, na konektado sa Verde Island Passage (VIP). Batay sa isinagawang baseline surveys, walang coral reefs, seagrass beds, mangroves, o natural na kagubatan sa loob ng project area, na binubuo na ng highly modified port at marine areas. Ang mga sensitibong ecosystem ng Verde Island Passage at ng Bauan Marine Protected Area ay nasa labas ng lugar ng proyekto.

2. AIIB Project Classification

Batay sa laki at uri ng proyekto, pati na rin sa mga posibleng environmental at social risks, ang proyekto ay ikinategorya bilang Category A sa ilalim ng AIIB Environmental and Social Framework (ESF). Ibig sabihin nito ay may mga posibleng epekto ang proyekto na maaaring pamahalaan at bawasan sa pamamagitan ng maayos na plano at tamang pagpapatupad.

Dahil dito, inihanda ang isang komprehensibong ESIA na may kasamangEnvironmental and Social Management Plan (ESMP), at isang Resettlement Plan (RP) alinsunod sa AIIB Environmental and Social Standards (ESS1–ESS3).

3. Posibleng Epekto sa Kapiligran at Lipunan

Sinuri ng ESIA ang mga posibleng epekto ng proyekto sa lahat ng yugto nito—mula bago magsimula ang construction hanggang operasyon.

3.1 Pisikal na Kapaligiran

Sa lahat ng yugto ng proyekto, ang mga pangunahing epekto ay may kaugnayan sa intensification ng industrial port activities sa loob ng umiiral na footprint at sa patuloy na paggamit ng isang developed coastal-industrial area. Sa pre-construction at construction, inaasahan ang pansamantalang disturbance ng reclaimed land, pagtaas ng labo ng tubig (turbidity) at suspended sediments mula sa dredging at marine works, alikabok, ingay, at vibration, at paglikha ng wastewater, solid waste, at hazardous materials.

Sa operational phase, kabilang ang mga patuloy na epekto tulad ng emissions mula sa vessels, cargo-handling equipment, trucks, at standby generators, operational noise, routine wastewater discharges, at ang panganib ng accidental spills na maaaring makaapekto sa lupa, groundwater, at marine waters.

Ang proyekto ay magbubunga rin ng greenhouse gas (GHG) emissions, pangunahin mula sa diesel-powered equipment at sasakyan. Bagama't ito ay lokal at incremental lamang at hindi inaasahang makabuluhan sa rehiyonal o pambansang antas, ang proyekto ay may mga hakbang para mapababa ang emissions intensity, tulad ng paggamit ng fuel-efficient equipment, mas maayos na terminal layout, pinahusay na traffic flow, at pagbawas ng idling. Natukoy rin ang mga climate-related physical risks gaya ng matinding ulan, pagbaha, storm surge, at sea-level rise, na tinutugunan sa pamamagitan ng climate-resilient design at adaptive management measures.

3.2 Biodiversity (Iba't ibang uri ng buhay sa dagat at lupa)

Ang proyekto ay hindi saklaw ang protected areas o critical habitats, ngunit ito ay nasa loob ng mas malawak na Verde Island Passage marine corridor. Ang mga posibleng epekto sa biodiversity ay maaaring mangyari sa construction at operation at may kaugnayan sa pagbabago sa kalidad ng tubig, sedimentation, underwater noise, vessel movements, at coastal processes na maaaring makaapekto sa marine at freshwater species sa Batangas Bay at sa Baliti (Tabok) River. Ang mga epekto sa terrestrial biodiversity ay limitado at nakapaloob sa mga disturbance-tolerant species sa loob ng isang highly modified port environment. Anumang pagbabago sa disenyo na may implikasyon sa biodiversity ay sasailalim sa reassessment at karagdagang mitigation measures kung kinakailangan.

3.3 Lipunan at Ekonomiya

Ang mga pangunahing social impacts ay pangunahing nangyayari sa pre-construction at construction, kabilang ang land acquisition, paglipat ng informal settler households, pagbili ng lupa mula sa pribadong may-ari, pansamantalang labor influx, pagtaas ng trapiko at community safety risks, at occupational health and safety risks sa mga manggagawa. Ang mga epektong ito ay maaaring magkaiba ang epekto sa kababaihan at kalalakihan, lalo na sa mga pamilyang lilipat, kung saan ang kababaihan ay maaaring makaranas ng mas malaking responsibilidad sa pamilya at mas mataas na vulnerability sa panahon ng transisyon.

Sa kabilang banda, inaasahan din ang positibong socio-economic impacts sa construction at operation, tulad ng paglikha ng trabaho, skills development, livelihood opportunities, mas episyenteng logistics, at mas pinahusay na port services na susuporta sa paglago ng ekonomiya ng rehiyon. Ang gender-responsive measures na nakapaloob sa ESMP at RP ay layong palakasin ang partisipasyon ng kababaihan at bawasan ang gender-related risks sa buong lifecycle ng proyekto.

4. Pagtugon sa mga Natukoy na Epekto

Ang lahat ng natukoy na epekto ay tinutugunan sa pamamagitan ng Environmental and Social Management Plan (ESMP). Kabilang sa mga pangunahing hakbang ang:

- *Pagkontrol sa labo ng tubig sa pamamagitan ng silt curtains at maingat na dredging;*
- *Pagbawas ng alikabok, ingay, at emissions sa construction;*
- *Maayos na pamamahala ng basura, wastewater, at hazardous materials;*
- *Spill prevention at emergency response measures;*
- *Proteksyon at monitoring ng marine environment;*
- *Occupational health and safety measures para sa mga manggagawa;*

- *Traffic at community safety management; at*
- *Patuloy na pakikipag-ugnayan sa komunidad at pagtugon sa mga reklamo (grievance mechanism).*

5. Plano ng Relokasyon

Kinakailangan ng proyekto ang paggamit ng lupa para sa bagong container yard at quay. Dahil dito, isang Resettlement Plan (RP) o plano ng relokasyon ang inihanda alinsunod sa AIIB ESS2 at sa mga batas ng Pilipinas.

5.1 Mga Apektadong Tao

- *131 informal settler households*
- *25 private landowners (15 sa Marine area at 10 sa Ilaya area)*

5.2 Para sa impormal na naninirahan sa lugar ng proyekto

- *Isang itinakdang residential lot sa Aplaya Relocation Site;*
- *Pinansyal na tulong sa bawat pamilya;*
- *Suporta sa paglilipat;*

Ang relocation site ay humigit-kumulang 1.3 km lamang mula sa kasalukuyang tirahan upang mapanatili ang kabuhayan at access sa mga serbisyo.

5.3 Mga Pribadong May-ari ng Lupa

- *Patas na cash compensation (parehas para mga mula sa Marine at Ilaya area);*
- *Isang itinakdang residential lot sa Aplaya Relocation Site (para sa mga mula sa Marine area lamang);*

Kung maaari, ang mga apektadong kabahayan ay bibigyan ng prayoridad sa empleyo sa panahon ng konstruksiyon at operasyon ng pantalan.

5.4 Buod ng Entitlement Matrix

Apektadong Grupo	***Uri ng Pagkawala***	***Karapatan / Benepisyo***
Mga informal settler household (131)	*Pagkawala ng tirahan at paggamit ng lupa*	*Residential lot sa Aplaya; tulong-pinansyal; suporta sa relokasyon at logistics; access sa mga pinahusay na pasilidad ng komunidad*
Mga informal settler household	*Pagkawala ng kabuhayan*	*Prayoridad sa empleyo; suporta sa livelihood restoration*
Mga vulnerable household	*Mga panganib sa panahon ng transisyon*	*Karagdagang tulong at facilitation sa pamamagitan ng LGU at Barangay*
Mga pribadong may-ari ng lupa – Marine (15)	*Pagkawala ng titled land*	*Patas na cash compensation at residential lot sa Aplaya*
Mga pribadong may-ari ng lupa – Ilaya (10)	*Pagkawala ng titled land*	*Patas na cash compensation*
Mga pasilidad ng komunidad	*Pagkawala ng mga communal asset*	*Muling pagtatayo at pag-upgrade sa Aplaya*

6. Konsultasyon at Grievance Redress

Isinagawa ang mga LGU at Barangay-led consultations, town hall meetings, household-level engagements, at pamamahagi ng financial assistance noong Hunyo at Hulyo 2025. Bukod dito, public scoping at consultations sa

ilalim ng Environmental Performance Report and Management Plan (EPRMP) ay isinagawa bilang bahagi ng Philippine EIS System, na sumaklaw sa umiiral at naunang aprubadong port operations at redevelopment activities. Ang mga konsultasyong ito ay nagsilbing mahalagang batayan sa pagbuo ng environmental at social management measures para sa Phase 1.

May umiiral na Grievance Redress Mechanism (GRM) kung saan maaaring magsumite ng reklamo o katanungan sa pamamagitan ng LGU, Barangay, ICTSI/BIPI, at iba pang itinalagang channel.

Ang impormasyon tungkol sa proyekto, kabilang ang ESIA, ESMP, at RP, ay isinapubliko sa pamamagitan ng LGU at Barangay channels at direktang pakikipag-ugnayan sa mga apektadong tao, alinsunod sa AIIB disclosure requirements.

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2 Introduction

2.1 Objectives of the ESIA Study

The ESIA for the Bauan International Port Re-Development Project has been undertaken to provide a comprehensive, systematic, and integrated evaluation of the potential environmental and social risks and impacts associated with the proposed port modernization and expansion activities. The ESIA serves as a key decision-support tool to ensure that the Project is designed, implemented, and operated in a manner that is environmentally sustainable, socially inclusive, and fully compliant with applicable national regulatory requirements and international good practice.

The ESIA also aims to ensure alignment with the AIIB ESF, including compliance with the Environmental and Social Exclusion List (ESEL), to confirm the Project's eligibility for AIIB financing.

This ESIA seeks to:

Establish Baseline Conditions

Document and analyze the existing environmental and social baseline conditions within the Project's Area of Influence (AoI), encompassing physical (e.g., climate, air quality, noise, water resources, coastal and marine processes), biological (e.g., terrestrial and marine ecology, habitats, and biodiversity), and socio-economic components (e.g., demographics, livelihoods, land and resource use, community health and safety, cultural heritage, and vulnerable groups). This baseline provides a reference point against which potential Project-related changes and impacts are assessed.

Identify and Evaluate Potential Impacts Across Project Phases

Systematically identify, predict, and assess the significance of potential direct, indirect, cumulative, and induced environmental and social impacts that may arise during the pre-construction, construction, operation, and decommissioning phases of the Project. Impact evaluation considers the magnitude, spatial extent, duration, reversibility, and likelihood of impacts, as well as the sensitivity and vulnerability of affected receptors.

Assess Regulatory and Policy Compliance

Evaluate the Project's consistency and compliance with relevant Philippine environmental and social laws, regulations, and policies, including the Philippine Environmental Impact Statement (EIS) System and applicable sectoral regulations, as well as with the AIIB Environmental and Social Policy (ESP) and associated ESS. Where gaps exist between national requirements and international standards, the ESIA aims to apply the more stringent or protective provisions.

Define Mitigation and Enhancement Measures

Identify and recommend appropriate mitigation, enhancement, and management measures following the mitigation hierarchy (avoidance, minimization, mitigation, and compensation) to address adverse environmental and social impacts, while enhancing potential positive impacts such as employment generation, local economic development, and improved port efficiency and safety.

Integrate Environmental and Social Considerations into Project Design

Ensure that environmental and social risks and opportunities are meaningfully integrated into Project planning, engineering design, construction methodologies, and operational procedures, thereby supporting informed decision-making and promoting sustainability and resilience throughout the Project lifecycle.

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Support Stakeholder Engagement and Social Acceptance

Provide a robust analytical basis to support meaningful consultation and engagement with stakeholders, including affected communities, government agencies, port users, and other interested parties. The ESIA facilitates transparent disclosure of Project information, incorporation of stakeholder concerns, and strengthening of social license to operate.

Inform Environmental and Social Management Instruments

Serve as the foundation for the preparation of the ESMP and related supplementary instruments, such as monitoring programs, emergency response plans, stakeholder engagement mechanisms, grievance redress mechanisms, and biodiversity or livelihood-related action plans, as applicable. These instruments guide the effective implementation, monitoring, and adaptive management of environmental and social commitments throughout the Project's implementation and operation.

2.2 Scope of the ESIA Study

The scope of the ESIA covers the Proposed Redevelopment of the BIPI, located in Barangay San Andres I, Municipality of Bauan, Province of Batangas, including all associated and ancillary facilities. These include, but are not limited to, marine and landside port infrastructure, utilities, access roads, construction laydown areas, dredging and backfilling works, material storage areas, navigation aids, and ongoing port operations.

The ESIA is designed to meet the requirements of national environmental regulations under the Philippine EIS System and to comply with international best practices and safeguard frameworks of multilateral development banks especially AIIB, ensuring environmental sustainability, social inclusiveness, and risk-informed decision-making.

2.2.1 Project Lifecycle Coverage

The ESIA addresses potential environmental and social risks and impacts across the full Project lifecycle, including:

Pre-Construction and Design Phase

- Site selection, engineering design, layout optimization, and technology options;
- Land acquisition requirements and early stakeholder engagement;
- Identification of avoidance and minimization measures integrated into project design.

Construction and Redevelopment Phase

- Civil works, dredging and backfilling, demolition of existing structures, material transport, and workforce mobilization;
- Temporary facilities such as workers' camps, laydown areas, and waste management facilities;
- Construction-related environmental, occupational, and community health and safety risks.

Operational Phase

- Port operations, cargo handling, vessel traffic, storage and transfer of goods, utilities operation, and routine maintenance;
- Long-term environmental emissions and discharges, occupational health and safety, traffic management, and community interactions.

Decommissioning or Closure Phase

- Potential partial or full closure scenarios;
- Asset removal, site rehabilitation, waste disposal, and post-closure environmental and social considerations.

2.2.2 Thematic Scope of Assessment

The ESIA adopts a multidisciplinary and integrated assessment approach, consistent with international lender standards, covering the following thematic components:

Physical Environment

Assessment of baseline conditions and potential impacts on the physical environment, based on site-specific surveys, desktop analyses, and regulatory datasets, including:

- Land use, zoning, and compatibility, including consistency with approved local land use plans, port and industrial zoning, and existing coastal development patterns in Bauan, Batangas;
- Geology, geomorphology, and soils, including site topography, soil characteristics, erosion susceptibility, and seismic setting, with consideration of earthworks, compaction, and landform alteration during port redevelopment;
- Hydrology and hydrogeology, including surface drainage, watershed characteristics draining to Batangas Bay, groundwater conditions and quality, flood susceptibility, and interaction between the Baliti River (Tabok River) estuary and coastal waters;
- Freshwater, coastal, and marine water quality, including baseline conditions for groundwater, surface freshwater (Baliti River (Tabok River)), and coastal marine waters, with assessment of existing pollutant loads, coliform levels, sediment inputs, and compliance with applicable DENR water quality classifications;
- Coastal and marine processes, including tides, currents, sediment transport, and bathymetry within Batangas Bay and the Verde Island Passage, with specific consideration of potential temporary changes associated with dredging and marine construction activities;
- Dredging and backfilling-related physical impacts, including localized changes in seabed profile, temporary increases in turbidity and suspended sediments, and recovery following completion of marine works;
- Air quality and greenhouse gas emissions, including construction dust, emissions from equipment and vessels, and operational sources, assessed relative to baseline conditions and applicable standards;
- Noise and vibration, including construction and operational noise sources and potential effects on nearby communities, port users, and sensitive receptors;

  Climate and disaster risk context, including GHG emissions from construction and operations, and exposure to climate-related hazards such as extreme rainfall, flooding, storm surge, and sea-level rise, with consideration of implications for port infrastructure, operations, and climate resilience.

Biological Environment

Evaluation of baseline biodiversity conditions and potential impacts on biological receptors within the Project's AoI, informed by field surveys and desktop screening, and consistent with the mitigation hierarchy and international biodiversity safeguards (including IFC PS6 and AIIB ESS), including:

- Terrestrial ecology, comprising modified and landscaped habitats within the port footprint, disturbance-tolerant flora and fauna, and the absence of natural terrestrial ecosystems or critical habitats within the fenced project area;
- Freshwater ecology, focusing on the Baliti River (Tabok River) system, including aquatic biota, plankton, macro-invertebrates, fisheries use, and habitat condition, recognizing the river's shallow, sediment-dominated, and already stressed ecological state;

- Marine and coastal ecology, including nearshore and offshore habitats in Batangas Bay, benthic substrates, plankton communities, fisheries resources, and the absence of coral reefs, seagrass beds, or mangrove stands within the immediate impact area based on manta tow and spot dive surveys;

- Regional biodiversity context, recognizing the Project's location within the broader Verde Island Passage marine corridor, while confirming that the Project footprint does not overlap with protected areas, Key Biodiversity Areas (KBAs), or legally designated Critical Habitat;

- Species of conservation concern, including review of IUCN Red List-listed species known from the wider region, with assessment of their relevance to the Project AoI and confirmation that no globally significant populations or critical habitat features were identified within the project site;

- Ecosystem services, particularly fisheries productivity, water quality regulation, and supporting services linked to coastal and estuarine systems used by local communities;

- Invasive and disturbance-tolerant species, including their dominance in modified freshwater and terrestrial habitats and implications for ecological sensitivity;

Social Environment

Assessment of baseline social conditions and potential project-related social risks and impacts within the Project's Area of Influence, informed by socioeconomic surveys, stakeholder consultations, desktop review of secondary data, and regulatory datasets. The assessment is undertaken in line with applicable international safeguard frameworks, including IFC PS2–PS4, ADB SPS, AIIB ESS1 - ESS3, and World Bank ESS1, Demographic profile and population dynamics in the Project's Area of Influence, and is integrated with the mitigation hierarchy, including:

- Demographic Profile and Population Dynamics, including population size, density, household composition, migration patterns, and settlement characteristics within the Project's AoI;
- Land Use, Land Tenure, and Livelihoods, including existing land use classifications, tenure arrangements within and adjacent to the Project site, fisheries, agriculture, informal economic activities, and the presence of residential occupancy within the Project Area;
- Employment and Economic Opportunities, including baseline labor availability, local skills profile, project-related employment generation, and potential labor in-migration during construction and operation;
- Traffic, Transport, and Access, including existing road network conditions, congestion within the municipal center, public transport systems, port access routes, and marine navigation within Batangas Bay;
- Community Health and Safety, including baseline health conditions, access to health and emergency services, exposure to traffic and industrial hazards, disaster response capacity, and public safety considerations associated with port operations;
- Labor and Working Conditions, including occupational health and safety performance, labor management practices, worker training systems, and contractor oversight arrangements;
- Gender Considerations and Social Inclusion, including household structure, gender participation in education and employment, and potential gender-differentiated impacts associated with labor influx and service demand;
- Vulnerable and Disadvantaged Groups, including fisherfolk, informal settler households within the Project Area, women-headed households, elderly persons, and other at-risk populations that may experience disproportionate impacts;
- Cultural Heritage, including the absence of indigenous peoples within the Project Area, existing cultural and religious assets, community identity, and procedures for managing chance finds during construction.

2.2.3 Cumulative and Induced Impacts

The ESIA includes an assessment of cumulative and induced impacts, consistent with international best practice, taking into account:

- Existing, approved, and reasonably foreseeable projects within Batangas Bay and the broader CALABARZON region;
- Combined impacts on marine ecosystems, water quality, fisheries, traffic congestion, air emissions, and community well-being;
- Potential induced development arising from improved port capacity and connectivity;
- Assessment of regional carrying capacity and long-term sustainability considerations.

2.2.4 Area of Influence (AoI)

The spatial scope of the ESIA is defined through an AoI consistent with national and AIIB requirements, encompassing:

- The core project footprint;
- Associated facilities and ancillary infrastructure;
- Areas potentially affected by direct, indirect, cumulative, and transboundary impacts, including marine navigation routes and coastal zones;
- Communities and ecosystems influenced by project-related activities.

2.3 ESIA Methodology

The ESIA methodology adopts a structured, iterative, risk-based, and adaptive approach, consistent with the AIIB ESF, which comprises three ESSs. The methodology is also aligned with applicable Philippine environmental and social regulatory frameworks and internationally recognized ESIA good practice.

The methodology is designed to:

- Identify, assess, and manage potential environmental and social risks and impacts throughout the Project lifecycle (pre-construction, construction, operation, and, decommissioning);
- Ensure compliance with national legal requirements, including the Philippine EIS System;
- Apply the precautionary principle, the mitigation hierarchy, and proportionality to risk; and
- Support informed decision-making, stakeholder engagement, and sustainable Project design.

2.3.1 Desk Review and Regulatory Framework

A comprehensive desk review was undertaken to establish the legal, institutional, and policy context applicable to the Project. This review ensured consistency between national regulatory requirements and the AIIB ESF.

National and Local Framework

The desk review covered applicable Philippine environmental and social laws, regulations, and administrative issuances, including those governing:

- Environmental Impact Assessment (Presidential Decree 1586 and DENR-EMB EIS System guidelines)
- Marine and coastal resource management;
- Biodiversity conservation and protected areas;
- Occupational health and safety;
- Labor, gender, and social protection;
- Land use planning, port operations, and local government mandates.

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Relevant local ordinances, comprehensive land use plans, and development frameworks of affected barangays, the municipality, and the province were also reviewed.

International and Lender Framework

The review considered applicable international conventions and treaties ratified by the Philippines, as well as the AIIB ESF, including:

- ESS 1 (Environmental and Social Assessment and Management),
- ESS 2 (Involuntary Resettlement),
- ESS 3 (Indigenous Peoples, if applicable),

Other international guidance materials (e.g., environmental, health, and safety guidelines) were referenced solely as technical or methodological good practice, where relevant, and do not supersede AIIB ESF requirements.

2.3.2 Environmental Approvals

The ESIA included a review of prior environmental approvals issued for the Project site, including ECC No. 0002-047-215, together with all associated conditions, commitments, and supporting technical documents subsequently transferred to BIPI.

The review was undertaken to:

- Establish the approved project scope and spatial coverage under previous environmental clearances;
- Identify legacy environmental and social commitments, compliance obligations, and applicable conditions that remain valid; and
- Inform the assessment of changes introduced under the proposed port redevelopment, including the need for updated impact assessment and management measures.

Findings from this review were used to delineate the baseline regulatory context and ensure continuity and consistency with prior approvals, while addressing any material scope expansions or modifications under the current Project.

Table 2-1 Summary of ECC Coverage and Prior Environmental Approvals

ECC No.	Issued to	Date Issued	Coverage
ECC 0002-047-215	AG&P Port Services Company of Batangas, Inc. (APSCBI)	August 4, 2000	Twenty-two (22) hectares area with the wharf frontage having a maximum length of seven hundred fifty (750) meters plus an offshore area of up to a depth of fourteen (14) meters within phases I and II of the projects as described in the EIS. Operations within this area consist only of berthing and un-berthing of container vessels alongside the wharf, the loading and unloading of cargo containers from marine vessels, and the receipt into and delivery out of the container storage area. The facilities and activities include the

			following: a. Rehabilitation of fifteen (15) hectares of the AG&P pre-fabrication yard to a modern international container terminal with initial operating capacity of 150,000 TEU per annum; b. Extension of the existing 100-meter wharf to 470 meters to provide two (2) berths for Panamax type vessels; c. Construction of a four-lane terminal access and exit road connecting the northern and southern areas of the site; d. Dredging depth alongside new wharf to 12.5 meters; and e. Construction of terminal access/exit roads, truck parking, marine operations, engineering, workshop, administration, customs and gatehouse facilities.
ECC 0002-047-215 (Transfer/ Amendment)	Bauan International Port, Inc. (BIPI)	August 27, 2024	1. Change of Company name from AG&P Port Services of Batangas, Inc. to Bauan International Port, Inc. 2. Change name of project name from AG&P International Container Terminal Project to Bauan International Port Project; and 3. Construction of a new container yard behind the quay, including building facilities to support port operations, with an upgrade within the terminal to improve connection to the existing road network.
DENR-EMB CALABARZON Letter of Approval (Non-ECC Modification)	Bauan International Port, Inc. (BIPI)	October 22, 2024	Approval for inclusion of backfilling works covering 9,900 square meters for expansion of the existing port facility/coastal protection. Classified under Item No. 3 of MC No. 2014-005 (Annex B) as an increase in project size or auxiliary component not exceeding coverage thresholds and adequately addressed by the existing EMP.

The Project is currently covered by an approved Environmental Compliance Certificate (ECC) issued by the Department of Environment and Natural Resources (DENR) for Phase 1 of development. This ECC remains valid and applicable to all Phase 1 activities, which form part of the scope of the current ESIA.

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In parallel, the Proponent has initiated an application for an ECC amendment with DENR to cover the proposed Phase 2 construction works. The ECC amendment is intended to reflect design refinements, expanded infrastructure scope, and construction activities that were not included in the originally approved Phase 1 ECC. Phase 2 is being processed under a separate regulatory approval pathway and is outside the scope of the present ESIA.

As part of the amendment process, the required endorsement from the Biodiversity Management Bureau (BMB) has been secured on March 2026, while DENR approval of the ECC amendment is anticipated by April 2026, subject to completion of regulatory review procedures.

The initiation of the ECC amendment for Phase 2 provides regulatory clarity on the overall project lifecycle and reinforces the need for a focused and robust environmental and social assessment of the VIPMC and associated Phase 1 facilities under the current ESIA. This clear delineation between project phases ensures that the assessment is undertaken within an approved regulatory framework, while recognizing that subsequent phases will be subject to separate environmental review and permitting.

Accordingly, this ESIA is scoped to assess Phase 1 activities covered by the existing ECC, consistent with applicable international environmental and social standards, while acknowledging the ongoing DENR regulatory process for Phase 2 as a distinct and subsequent approval pathway.

2.3.3 Project Description and Alternatives Analysis

The Project description provides a comprehensive and systematic account of:

- Project location and setting;
- Key components and facilities;
- Design features and engineering specifications;
- Construction methodologies and phasing;
- Operational processes and throughput;
- Ancillary and support facilities; and
- Resource requirements, including materials, water, energy, and labor.

In line with AIIB ESS 1 and internationally recognized ESIA good practice, an Alternatives Analysis was undertaken at a level commensurate with Project risk and scale. This includes:

- The no-project scenario, to provide a baseline for comparative assessment;
- Alternative design layouts, construction methods, or operational options; and
- Consideration of environmental, social, technical, and economic factors influencing Project selection.

The analysis demonstrates the rationale for the preferred redevelopment option and how environmental and social considerations were integrated into Project planning and design.

2.3.4 Area of Influence (AoI)

The AoI defines the spatial extent within which the Project's direct, indirect, and cumulative environmental and social impacts may reasonably occur, consistent with AIIB ESS 1 and ESIA good practice.

The AoI was delineated based on:

- The nature and scale of Project activities;
- Potential impact pathways (e.g., air, water, noise, traffic, and socio-economic linkages);
- Sensitivity and vulnerability of environmental and social receptors; and
- Professional judgment informed by baseline data and sector experience.

Components of the AoI

The AoI includes the following spatial components:

- **Project Footprint and Immediate Facilities**
  All permanent and temporary Project components within the port redevelopment area.
- **Buffer Zones**
  Buffer areas extending approximately 5–10 meters inward from the Project perimeter, reflecting engineering, safety, and operational interface considerations. These buffers do not represent ecological buffers or additional impact areas.
- **Primary Impact Area (Direct Impact Area – DIA)**
  Areas directly affected by construction and operation activities, including:
  - The port site and associated facilities;
  - Adjacent access roads and transport corridors;
  - Nearby commercial and residential areas;
  - Immediate marine waters affected by dredging and backfilling, vessel movement, and port operations.
- **Secondary Impact Area (Indirect Impact Area – IIA)**
  Areas potentially affected by:
  - Increased vessel traffic and logistics activity;
  - Air emissions, noise, and traffic;
  - Economic stimulation and induced development; and
  - Broader marine and coastal processes beyond the immediate port boundary.

2.3.5 Baseline Data Collection

Baseline environmental and social conditions were established to provide a robust benchmark against which Project-related impacts are assessed.

Baseline data collection employed a tiered and integrated approach, including:

- Review of secondary data from national, regional, and local government sources;
- Field surveys and site inspections;
- Environmental sampling and monitoring for air, noise, and water;
- Socio-economic profiling of potentially affected communities, including demographic, livelihood, and service access indicators.

Where relevant, baseline information reflects seasonal variability, particularly for environmental parameters and resource-dependent livelihoods, in line with AIIB and international best practice.

2.3.6 Impact Identification and Assessment

Impact significance was evaluated based on a structured consideration of:

- Impact magnitude, including scale, spatial extent, duration, reversibility, and likelihood; and
- Receptor sensitivity, informed by baseline conditions and conservation or social value.

Significance ratings were assigned for each identified impact prior to mitigation, providing an indication of inherent project risk. Elevated receptor sensitivity was applied to:

- Marine ecosystems within Batangas Bay and the Verde Island Passage Marine Corridor;

- Natural habitats and biodiversity receptors assessed under the Critical Habitat Assessment (CHA); and
- Displaced informal settler families and other socially vulnerable groups.

The assessment also took into account applicable legal and policy thresholds, stakeholder concerns, and the anticipated effectiveness of proposed mitigation measures in determining final impact significance.

2.3.7 Mitigation and Management Measures

Mitigation measures were developed in accordance with the mitigation hierarchy:

- Avoidance;
- Minimization;
- Mitigation;
- Compensation or offset (where residual impacts remain).

All measures are consolidated into the ESMP, which:

- Specifies mitigation actions for each identified impact;
- Assigns roles and responsibilities;
- Defines monitoring indicators, methods, and frequency;
- Establishes reporting and corrective action procedures.

The ESMP is designed as a living document, to be updated as Project design evolves and throughout implementation, consistent with AIIB ESS requirements.

2.4 ESIA Study Timeline and Project Development Lifecycle

The ESIA was undertaken in a phased, iterative, and risk-based manner, aligned with the Project development lifecycle, national regulatory requirements, and the AIIB ESF. The timeline was designed to ensure that environmental and social considerations informed Project design, siting, scheduling, and risk management decisions at the earliest possible stage and throughout implementation.

Table 2-2 ESIA Study and Project Implementation Timeline

Phase	Activity	Key Outputs	Indicative Schedule
ESIA Preparation Phase	Scoping and Inception	Inception Report; definition of AoI; regulatory and ESF gap analysis; stakeholder mapping	October 2025
	Baseline Data Collection	Environmental and social baseline datasets (physical, biological, socio-economic); field surveys and secondary data review	October – November 2025
	Impact Assessment and Analysis	Identification and evaluation of direct, indirect, and cumulative impacts; analysis of alternatives; climate risk screening	December 2025

Phase	Activity	Key Outputs	Indicative Schedule
	Draft ESIA and Supplementary Studies	Draft ESIA and ESMP incorporating stakeholder analysis, gender analysis, and other thematic plans	December 2025
	Final ESIA and ESMP	Final ESIA and ESMP incorporating regulatory and lender comments	January 2026
Permitting and Pre-Construction Phase	Licenses, Permits, and Registrations	Special Working Permit from MARINA / Dredging Permit Dumping Permit (issued) Biodiversity Management Bureau (BMB) Endorsement (issued) *Note: The project component for phase 1 is covered by the existing ECC.* DENR approval of the ECC Amendment	February 2026 November 2025 March 2026 April 2026
	Land/Building Acquisition and Improvement	Land acquisition and/or asset improvement consistent with national law and AIIB ESF requirements	November 2024 – July 2026
Construction Phase	Site Preparation and Civil Works	Implementation of ESMP; environmental and social monitoring; contractor compliance	October 2026 – August 2027
Commissioning and Operation Phase	Equipment Installation, Staffing, and Trial Run	Installation of machinery; hiring and training; trial operations with ESMP implementation	July 2025 – July 2038
	Commercial Operations	Operational ESMP implementation; monitoring and reporting	January 2028 onward

2.5 Structure of the ESIA Report

The ESIA Report is structured to provide a comprehensive, systematic, and transparent evaluation of the potential environmental and social impacts of the proposed project, consistent with Philippine regulations and AIIB ESF requirements. The report includes the following sections:

Executive Summary

- Concise summary of the ESIA findings, key environmental and social impacts, and proposed mitigation measures.
- Highlights compliance with national laws (e.g., Philippine EIA System under DAO 2017-25) and AIIB ESF requirements.
- Includes a summary of stakeholder engagement outcomes and key social considerations such as resettlement and labor impacts.

Introduction

- Background and rationale for the project.
- Objectives and scope of the ESIA study.
- Overview of methodology used for environmental and social assessments, including baseline data collection, risk analysis, and impact evaluation.
- Structure of the report.

Policy, Legal, and Administrative Framework

- National legislation, regulations, and standards applicable to environmental protection, social safeguards, labor, and health & safety (e.g., DENR Administrative Orders, RA 9003, RA 10752, RA 9710).
- Relevant local government regulations and permitting requirements.
- International standards, including AIIB ESF, IFC Performance Standards, and relevant UN Conventions.
- Institutional responsibilities for environmental and social governance.

Project Description

- Detailed description of the proposed project, including design, components, and operational characteristics.
- Project location, map, and AoI.
- Technical specifications, construction phases, and operational scenarios.
- Expected lifetime of the project and decommissioning considerations.

Associated Facilities

- Identification of facilities or activities connected to the project that may have significant environmental or social impacts (e.g., access roads, worker camps, transmission lines, pipelines).
- Assessment of cumulative impacts from associated facilities, consistent with AIIB ESF's requirement to consider project-related cumulative and induced impacts.

Analysis of Alternatives

- Evaluation of project alternatives, including the "no project" option.
- Consideration of location, technology, design, and operational alternatives.
- Environmental, social, technical, and economic rationale for the selected alternative, consistent with AIIB ESF Principle 1 (avoiding, minimizing, or mitigating adverse impacts).

Baseline Environmental and Social Data

- Comprehensive assessment of the current environmental conditions, including:
- Physical environment (air, water, soil, climate, noise).
- Biological environment (terrestrial, freshwater, marine biodiversity).
- Socioeconomic environment (demographics, livelihoods, cultural heritage).

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- Community health and safety.
- Mapping of sensitive receptors and protected areas.
- Data collection methods and seasonal considerations.

Evaluation / Assessment of Environmental and Social Risks and Impacts

- Identification and evaluation of potential adverse and positive impacts during pre-construction, construction, operation, and decommissioning phases.
- Risk assessment framework aligned with AIIB ESF (likelihood, severity, reversibility).
- Cumulative, induced, and transboundary impacts analysis.
- Special consideration for vulnerable groups, indigenous peoples, and gender-based impacts.

Environmental and Social Monitoring Plan (ESMP)

- Proposed measures to avoid, minimize, or offset adverse environmental and social impacts.
- ESMP framework, including monitoring, reporting, and performance indicators.
- Alignment with national standards (DENR-EMB requirements) and AIIB ESF mitigation hierarchy.
- Climate change adaptation and resilience measures if relevant.

Institutional Mechanism for Implementing ESMP and RP

- Roles and responsibilities of implementing agencies and contractors.
- Organizational structure for environmental and social management.
- Capacity building and training requirements.
- Monitoring and reporting mechanisms to ensure compliance with ESMP and RP commitments.

Stakeholder Engagement Plan / Public Consultation and Information Disclosure

- Stakeholder identification and mapping.
- Public consultation methods, including focus group discussions, key informant interviews, and community meetings.
- Disclosure of project information in accessible formats, in compliance with AIIB ESF Principle 6 and DENR-EMB public consultation requirements.
- Documentation of stakeholder concerns and incorporation into project planning.

Grievance Redress Mechanism (GRM)

- Clear, accessible, and culturally appropriate procedures for receiving and addressing grievances from affected communities and workers.
- Tracking, reporting, and resolution mechanisms.
- Integration with AIIB ESF requirements to ensure timely and fair handling of grievances.

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Appendices

- Supporting documents

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3 Policy, Legal, and Administrative Framework

The Project will be implemented in compliance with applicable local, national, and international policies, laws, and regulations. This framework provides the legal and institutional basis for environmental and social assessment, planning, implementation, and management measures. It ensures adherence to the Philippine EIS System, national labor and occupational safety standards, and the AIIB ESF.

The framework is aligned with international good practice, including the IFC Performance Standards (PS 1–8), and emphasizes risk-based assessment, stakeholder engagement, grievance redress, climate resilience, gender equality, and social inclusion.

3.1 Local and National Environmental Framework

3.1.1 Philippine Laws and Regulations

PD 1586 – Environmental Impact Statement (EIS) System

- Establishes the requirement for an ECC for projects that may significantly impact the environment.
- Mandates systematic identification, assessment, and management of environmental impacts, including cumulative and transboundary effects.
- Provides the legal basis for public consultation, stakeholder engagement, and disclosure of environmental information, ensuring transparency in project planning and decision-making.

DENR DAO 2017-25 – Revised Procedural Manual for EIS System

- Provides detailed procedural guidance on scoping, baseline data collection, impact assessment, mitigation planning, monitoring, and reporting.
- Ensures standardization of ESIA practices in the Philippines and facilitates alignment with international best practices such as AIIB ESF and IFC PS.

RA 8749 – Clean Air Act of 1999

- Establishes ambient air quality standards and emission limits for industries, vehicles, and other pollution sources.
- Requires air pollution prevention and control measures, including monitoring and reporting.
- Supports protection of community health and climate-sensitive initiatives by reducing greenhouse gas emissions and other pollutants.

RA 9275 – Clean Water Act of 2004

- Mandates protection of surface and groundwater resources through wastewater management, effluent treatment, and water quality monitoring.
- Supports climate-resilient water management and sustainable use of freshwater resources.

RA 9003 – Ecological Solid Waste Management Act of 2000

- Promotes solid waste segregation, reduction, recycling, and environmentally sound disposal.

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- Encourages community involvement and participation in sustainable waste management programs.

Verde Island Passage Protected Seascape (VIPPS) Bill (SBN-831, 20th Congress)[1]

- Pending legislative measure in the Philippines that seeks to declare the Verde Island Passage a protected seascape under the National Integrated Protected Areas System (NIPAS).
- Reflects national intent to codify Verde Island Passage's ecological significance and provide for its long-term management and conservation.
- Complements existing protected area policy under ENIPAS (RA 11038) and is relevant to the Project's marine biodiversity considerations and cumulative impact assessment.

  Note: While the Verde Island Passage Protected Seascape Bill has not yet been enacted into law, it is considered a material policy consideration for marine biodiversity assessment and cumulative impact analysis, consistent with precautionary and good international industry practice.

RA 7586 – NIPAS Act of 1992 / RA 11038 – ENIPAS Act of 2018

- Establishes the legal framework for the conservation and management of protected areas, habitats, and biodiversity.

- Requires projects to avoid or mitigate impacts on ecologically sensitive areas and integrate biodiversity considerations into planning.

RA 9147 – Wildlife Resources Conservation and Protection Act

- Requires protection of wildlife species and habitats;
- Regulates activities that may cause wildlife disturbance or habitat loss; and
- Supports biodiversity assessment and mitigation measures.

RA 6969 – Toxic Substances and Hazardous and Nuclear Wastes Control Act

- Regulates handling, storage, transport, and disposal of hazardous chemicals and wastes.

- Protects human health and ecosystems and mandates emergency preparedness and response planning.

RA 10752 – Right-of-Way Act

- Provides the legal framework for land acquisition, involuntary resettlement, and compensation.

- Ensures fair and timely compensation, livelihood restoration, and meaningful consultation with affected persons, aligning with AIIB ESS2 / IFC PS5.

RA 7279 – Urban Development and Housing Act

- Establishes the legal framework for housing and urban development, including safeguards for underprivileged and informal settler families affected by development projects.

- Requires humane and coordinated relocation processes, adequate consultation, and provision of basic services at resettlement sites.

[1] Senate Bill No. 518, 19th Congress (2022), *Verde Island Passage Protected Seascape Bill*, Senate of the Philippines. The bill reflects continuing legislative intent and has been re-filed in subsequent Congresses.

- Prohibits demolition or eviction without due process, adequate notice, and relocation assistance, where applicable.
- Provides a statutory basis for social safeguards applied in the RP, complementing AIIB ESS2 requirements on involuntary resettlement and livelihood restoration.

Local Government Code (RA 7160)

- Defines LGU roles in project permitting, environmental monitoring, enforcement, and community engagement.
- Ensures that local stakeholders are actively involved in decision-making and monitoring compliance.

RA 11201 – DHSUD Act

- Establishes DHSUD as the primary national agency responsible for housing, resettlement, and urban development.
- Provides institutional oversight for resettlement planning, housing assistance, and coordination with LGUs and national agencies.
- Supports alignment of the Project's RP with national housing policies and standards.

RA 9710 – Magna Carta of Women

- Promotes gender equality and social inclusion in project planning and implementation.
- Ensures women's participation in consultations, grievance mechanisms, and livelihood opportunities, and protection from discrimination or occupational risks.

3.1.2 Labor and Occupational Safety Framework

Labor Code of the Philippines (PD 442)

- Governs employment standards, labor rights, and workplace conditions, including fair treatment, minimum wage, working hours, and dispute resolution.
- Aligns with AIIB ESS 1 requirements on labor and working conditions.

RA 11058 – Occupational Safety and Health Standards Act

- Mandates implementation of occupational safety and health systems in workplaces.
- Requires risk assessments, hazard identification, preventive measures, and worker training to ensure safe working environments.

Relevant DOLE Guidelines and Department Orders

- Provide detailed guidance on labor inspections, occupational health, and grievance handling.

RA 11199 – Social Security Act

- Ensures social protection for workers, including coverage for work-related illness, injury, and other contingencies.

RA 11210 – Expanded Maternity Leave Law

- Provides maternity benefits and protection for female employees.

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- Supports gender equity and social welfare in the workplace.

3.2 International Policy Framework

3.2.1 AIIB Environmental and Social Framework

- **AIIB Environmental and Social Policy (ESP)**

    - Established the overarching principles governing the management of environmental and social risks and impacts for projects financed by AIIB.

    - Provides the policy foundation for the application of the ESF and its associated ESS, ensuring that projects are developed in a manner that is environmentally sound, socially inclusive, and aligned with international good practice.

    - Emphasizes engagement that is proportionate to project risks and impacts and that gives particular attention to affected communities, vulnerable and disadvantaged groups, and other interested stakeholders

- **AIIB Environmental and Social Standards (ESS)**
    - ESS1 – Environmental and Social Assessment and Management: Requires systematic identification, assessment, and management of environmental and social risks and impacts throughout the project lifecycle, including integration of mitigation measures into project design, implementation, and operations, and establishment of appropriate monitoring and management systems.

    - ESS2 – Involuntary Resettlement and Land Acquisition: Sets requirements for avoiding or minimizing involuntary resettlement; ensuring fair compensation, livelihood restoration, and support for affected and vulnerable populations; and meaningful consultation with displaced persons.

    - ESS3 – Indigenous Peoples: Aims to ensure that Indigenous Peoples are treated with dignity, respect, and cultural sensitivity; that adverse impacts are avoided or minimized; and that Indigenous Peoples receive culturally appropriate benefits, with meaningful consultation and, where applicable, Free, Prior, and Informed Consent (FPIC).

- **AIIB Environmental and Social Exclusion List (ESEL)**

  The AIIB ESEL defines activities that are ineligible for AIIB financing due to their unacceptable environmental and social risks, adverse impacts, or inconsistency with international conventions and good practice. The ESEL serves as a safeguard instrument that complements the AIIB ESP and the ESS, ensuring that AIIB-financed projects do not support activities that would cause irreversible harm to people, biodiversity, cultural heritage, or the environment.

  The ESEL prohibits AIIB financing for, among others:

    - Activities that cause significant conversion or degradation of critical habitats;

    - Projects involving illegal, unreported, or unregulated fishing, or trade in endangered species;

    - Activities that violate international environmental agreements, including CITES and the Convention on Biological Diversity;

- Projects involving forced labor, child labor, or serious violations of labor rights;
- Activities that result in large-scale involuntary resettlement without adequate safeguards; and
- Projects that contravene national environmental or social laws or international obligations of the host country.

3.2.2 Alignment with International Best Practices

- IFC Performance Standards (PS 1–8)
  - Provides a globally recognized framework for environmental and social risk management, stakeholder engagement, resettlement, labor management, and biodiversity protection.
- Stakeholder Engagement & Grievance Redress
  - Requires inclusive, culturally sensitive consultation with communities, workers, and stakeholders.
  - Establishment of a transparent Grievance Redress Mechanism (GRM) consistent with AIIB and IFC requirements.
- Climate Resilience & Environmental Sustainability
  - Incorporates climate risk assessment, adaptation measures, and mitigation of greenhouse gas emissions.
  - Promotes resource efficiency and sustainable environmental management.
- Gender Equality & Social Inclusion
  - Ensures gender-responsive project planning, equal participation, and protection of vulnerable groups.
  - Considers impacts on women, children, indigenous peoples, and marginalized populations in all phases of the project.
- Unexploded Ordnance (UXO) Risk Management and Safety Protocols
  - Requires a desk-based historical review and, where warranted, geophysical surveys prior to dredging.
  - Establishes “stop-work” procedures in the event of suspected UXO discovery, including site isolation and notification of authorities.
  - Ensures that no dredging resumes in affected areas until UXO clearance is formally confirmed by authorized agencies, consistent with national regulations and international good practice

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3.2.3 International Commitments of the Philippines

Environmental Commitments

United Nations Framework Convention on Climate Change (UNFCCC) – 1994

The Philippines, as a Party to the UNFCCC, commits to mitigating greenhouse gas (GHG) emissions, promoting climate-resilient development, and integrating climate change considerations into national planning. For ESIA purposes, this commitment requires the inclusion of climate risk assessments, adaptation strategies, and measures to minimize greenhouse gas emissions during project planning, construction, and operation. Projects must account for potential climate hazards and vulnerabilities in their environmental and social management plans.

Paris Agreement – 2016

Under the Paris Agreement, the Philippines submits Nationally Determined Contributions (NDCs) aimed at limiting global warming and enhancing national resilience to climate impacts. For ESIA, this commitment emphasizes climate-responsive project design, adoption of low-carbon technologies, and integration of adaptation measures to ensure projects are aligned with national climate goals and sustainable development pathways.

Convention on Biological Diversity (CBD) – 1993

The Philippines is committed to conserving biodiversity and promoting its sustainable use. This requires ESIA studies to conduct comprehensive biodiversity assessments, identify potential impacts on ecosystems and species, and propose appropriate mitigation measures. The CBD also guides the development of conservation strategies and monitoring frameworks to ensure the project avoids or minimizes adverse effects on sensitive habitats.

Ramsar Convention on Wetlands – 1994

As a signatory to the Ramsar Convention, the Philippines is obliged to protect wetlands of international importance and promote their sustainable use. ESIA studies must evaluate the potential impacts of projects on wetlands, including alterations to hydrology, pollution risks, and habitat loss, and implement mitigation measures to preserve ecological integrity and support community livelihoods dependent on these ecosystems.

CITES – 1981

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) requires the Philippines to regulate the trade of endangered species and ensure their conservation. Projects undergoing ESIA must ensure that no activities contribute to illegal trade or exploitation of protected species, and include monitoring and mitigation measures to safeguard threatened flora and fauna.

Montreal Protocol – 1989

The Philippines' commitment to the Montreal Protocol focuses on reducing ozone-depleting substances. ESIA studies for relevant projects must ensure the use of alternative, ozone-friendly substances in industrial and refrigeration processes, thereby minimizing adverse environmental effects and aligning with global environmental protection initiatives.

Stockholm Convention – 2004

As a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs), the Philippines is committed to reducing and eliminating harmful chemicals. ESIA studies must consider the management of hazardous substances, safe handling and disposal of chemical wastes, and measures to prevent contamination of human and ecological receptors.

Basel Convention – 1994

The Philippines has ratified the Basel Convention to control transboundary movements of hazardous wastes and their disposal. Projects must comply with stringent waste management practices, including storage, transport, and environmentally sound disposal, ensuring that both workers and communities are protected from hazardous exposure.

Minamata Convention on Mercury – 2017

The Minamata Convention commits the Philippines to reduce mercury emissions and prevent environmental contamination. ESIA processes must integrate mitigation measures in project design and operations to minimize mercury release, particularly in industrial, mining, and artisanal activities, safeguarding environmental and public health.

Human Rights and Labor Commitments

Universal Declaration of Human Rights (UDHR) – 1948

The UDHR establishes fundamental human rights, including equality, non-discrimination, and protection from abuse. ESIA processes must ensure that project design, operations, and mitigation measures respect human rights, promote equitable access to benefits, and prevent adverse social impacts on affected communities.

International Covenant on Civil and Political Rights (ICCPR) – 1986

The ICCPR guarantees civil and political rights such as freedom of expression, assembly, and due process. ESIA studies should facilitate meaningful participation of communities in consultations, ensure transparency in project decision-making, and protect communities from coercion or undue influence.

International Covenant on Economic, Social and Cultural Rights (ICESCR) – 1986

The ICESCR establishes rights to work, health, education, and an adequate standard of living. ESIA must assess potential social impacts, ensure that affected populations have access to social services, and design mitigation measures that promote community welfare and social inclusion.

ILO Core Conventions

The Philippines has ratified key International Labor Organization (ILO) conventions covering the prohibition of forced and child labor, freedom of association, collective bargaining, and elimination of workplace discrimination. ESIA studies must incorporate labor management plans, ensure safe working conditions, uphold labor rights, and establish grievance mechanisms.

Social, Gender, and Indigenous Peoples Commitments

Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) – 1981

CEDAW obligates the Philippines to promote gender equality and protect women from discrimination. ESIA processes should integrate gender-responsive planning, ensure women's participation in consultations and decision-making, and include mitigation measures addressing gender-specific risks and opportunities, including in livelihood restoration and grievance redress mechanisms.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) – 2007

UNDRIP recognizes the rights of indigenous peoples to their lands, resources, and cultural heritage. ESIA must incorporate Free, Prior, and Informed Consent (FPIC), culturally appropriate consultation, and safeguards to

ensure that indigenous communities are meaningfully engaged, that their rights are respected, and that project benefits are equitably shared.

Convention on the Rights of the Child (CRC) – 1990

The CRC commits the Philippines to protect the rights of children, including their health, safety, and access to education. ESIA studies must consider child-sensitive safeguards, prevent exposure to project-related risks, and ensure that community programs do not adversely impact children.

Sustainable Development and Climate Commitments

2030 Agenda / Sustainable Development Goals (SDGs) – 2015

The SDGs guide the Philippines in pursuing inclusive, equitable, and sustainable development. ESIA processes should align project impacts and mitigation measures with relevant SDGs, addressing poverty reduction, health, education, gender equality, environmental protection, and climate action to maximize positive social and environmental outcomes.

Sendai Framework for Disaster Risk Reduction – 2015

The Philippines' commitment to the Sendai Framework emphasizes reducing disaster risks and enhancing resilience to natural hazards. ESIA studies should include disaster risk assessments, climate adaptation measures, and resilience-building strategies for vulnerable communities, ensuring the project can withstand and adapt to extreme events and climate-related hazards.

Maritime, Shipping, and Marine Environmental Commitments

International Convention for the Prevention of Pollution from Ships (MARPOL)

Establishes controls on marine pollution from ships, including oil, hazardous substances, sewage, garbage, and air emissions. For ESIA purposes, MARPOL informs pollution prevention measures, waste handling, spill prevention, and operational controls for port-related activities and vessel traffic.

International Maritime Organization (IMO) Conventions and Instruments

Relevant IMO instruments provide international standards for maritime safety, marine environmental protection, and ship–port interface management. These standards inform port operational practices, navigation safety, vessel traffic management, and emergency preparedness.

These maritime commitments complement national regulations and reinforce pollution prevention, marine ecosystem protection, and safety requirements applicable to port redevelopment projects

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Table 3-1Summary Table: International Commitment Matrix

International Commitment	Relevance to ESIA	Social Safeguards / Community	Labor & Working Conditions	Climate/ Environmental Protection
UNFCCC – 1994	Requires climate risk assessment, mitigation planning, and integration of climate considerations in project design	Supports adaptation measures for vulnerable communities	-	Guides GHG eduction and climate-resilient infrastructure
Paris Agreement – 2016	Ensures alignment with NDCs and low-carbon development	-	-	Promotes climate-resilient and low-emission project design
Convention on Biological Diversity (CBD) – 1993	Guides biodiversity assessments and ecosystem management	Protects communities relying on ecosystem services	-	Conserves habitats, species, and ecological functions
Ramsar Convention – 1994	Assesses impacts on wetlands and hydrology	Safeguards livelihoods dependent on wetlands	-	Ensures sustainable wetland management
CITES – 1981	Evaluates impacts on protected species	Supports protection of indigenous and local resource use	-	Prevents exploitation of endangered species
Montreal Protocol – 1989	Evaluates ozone-depleting substance use in operations	-	Ensures safe industrial processes	Reduces ozone-depleting emissions
Stockholm Convention – 2004	Addresses chemical and hazardous material impacts	Protects communities from exposure	OSHE compliance for workers	Prevents persistent organic pollutant contamination
Basel Convention – 1994	Manages hazardous waste and disposal	Protects public health	Ensures safe handling for workers	Promotes environmentally sound waste management
Minamata Convention – 2017	Controls mercury use and emissions	Reduces community exposure risks	OSHE compliance	Mercury reduction and environmental safety
UDHR – 1948	Ensures respect for human rights in project planning	Prevents discrimination and social inequities	-	-
ICCPR – 1986	Promotes community participation and consultation	Protects civil rights and community freedoms	-	-
ICESCR – 1986	Guides social impact assessment	Ensures access to health, education, and livelihood	Supports fair employment	-

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International Commitment	Relevance to ESIA	Social Safeguards / Community	Labor & Working Conditions	Climate/ Environmental Protection
ILO Core Conventions	Guides labor management and working conditions	Protects vulnerable workers	Prevents forced/child labor, ensures OSHE and grievance mechanisms	-
CEDAW – 1981	Integrates gender-responsive planning	Promotes women's participation and protection	Ensures gender equity in employment	-
UNDRIP – 2007	Requires FPIC and culturally appropriate consultation	Protects indigenous rights, land, and culture	Supports inclusion in labor opportunities	Promotes sustainable resource use
CRC – 1990	Guides child-sensitive risk assessment	Protects children in communities	-	-
2030 Agenda / SDGs – 2015	Aligns project with sustainable development objectives	Supports poverty reduction, health, education, gender equality	Ensures inclusive labor practices	Promotes sustainable environmental management
Sendai Framework – 2015	Requires disaster risk assessment and resilience planning	Strengthens community disaster preparedness	-	Enhances climate and disaster resilience

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3.3 Gap Analysis: Philippine EIA and AIIB ESF

The Philippine Environmental Impact Assessment (EIA) System and the AIIB ESF share a common objective of promoting environmentally and socially responsible project development. However, they differ in scope, emphasis, and level of integration of environmental and social risk management.

The Philippine EIA System, established under Presidential Decree (PD) 1586 and implemented through relevant DENR Administrative Orders, provides a structured regulatory mechanism for assessing environmental impacts and securing environmental approval through the issuance of an ECC. The system emphasizes baseline environmental data collection, identification and evaluation of environmental risks, formulation of mitigation measures, and compliance monitoring. Public consultation is a mandatory component of the Philippine EIA process; however, engagement is generally focused on statutory requirements linked to ECC issuance. Social issues such as land acquisition and resettlement are addressed through separate national legislation, while labor, occupational safety, gender, and governance considerations are typically managed outside the EIA process.

In contrast, the AIIB ESF provides an integrated approach to environmental and social risk management applicable throughout the project lifecycle. The AIIB ESF comprises three ESSs:

- ESS 1 – Environmental and Social Assessment and Management, which addresses environmental risks, pollution prevention, resource efficiency, biodiversity, labor and occupational health and safety, community health and safety, stakeholder engagement, grievance mechanisms, gender, and climate and disaster risk considerations;

- ESS 2 – Land Acquisition and Involuntary Resettlement; and

- ESS 3 – Indigenous Peoples.

ESS 1 serves as the overarching standard governing environmental and social risk identification, assessment, mitigation, monitoring, and adaptive management. It requires a proportional, risk-based approach that integrates environmental and social considerations into project design, implementation, and operation.

A comparison of the two frameworks highlights several differences in emphasis rather than contradictions. The Philippine EIA System focuses primarily on environmental impacts and regulatory compliance, while the AIIB ESF emphasizes integrated environmental and social risk management, proportionality to risk, stakeholder engagement beyond statutory consultation, and the establishment of formal management systems and grievance mechanisms. While the national system provides a strong foundation for environmental protection, additional elements required under the AIIB ESF—particularly under ESS 1—are incorporated through the ESIA and the ESMP.

For this Project, the ESIA has been prepared to bridge procedural and substantive differences between the Philippine EIA System and the AIIB ESF by:

- Building upon the environmental baseline and regulatory compliance requirements of the Philippine EIA System;
- Expanding the scope of assessment to include labor and occupational health and safety, community health and safety, gender considerations, stakeholder engagement, and climate and disaster risk screening, to align with ESS 1 requirements;
- Applying the mitigation hierarchy and proportionality principle to environmental and social risks; and
- Consolidating mitigation, monitoring, institutional responsibilities, and adaptive management measures into an integrated ESMP.

This approach ensures that the Project meets both national regulatory requirements and AIIB environmental and social safeguard expectations without duplication or conflict.

Table 3-2 Detailed Gap Analysis

Aspect	Philippine EIA System	AIIB ESF	Gap / Limitation	Recommendation / Bridging Measures
Scope of Assessment	Primarily environmental impacts; social considerations included only indirectly through consultation; resettlement addressed under RA 10752 (ROW).	Integrated environmental, climate, social, labor, and governance risk assessment across all ESS.	Philippine EIA lacks a systematic social, labor, and cultural heritage assessment framework; limited integration of ESG factors.	ESIA expands scope to include environmental, labor, community, and social risks to align with ESS 1
Environmental Management	Environmental mitigation and monitoring required for ECC compliance	ESS 1 requires systematic risk management, monitoring, and adaptive management	ESF places stronger emphasis on management systems, mitigation hierarchy including biodiversity offsetting, and critical habitat, cumulative impacts and ecosystem services considerations	ESMP integrates environmental mitigation, monitoring, and corrective actions
Land Acquisition & Resettlement	Addressed under separate national laws (e.g., ROW legislation)	ESS 2 applies when resettlement impacts are identified	Payment of full replacement cost and livelihood restoration requirement	A standalone resettlement plan has been prepared in accordance with AIIB ESS2 and national regulations
Indigenous Peoples	Addressed through separate laws and permitting	ESS 3 applies where Indigenous Peoples are present	No significant gap	ESS 3 screening conducted; not applicable to the Project
Labor & Occupational Health and Safety	Governed by Labor Code and OSH laws; not central to EIA	Addressed under ESS 1	Labor risks not systematically assessed in EIA	Labor and OSH risks assessed and managed through ESMP
Community Health and Safety	Addressed indirectly through environmental controls	Covered under ESS 1	ESF requires explicit assessment	Community health and safety risks assessed under ESS 1

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Aspect	Philippine EIA System	AIIB ESF	Gap / Limitation	Recommendation / Bridging Measures
Stakeholder Engagement	Public consultation required for ECC	ESS 1 requires structured and ongoing engagement	Engagement under EIA often limited in duration	Stakeholder Engagement Plan developed and implemented
Grievance Redress Mechanism	Not standardized	ESS 1 requires accessible and transparent GRM	GRM not mandatory under EIA	Project-level GRM established
Biodiversity	Focus on protected areas and regulatory thresholds	Biodiversity addressed under ESS 1	Different depth of assessment	Biodiversity risks assessed proportionately under ESS 1
Climate & Disaster Risk	Not systematically required	ESS 1 requires consideration of climate and disaster risks	Climate risk not formalized under EIA	Climate and disaster risk screening incorporated
Monitoring & Reporting	Focus on ECC compliance	ESS 1 requires integrated monitoring and adaptive management	Broader monitoring scope under ESF	ESMP includes environmental and social indicators
Gender & Vulnerable Groups	Not explicitly required	Addressed under ESS 1	Gender not systematically assessed	Gender risks assessed and mitigation integrated into ESMP

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4 Project Description

4.1 Project Background and Overview

The Bauan International Port Re-Development Project is located in Barangay San Andres I, in the Municipality of Bauan, Province of Batangas. The project site benefits from a strategic location along Batangas Bay, a naturally sheltered cove that provides protection from adverse weather conditions and supports safe and efficient marine operations. The port serves as a critical logistics hub for the Cavite-Laguna-Batangas-Rizal-Quezon (CALABARZON) region, facilitating both inter-island and international trade while supporting the automobile, construction, and general cargo sectors.

The Port was originally granted an ECC No. 0002-047-215 issued to AG&P Port Services Company of Batangas, Inc. (APSCBI). The ECC was subsequently transferred to BIPI, establishing BIPI as the current Project proponent and authorized port operator. The ECC and its transfer remain valid and constitute the prevailing domestic environmental approval governing port operations and redevelopment activities within the approved footprint, consistent with the Philippine EIS System under Presidential Decree No. 1586 and DENR Administrative Order 2017-25.

Scope of the ESIA and AIIB Financing

This ESIA is explicitly limited to Phase 1 expansion and redevelopment activities that are already covered by the existing ECC and for which partial financing is being sought from the AIIB. The ESIA does not cover any activities outside the scope, footprint, or conditions of the existing ECC.

BIPI has separately initiated an Environmental Performance Report and Management Plan (EPRMP) application to support potential Phase 2 development. However, the Phase 2 scope is not covered by this ESIA, and the timing, configuration, and implementation of Phase 2 remain subject to ongoing domestic regulatory review and future approvals. Any future Phase 2 activities will require separate environmental and social assessment, including compliance with both national regulatory requirements and applicable international financing standards, as appropriate.

The redevelopment project seeks to modernize port facilities, enhance operational efficiency, and strengthen BIPI's role as a strategic gateway for commerce and industry in the CALABARZON region. The project aligns with international good practices, including the AIIB Environmental and Social Standard (ESS) and IFC Performance Standards, by integrating environmental protection, social safeguards, labor standards, climate resilience, and stakeholder engagement into project design and operations.

Integration with the Domestic EIA Process

This ESIA has been prepared to complement, and not replace, the Philippine EIA process. Any additional findings, mitigation measures, or conditions arising from ongoing or future domestic regulatory processes shall be incorporated into the international ESIA, as applicable. Where relevant, disclosure of this ESIA reflects a clear commitment that no construction activities will commence outside the scope of the existing ECC until all required domestic approvals have been completed.

Change Management and Adaptive Assessment

Consistent with AIIB ESF requirements, the following principles apply to the Project:

- Any changes to Project design, alignment, or footprint within Phase 1 shall be subject to reassessment, and any additional findings and mitigation measures shall be incorporated into the ESIA and associated management plans.
- If any expansion or realignment occurs beyond the existing approved footprint, additional baseline surveys such as terrestrial and/or marine ecological surveys and social impact assessment shall be conducted.
- Adaptive management measures shall be applied to ensure that environmental and social risks and impacts remain within acceptable limits throughout Project implementation.

4.1.1 Project Location and Area

The port is strategically located approximately 120 kilometers south of Metro Manila and about 9 kilometers west of Batangas City, occupying a key position along the eastern margin of Batangas Bay. The bay is naturally sheltered by surrounding islands and landforms, which reduce exposure to severe weather and provide favorable conditions for navigation and port operations. The port serves primarily as a roll-on/roll-off (RORO) and project cargo terminal, supporting the movement of automobiles, construction equipment, and general cargo within Batangas and the wider CALABARZON region.

The Province of Batangas is situated in southwestern Luzon within the CALABARZON Region and is bounded by Cavinti and Laguna to the north, Quezon to the east, Mindoro across the Verde Island Passage to the south, and the South China Sea to the west. Batangas is one of the country's most important industrial and logistics hubs and was recognized by the Commission on Audit (COA) in 2020 as the second richest province in the Philippines in terms of total provincial assets. Its strong economic performance reflects the concentration of ports, industrial estates, power facilities, and tourism areas along its coastlines.

The Municipality of Bauan is a first-class coastal municipality located in the central lowlands of Batangas Province. Its terrain consists of gently rolling hills and upland areas, with Mount Durungao as the highest point, transitioning into extensive coastal and near-shore marine environments. Bauan is bordered by San Luis to the north, San Pascual to the east, and Mabini to the south and southwest, and is flanked by Balayan Bay to the west and Batangas Bay to the southeast. The municipality is accessible through major road networks including the Palico–Balayan–Batangas Road, Bauan–Mabini Road, and Makalintal Avenue, and is approximately 7 kilometers from Batangas City and about 112 kilometers from Manila.

Importantly, Bauan forms part of the Verde Island Passage, internationally recognized as the "center of the center of marine biodiversity of the world." The Verde Island Passage supports the highest recorded concentration of marine shorefish species globally and hosts extensive coral reefs, seagrass beds, and mangrove ecosystems that provide critical habitats for fisheries, coastal protection, and marine-based livelihoods. Because Batangas Bay and the coastal waters of Bauan are hydrologically and ecologically connected to the Verde Island Passage, activities within the bay have the potential to influence the broader marine ecosystem through water circulation, sediment transport, and biological connectivity.

While the Bauan International Port is located within the coastal zone of Batangas Bay, baseline environmental surveys for the Project confirmed that no coral reefs, seagrass beds, mangroves, or natural terrestrial habitats are present within the Project footprint. Benthic conditions within the port area are characterized by modified substrates and long-standing port-related disturbance, reflecting its established industrial and maritime use. Sensitive marine ecosystems associated with the Verde Island Passage and the Bauan Marine Protected Area are located outside the Project Area and its zone of direct influence. Bauan Marine Protected Area is located approximately 6.25 km from the Project. Accordingly, the Project is situated in a developed port environment and does not directly encroach upon or disturb protected or high-value marine habitats, while still operating within a broader regional setting that underscores the importance of sound environmental management.

4.1.2 Project Area Mapping

To support environmental and social planning, the project area has been delineated with respect to multiple spatial scales, including sitio, barangay, municipality, province, and region boundaries. Mapping also identifies the vicinity, proposed buffer zones, and primary and secondary areas of potential environmental and social influence, consistent with national EIA requirements and international best practices (AIIB ESF and IFC PS1). These maps are essential for:

- Defining the AoI for baseline data collection.
- Guiding the assessment of potential environmental, social, and cumulative impacts.
- Informing stakeholder engagement, including consultation with affected communities, government agencies, and other relevant stakeholders.
- Identifying critical habitats, sensitive ecosystems, and community assets that may be impacted by the project.

The Bauan International Port's strategic location, economic importance, and natural protection make it a suitable site for modernization, while ensuring alignment with national laws, environmental standards, and international best practices for sustainable port development.

An Ecologically Appropriate Area of Analysis (EAAA) has been considered through the biodiversity and marine baseline assessments presented in Chapter 6 (Baseline Conditions) and further assessed in the impact evaluation chapters of the ESIA. The EAAA accounts for potential ecological linkages and impact pathways that may extend beyond the immediate Project footprint, including marine ecological processes and regional biodiversity context, and is not limited to administrative or engineering boundaries.

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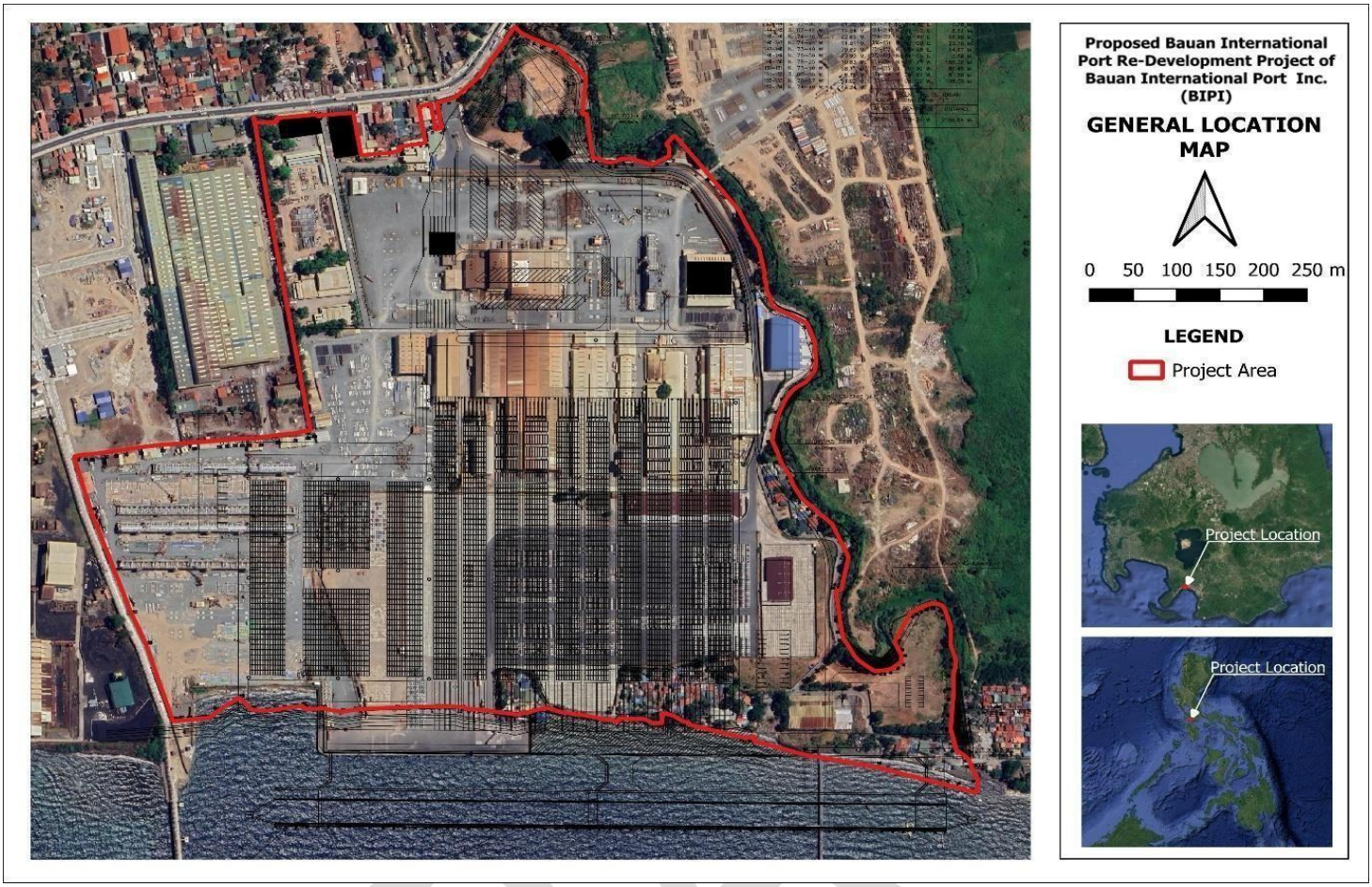

Figure 4-1 General Existing Location Map of the Project Site

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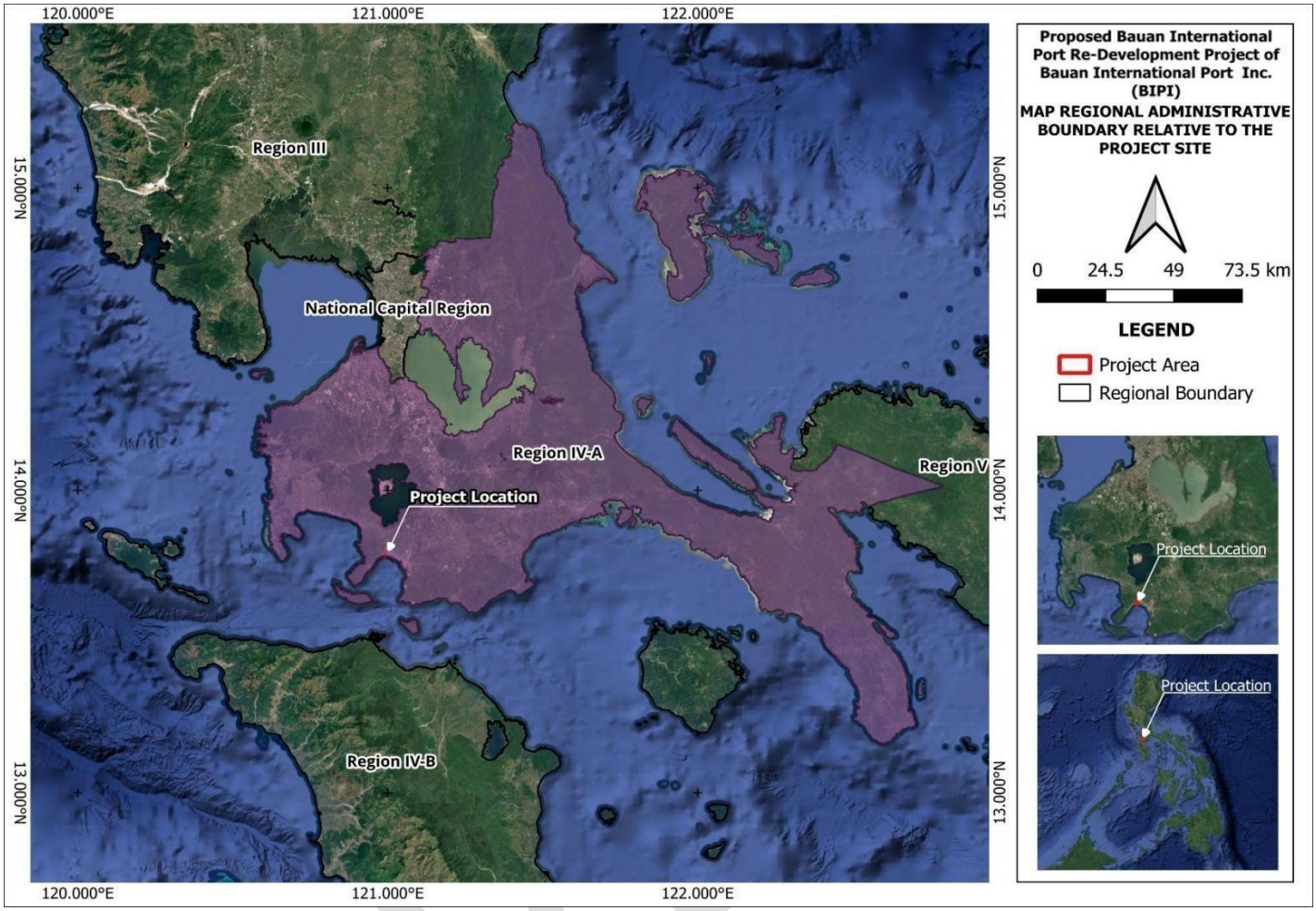

Figure 4-2 Project Location vis-a-vis Regional Boundaries

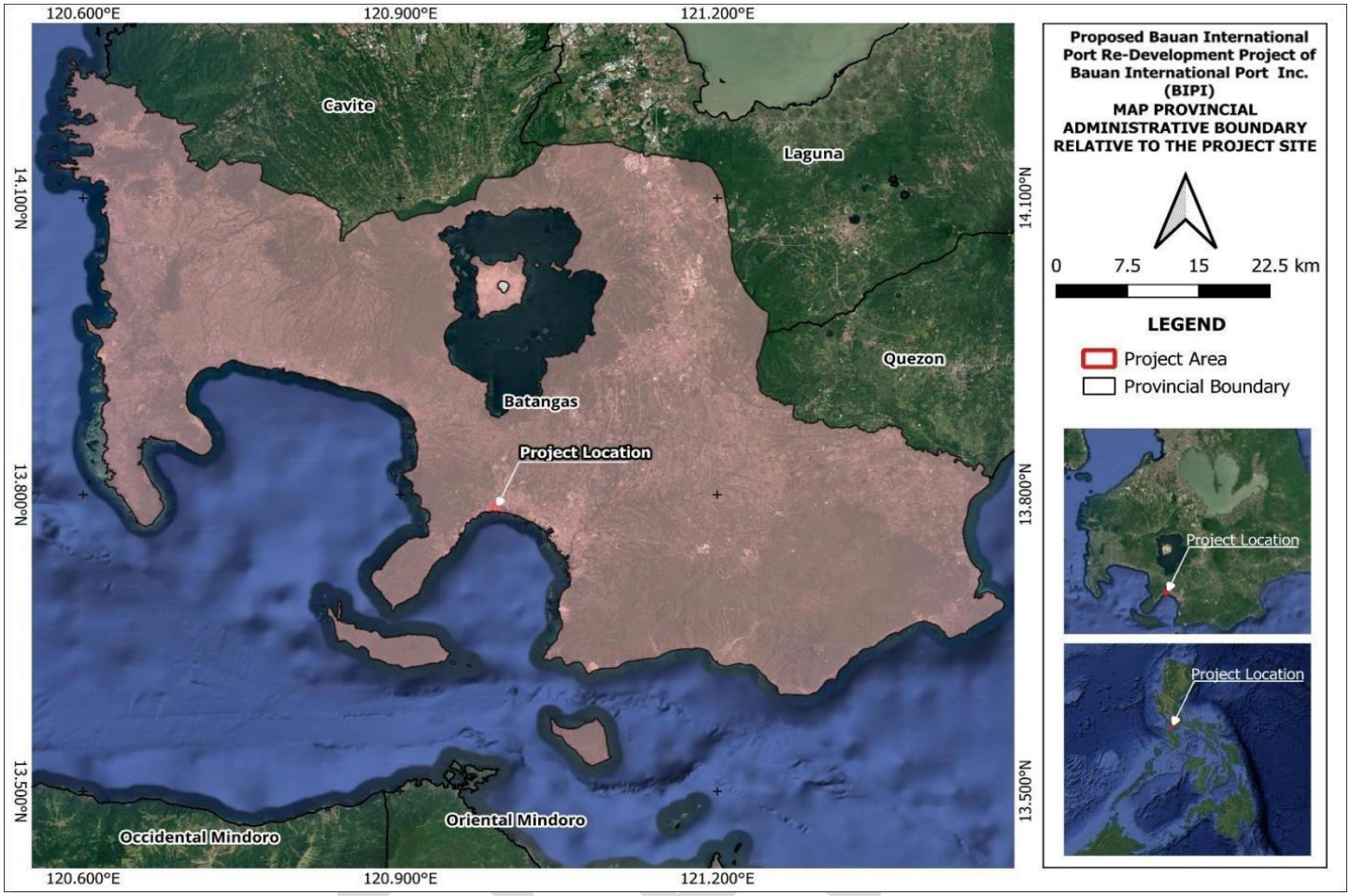

Figure 4-3 Project Location vis-a-vis Provincial Boundaries

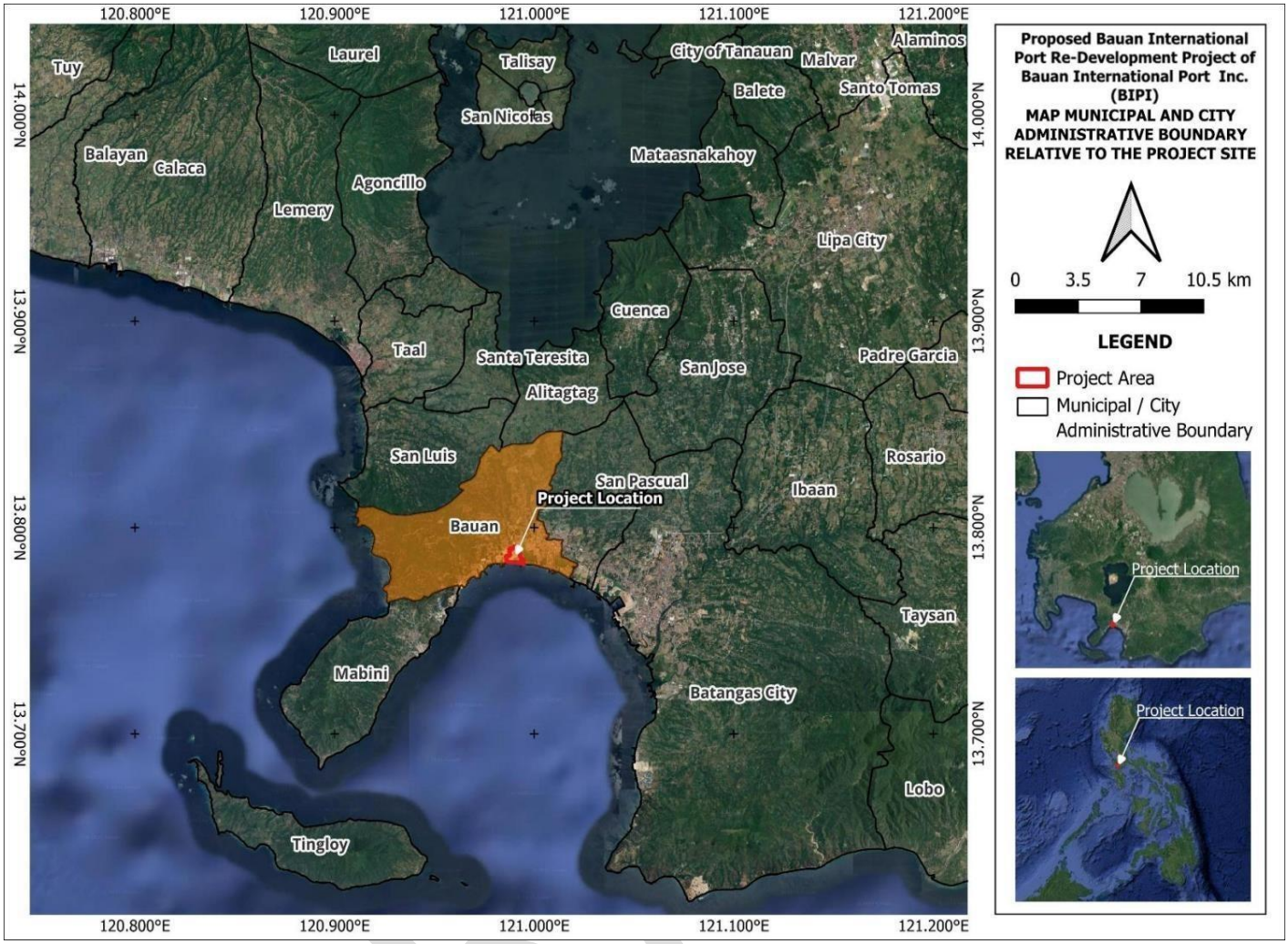

Figure 4-4 Project Location vis-a-vis Municipal Boundaries

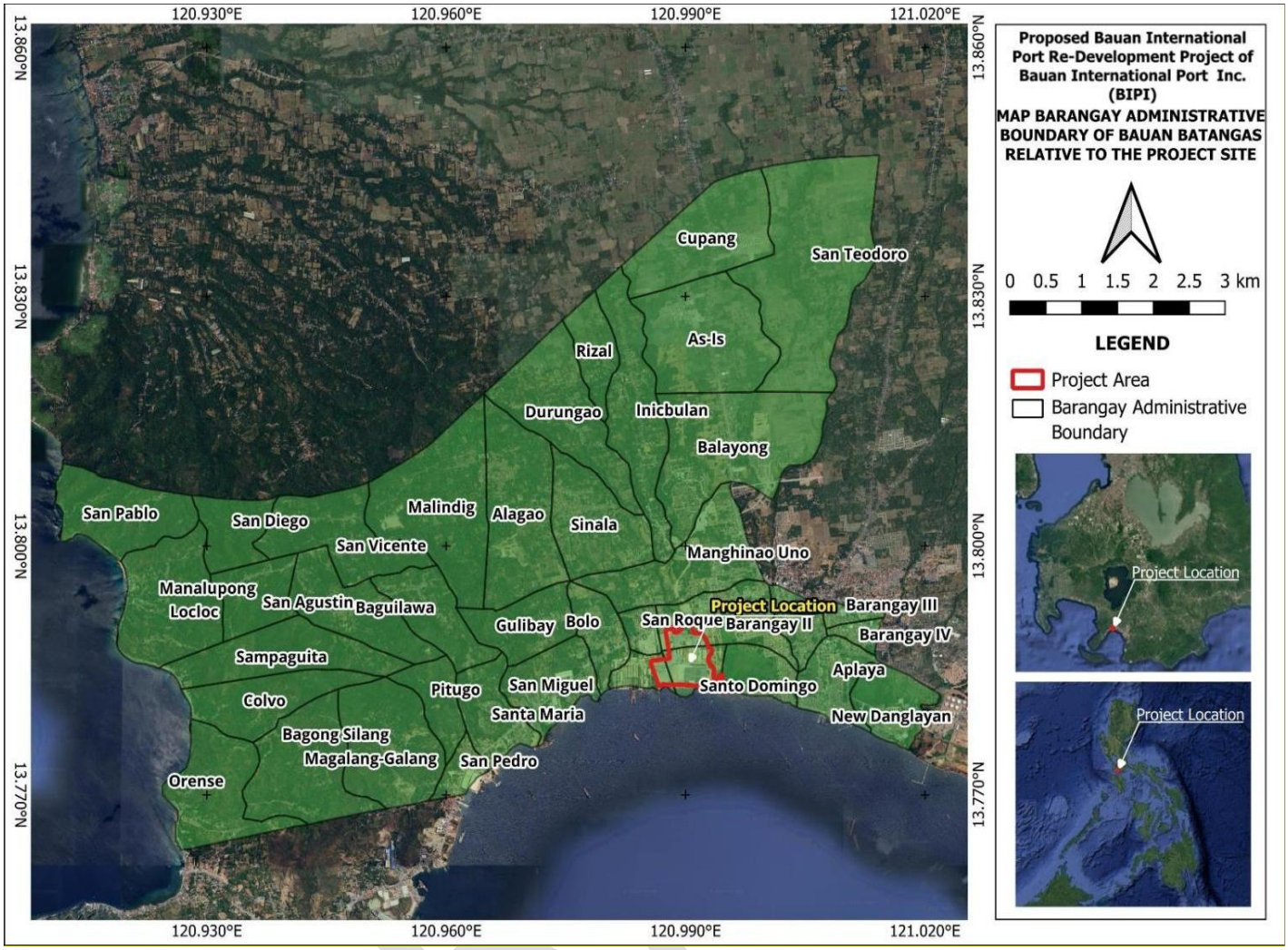

Figure 4-5 Project Location showing Barangay Boundaries

4.1.3 Geographical Coordinates

The geographic extent of the Bauan International Port Re-Development Project covers a total area of approximately 51.76 hectares. The project boundaries are defined using geographic coordinates referenced to the World Geodetic System 1984 (WGS 84), which is the internationally accepted standard for spatial data consistency and interoperability.

The use of WGS 84 ensures alignment with national mapping standards adopted by government agencies and international financial institutions, including the AIIB, and supports accurate integration with Geographic Information Systems (GIS), satellite imagery, and environmental baseline datasets. The coordinates

delineating the project footprint are presented in the succeeding table and serve as the basis for impact assessment, monitoring, and regulatory review.

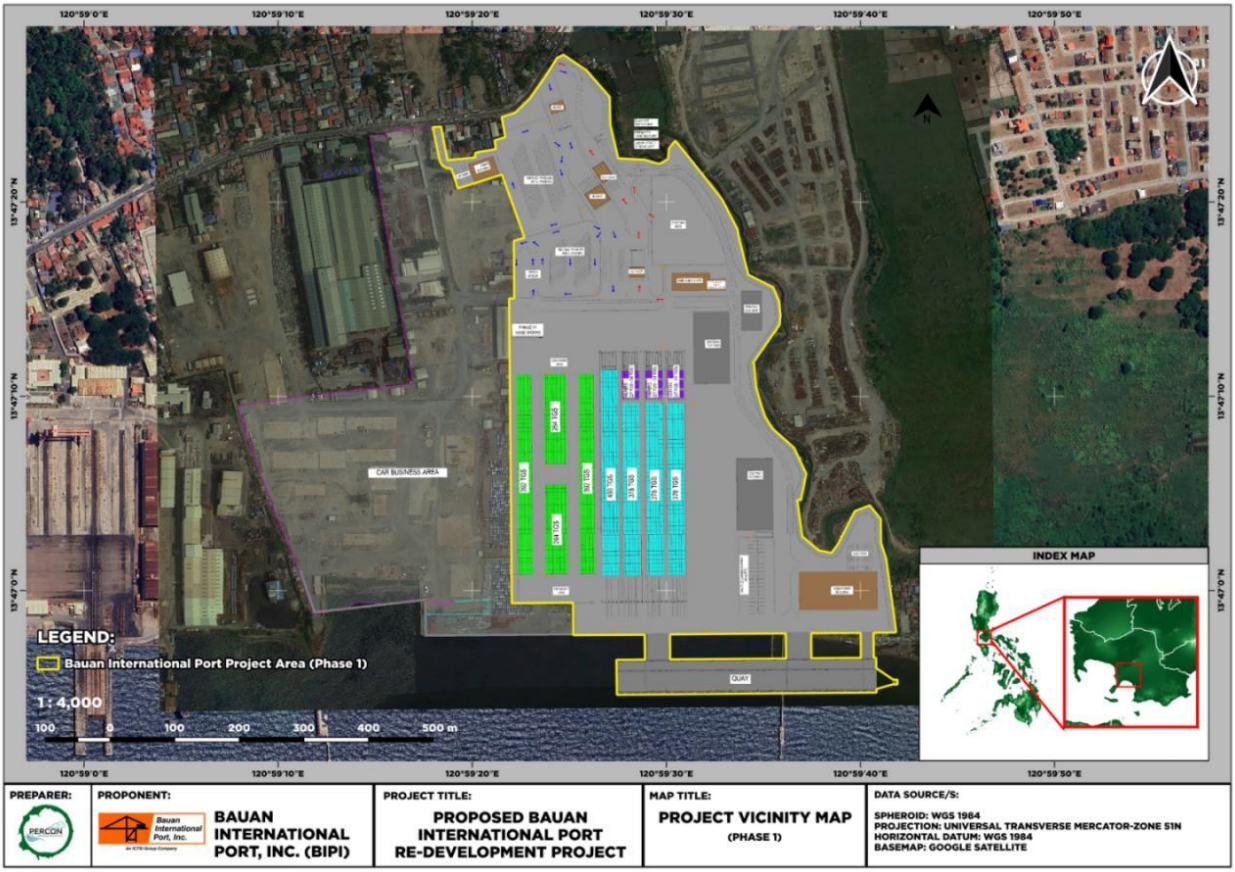

Figure 4-6 Vicinity Map Project Area

Table 4-1 Geographical Coordinates of Project Site

BIPI LOT BOUNDARY - COORDINATES OF CORNERS		
CORNER NO.	**NORTHING**	**EASTING**
1	1525094.11	498493.262
2	1525094.92	498518.389
3	1525099.81	498517.597
4	1525104.53	498562.741
5	1525102.58	498563.059
6	1525102.4	498566.388
7	1525103.53	498567.427
8	1525106.48	498603.457
9	1525052.96	498612.413
10	1525055.48	498634.014

CORNER NO.	NORTHING	EASTING
118	1524478.4	499229.137
119	1524481.5	499234.917
120	1524486.37	499244.594
121	1524489.09	499251.39
122	1524488.21	499257.568
123	1524486.46	499261.932
124	1524483.06	499264.781
125	1524473.2	499267.787
126	1524470.62	499268.727
127	1524465.6	499270.18
128	1524462.77	499270.803

11	1525056.32	498644.611
12	1525058.99	498655.589
13	1525063.86	498655.097
14	1525066.29	498669.889
15	1525067.29	498677.051
16	1525068.9	498684.138
17	1525114.05	498676.801
18	1525117.94	498689.937
19	1525091.54	498694.451
20	1525086.24	498694.556
21	1525085.53	498694.776
22	1525087.23	498702.16
23	1525119.27	498697.089
24	1525123.17	498709.374
25	1525126.79	498718.451
26	1525149.35	498741.426
27	1525182.57	498764.051
28	1525205.16	498777.89
29	1525213.32	498782.89
30	1525214.18	498784.637
31	1525209.57	498787.965
32	1525207.73	498789.695
33	1525202.54	498798.592
34	1525200.6	498801.888
35	1525198.6	498806.436
36	1525193.8	498816.411
37	1525188.52	498829.177
38	1525185.96	498833.984
39	1525150.64	498863.427
40	1525104.46	498859.121
41	1525105.91	498864.084
42	1525071.09	498868.259
43	1525060.86	498869.486
44	1525049.46	498871.645
45	1525049.06	498878.213
46	1525046.68	498879.978
47	1525044.56	498884.239
48	1525043.63	498887.447

129	1524460.9	499272.14
130	1524436.51	499272.049
131	1524419.21	499277.323
132	1524408.8	499277.242
133	1524397.79	499274.718
134	1524381.65	499275.11
135	1524368.45	499274.622
136	1524348.05	499273.153
137	1524331.49	499271.898
138	1524313.26	499276.498
139	1524305.82	499277.574
140	1524292.97	499292.553
141	1524285.69	499294.567
142	1524265.95	499302.547
143	1524251.54	499300.598
144	1524257.68	499278.801
145	1524260.71	499267.696
146	1524282.91	499191.162
147	1524297.03	499118.626
148	1524299.21	499108.016
149	1524316.04	499052.401
150	1524309.86	499052.383
151	1524312.06	499041.602
152	1524328.91	498979.506
153	1524331.91	498979.319
154	1524332.73	498973.141
155	1524340.06	498962.184
156	1524343.94	498948.698
157	1524330.75	498949.778
158	1524330.48	498939.92
159	1524335.79	498930.01
160	1524336.09	498919.137
161	1524336.6	498900.872
162	1524331.6	498899.987
163	1524335.28	498892.094
164	1524335.42	498884.922
165	1524337.67	498876.471
166	1524339.3	498868.479

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49	1525042.67	498889.442
50	1525043.73	498897.399
51	1525045.11	498900.59
52	1525047.24	498903.89
53	1525047.45	498904.979
54	1525046.78	498916.154
55	1525039.68	498938.568
56	1525047.5	498951.788
57	1525050.55	498957.513
58	1525060.87	498957.711
59	1525065.4	498954.295
60	1525075.8	498962.699
61	1525076.16	498964.005
62	1525045.77	498987.625
63	1524982.63	499035.269
64	1524935.1	499058.031
65	1524915.05	499061.77
66	1524901.24	499064.846
67	1524900.84	499063.386
68	1524891.38	499065.728
69	1524884.84	499066.029
70	1524876.53	499068.413
71	1524874.58	499069.892
72	1524861.61	499073.106
73	1524841.24	499111.192
74	1524818.76	499119.832
75	1524796.38	499121.523
76	1524781.65	499120.387
77	1524767.08	499110.376
78	1524761.71	499101.806
79	1524756.66	499095.404
80	1524744.81	499087.181
81	1524728.58	499080.459
82	1524706.34	499074.689
83	1524693.62	499072.579
84	1524675.58	499063.372
85	1524652.26	499060.129
86	1524647.52	499060.395

167	1524340.94	498860.455
168	1524341.74	498852.405
169	1524343.71	498844.034
170	1524344.43	498836.738
171	1524347.45	498828.45
172	1524349.78	498822.069
173	1524348.65	498815.063
174	1524341.12	498787.111
175	1524342.74	498781.166
176	1524343.07	498775.473
177	1524345.03	498763.354
178	1524347.01	498750.706
179	1524347.97	498742.697
180	1524348.33	498733.793
181	1524351.15	498725.647
182	1524351.62	498717.082
183	1524351.97	498709.189
184	1524352.08	498700.768
185	1524351.53	498692.352
186	1524351.43	498682.663
187	1524350.66	498665.683
188	1524350	498650.848
189	1524348.39	498615.036
190	1524348.52	498612.402
191	1524344.96	498590.751
192	1524349.37	498570.014
193	1524348.69	498560.013
194	1524348.56	498550.734
195	1524352.56	498547.886
196	1524351.01	498538.011
197	1524349.09	498525.933
198	1524347.52	498516.057
199	1524346.04	498506.67
200	1524347.72	498490.794
201	1524362.78	498477.307
202	1524348.92	498457.169
203	1524337.37	498443.967
204	1524335.74	498427.317

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87	1524628.74	499066.44
88	1524608.56	499072.933
89	1524580.6	499086.743
90	1524573.08	499092.257
91	1524570.6	499096.037
92	1524567.95	499104.635
93	1524566.15	499133.206
94	1524565.35	499139.75
95	1524563.4	499143.711
96	1524547.16	499157.9
97	1524505.6	499149.561
98	1524505.34	499143.627
99	1524471.52	499148.083
100	1524467.73	499148.286
101	1524453.43	499150.459
102	1524444.23	499152.343
103	1524438.7	499156.023
104	1524422.6	499164.81
105	1524417.52	499169.002
106	1524410.34	499177.984
107	1524403.74	499187.62
108	1524404.38	499194.405
109	1524404.9	499197.679
110	1524406.6	499204.844
111	1524413.47	499214.286
112	1524416.21	499216.858
113	1524423.88	499216.822
114	1524430.88	499213.446
115	1524440.1	499209.424
116	1524441.11	499209.085
117	1524477.54	499227.4

205	1524333.88	498409.223
206	1524333.35	498403.106
207	1524430.89	498372.849
208	1524469.33	498356.374
209	1524599.94	498310.72
210	1524665.6	498292.636
211	1524666.83	498297.641
212	1524667.49	498301.577
213	1524668.58	498312.587
214	1524670.33	498324.983
215	1524670.55	498326.467
216	1524672.55	498339.697
217	1524673.68	498347.222
218	1524676.9	498365.549
219	1524677.08	498366.887
220	1524679.79	498387.096
221	1524682.86	498422.479
222	1524685.79	498457.838
223	1524686.8	498464.957
224	1524687.92	498474.911
225	1524687.97	498480.573
226	1524688.44	498488.339
227	1524688.46	498496.949
228	1524691.85	498515.633
229	1524694.67	498539.164
230	1524697.98	498553.456
231	1524698.23	498557.04
232	1524851.12	498531.41
233	1524936.38	498517.141
234	1524987.23	498508.981

4.1.4 Primary and Secondary Impact Areas

Consistent with the DENR EIA Procedural Manual (DAO 2017-25) and the AIIB ESS1, the study area for the ESIA has been delineated into DIA and IIA. This approach allows for a systematic evaluation of both immediate and downstream environmental and social impacts arising from project construction, operation, and ancillary activities. The extent of the DIA and IIA varies by environmental and social component and is discussed in detail within the respective sections.

Direct Impact Area (DIA)

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The Direct Impact Area encompasses locations that will experience immediate, physical, and operational impacts from the Bauan International Port Re-Development Project. For land resources, the DIA includes the port footprint, internal circulation roads, storage and logistics areas, and adjacent transport corridors where construction activities and infrastructure upgrades will occur. These interventions may alter land use patterns, traffic flow, and localized economic activity.

For water resources, the DIA covers coastal and marine areas within and immediately adjacent to the port, where dredging, berthing improvements, and port operations may affect water quality, sediment dynamics, and marine habitats. Air quality impacts within the DIA are primarily associated with construction activities, increased vessel calls, cargo handling operations, and emissions from port equipment and vehicles.

From a social perspective, the DIA includes port workers, project personnel, nearby commercial establishments, and adjacent communities that may experience both positive impacts – such as employment generation, improved logistics efficiency, and economic stimulation – and potential adverse impacts, including increased noise, traffic, and environmental pressures. In line with national regulations and AIIB ESS requirements, mitigation measures will be implemented to manage adverse impacts and enhance positive outcomes.

Indirect Impact Area (IIA)

The Indirect Impact Area comprises areas that may experience secondary or cumulative impacts as a result of the project, even though they are not directly disturbed by construction or operations. On land, this may include surrounding municipalities and economic zones that could experience increased commercial and industrial development due to improved port capacity and connectivity.

In terms of water resources, indirect impacts may extend to nearby marine ecosystems beyond the immediate port area, potentially influenced by increased vessel traffic, changes in navigational patterns, and the wider dispersion of pollutants. Air quality effects may also extend into surrounding residential and commercial areas due to increased truck movements and supporting logistics activities.

Socially, the IIA may experience shifts in employment patterns, population dynamics, and service demand as economic opportunities expand in logistics, trade, and allied industries. While these changes are expected to contribute positively to local and regional development, they may also introduce challenges such as increased traffic congestion, pressure on housing and public services, and rising costs of living. These indirect impacts are assessed in accordance with cumulative impact assessment principles under international best practice.

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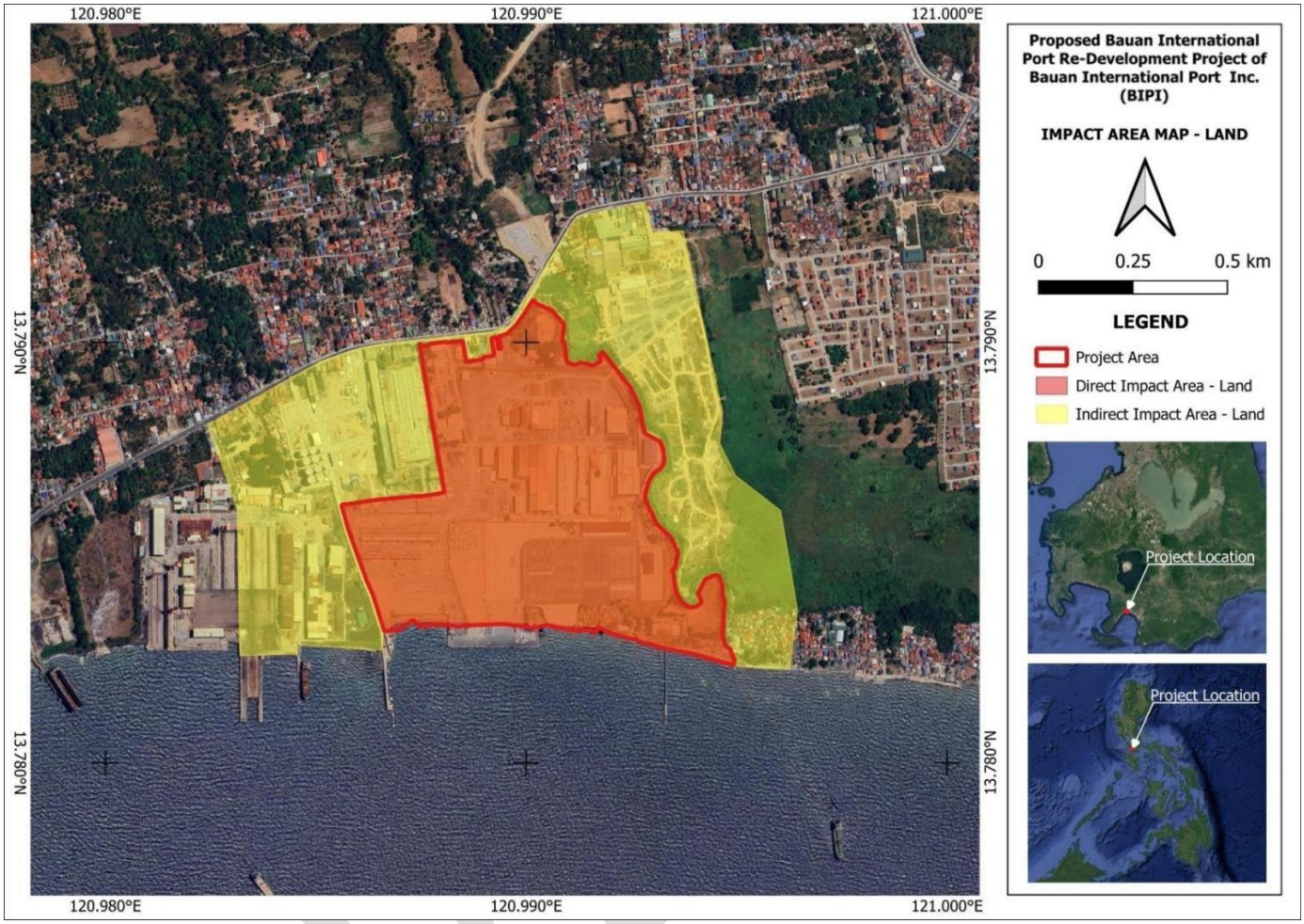

Figure 4-7 Map of Impact Areas - Land

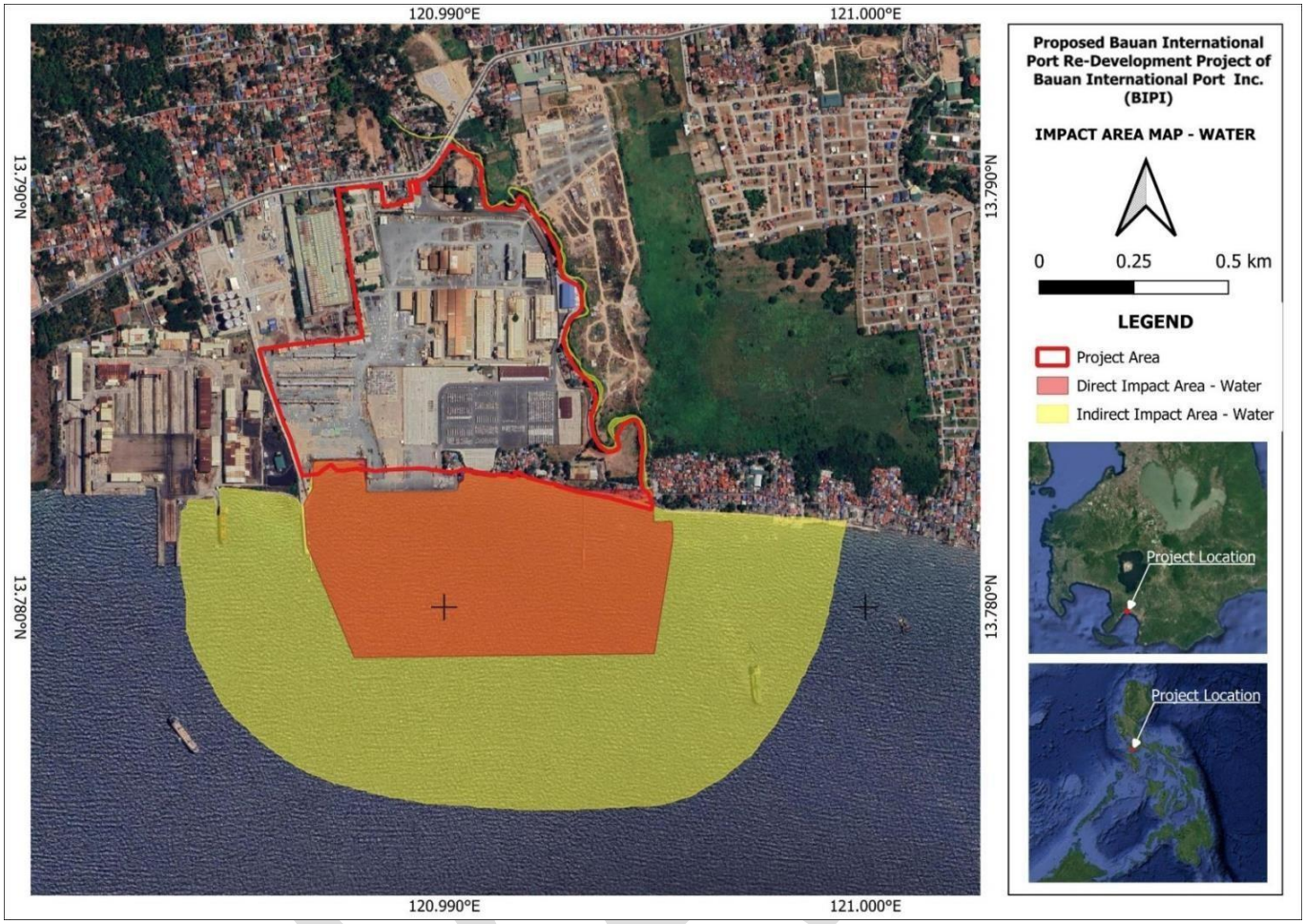

Figure 4-8 Map of Impact Areas - Water

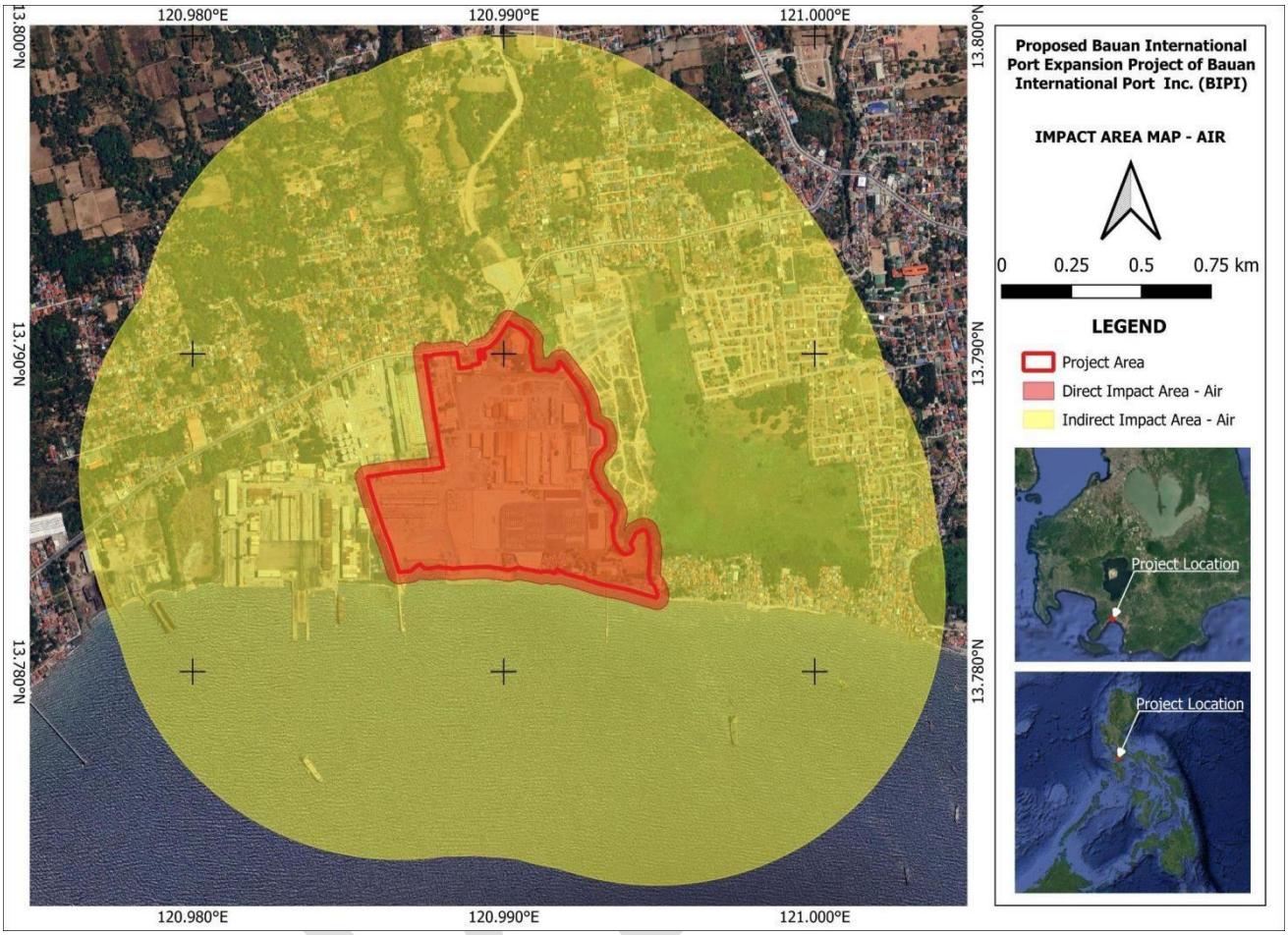

Figure 4-9 Map of Impact Areas - Air

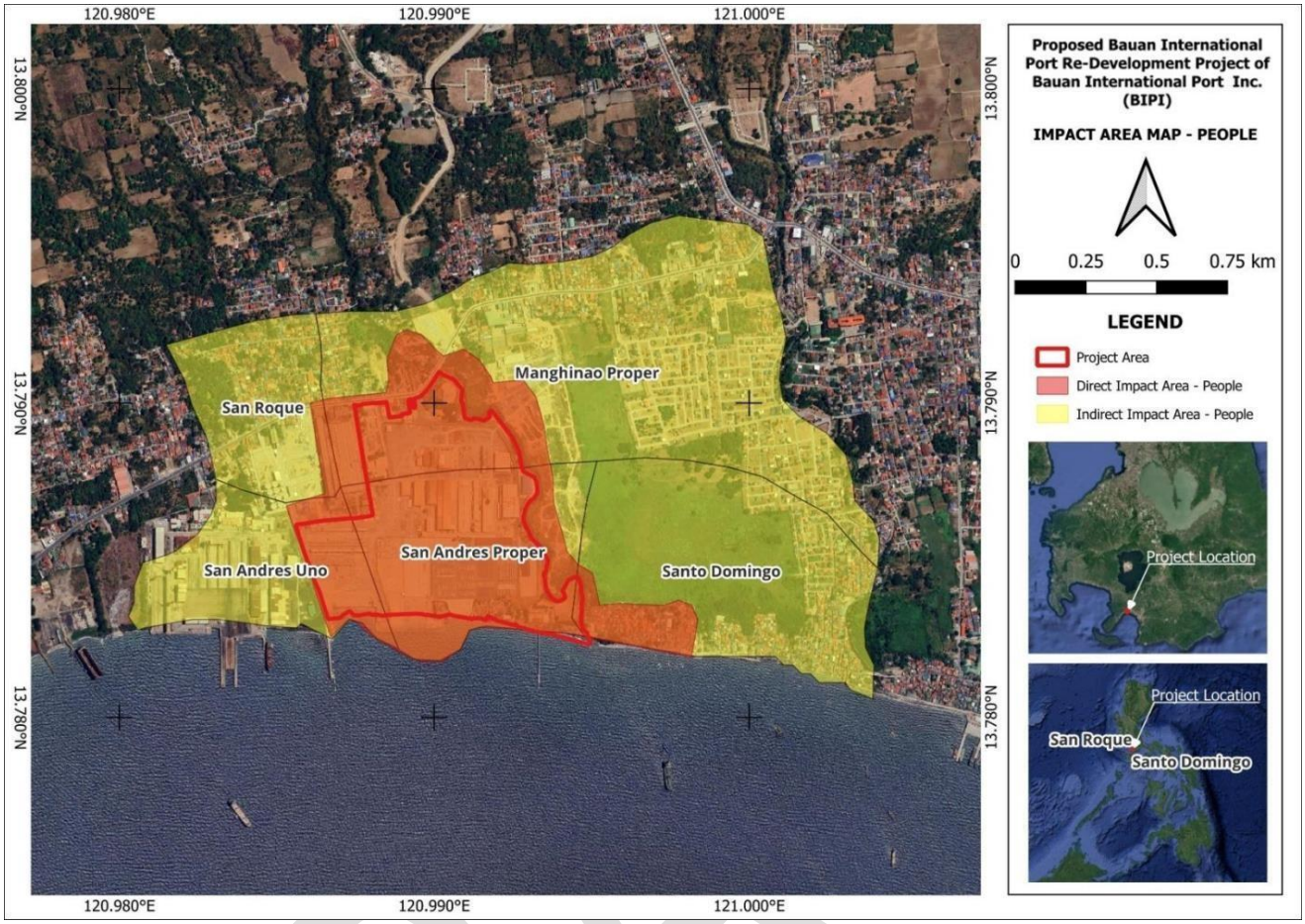

Figure 4-10 Map of Impact Areas - People

4.1.5 Description of the Vicinity and Accessibility of the Project Site

Bauan International Port is strategically located approximately 120 kilometers south of Metro Manila and about nine kilometers west of Batangas City, positioning it as a critical logistics hub within Southern Luzon and the CALABARZON industrial corridor. Its location enables efficient linkage between national production centers, export-oriented industries, and international shipping routes.

Access from Metro Manila typically involves travel via the South Luzon Expressway (SLEX) and the Southern Tagalog Arterial Road (STAR Tollway) toward Batangas City, followed by local roads such as the Bauan–Mabini Road. Travel time generally ranges from two to three hours, depending on traffic conditions. From Batangas City, the port is accessible within 30 minutes to one hour, facilitating rapid movement of goods between the port and nearby industrial estates.

The port is well connected through an established road network, including Makalintal Avenue, Palico–Balayan–Batangas Road, and other arterial and secondary roads. This accessibility supports the port's role in handling roll-on/roll-off (RORO) cargo, project cargo, and automobile imports and exports, reinforcing its importance to regional and national trade logistics.

4.1.6 Buffer Zone

An inward buffer zone of approximately 5–10 meters from the Project footprint boundary is incorporated into the Project layout as part of the overall design, construction management, and operational control framework. This buffer provides a controlled transition between active construction and operational areas and immediately adjacent spaces within the existing port environment, supporting safe and orderly implementation of Project activities.

The buffer width is engineering- and operations-driven and reflects established practice for port and marine infrastructure projects situated within previously developed and heavily modified coastal settings, such as the existing Bauan International Port. Baseline assessments confirm that the Project footprint and its immediate surroundings are characterized by reclaimed land, engineered shorelines, paved surfaces, and long-standing port operations, with no natural terrestrial habitats or sensitive ecological receptors present within the immediate interface zone.

The 5–10 meters buffer zone is designed to accommodate the following functions:

- Construction and operational safety, including safe movement and maneuvering of construction equipment, vehicles, and personnel, as well as access for routine inspection and maintenance activities;
- Installation, operation, and maintenance of environmental and safety control measures, including temporary drainage provisions, erosion and sediment control features, barriers, safety fencing, and spill response equipment;
- Management of localized edge effects at the boundary of active works, such as construction noise, dust generation, vibration, and occupational health and safety risks, ensuring these effects remain contained within the approved Project area; and
- Operational flexibility, allowing routine port operations and maintenance to be undertaken without encroachment beyond the approved Project footprint or interference with adjacent port infrastructure.

The buffer zone is not intended to function as an ecological or biodiversity buffer and does not represent a conservation setback or habitat exclusion zone. This is consistent with baseline findings indicating a highly modified port environment with limited intrinsic biodiversity value. Ecological considerations are addressed at the appropriate spatial scale through the EAAA covering Batangas Bay and the wider Verde Island Passage, as presented in the Environmental and Social Baseline Chapter.

The spatial relationship between the existing Bauan International Port infrastructure and the designated buffer zone is illustrated in Figure 4-11.

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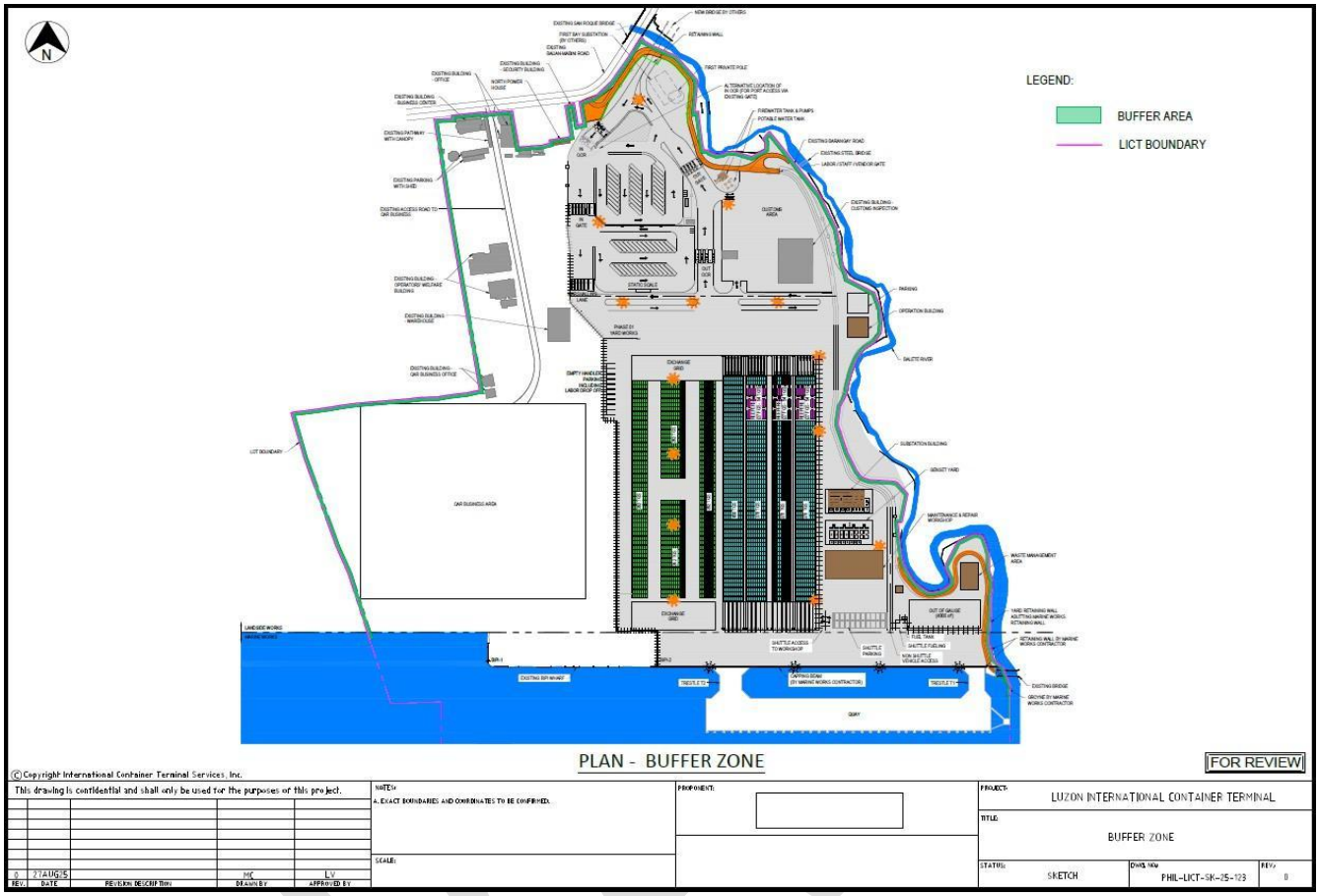

Figure 4-11 Map Showing Project Area and Buffer Zone

4.1.7 Proximity to the Nearest Protected Areas, Ramsar Sites, and Marine Protected Areas

An assessment of the Project's proximity to environmentally sensitive areas has been undertaken in accordance with the National Integrated Protected Areas System (NIPAS) Act, the Expanded NIPAS (ENIPAS) Act, and applicable Philippine biodiversity regulations. Biodiversity considerations, including proximity to protected areas and other sensitive ecological features, have been assessed as part of the environmental and social risk assessment under ESS 1 of the AIIB ESF, using a proportionate, risk-based approach informed by internationally recognized good practice.

Several protected areas are located within the broader region of influence of the project, as summarized in Table 4-2 and illustrated in Figure 4-12. These include legislated terrestrial protected landscapes such as the Taal Volcano Protected Landscape, Mount Makiling Forest Reserve, and the Mounts Palay-Palay–Mataas-na-Gulod Protected Landscape, as well as the Verde Island Passage, which is internationally recognized for its exceptional marine biodiversity and is subject to ongoing conservation initiatives.

Bauan MPA, the nearest marine protected area to the Project site, is located approximately 6.25 kilometers from the Bauan International Port, Inc. (BIPI) Project site and lies outside both the Project footprint and the defined Area of Influence (AoI). Based on the nature, scale, and geographic extent of the Project activities, potential direct and indirect impacts—such as increased turbidity, underwater noise, and vessel movements—are expected to be localized and confined within the nearshore environment adjacent to the port. Given the distance of Bauan MPA from the Project site and the absence of impact pathways extending to this range, the Project is not anticipated to exert significant adverse effects on the ecological integrity or conservation objectives of the reef. Nevertheless, Bauan MPA has been considered in the ESIA as part of the broader

regional biodiversity context and cumulative impact screening consistent with national regulations and AIIB environmental and social standards.

While the project site does not directly overlap with any NIPAS or Ramsar-designated areas, its location within the broader Verde Island Passage network boundary necessitates careful consideration of potential indirect and cumulative impacts on marine biodiversity. Accordingly, the ESIA incorporates biodiversity baseline assessments, impact avoidance and mitigation measures, and monitoring commitments consistent with both national regulations and international best practices.

Table 4-2 Proximity of the Project Site to NIPAS and RAMSAR Sites

Name	Legal Basis	Legal Status	Approximate Distance from the Project Site
Mts. Palay-Palay-Mataas-na-Gulod Protected Landscape	Proclamation 1315 s. 2007 / E-NIPAS (RA-11038)	Legislated	56.69 km
Taal Volcano Protected Landscape	Proclamation 906 s. 1996 / E-NIPAS (RA-11038)	Legislated	7.765 km
Mount Makiling Forest Reserve	RA No. 6967 (1990)	Legislated	53.31 km
Verde Island Passage	Verde Island Passage Protected Seascape (VIPPS) Bill of 2022		Within the Network Boundary
Bauan Marine Protected Area	Municipal Ordinance No. 7, s. 2009, Local Government Code 1991 (RA 7160 Sec. 149, Philippine Fisheries Code (RA 8550), as amended by RA 10654, BFAR-DA Administrative Order No. 01, s. 2004, DILG Memorandum Circular No. 2023-119	Legislated	6.25km

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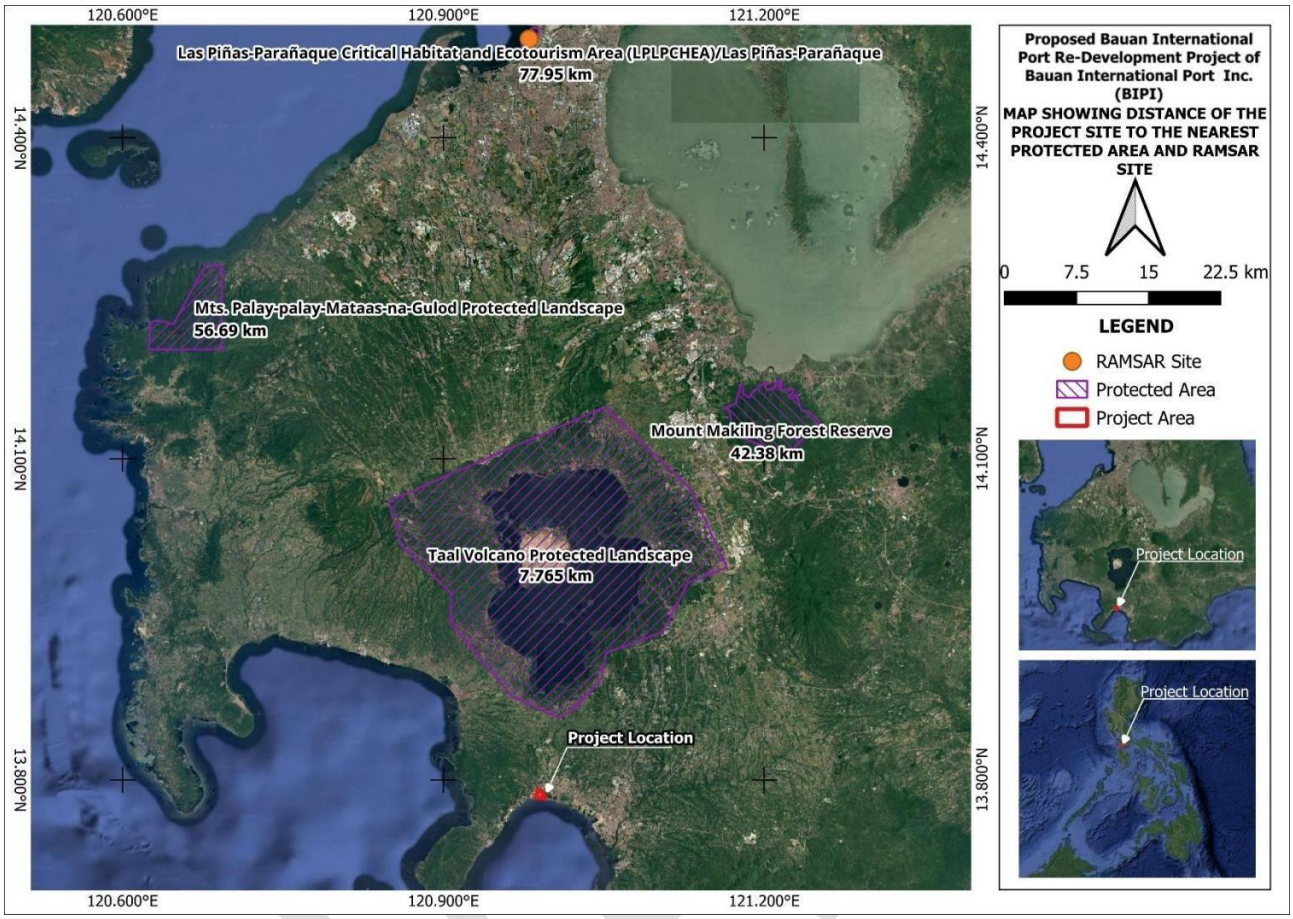
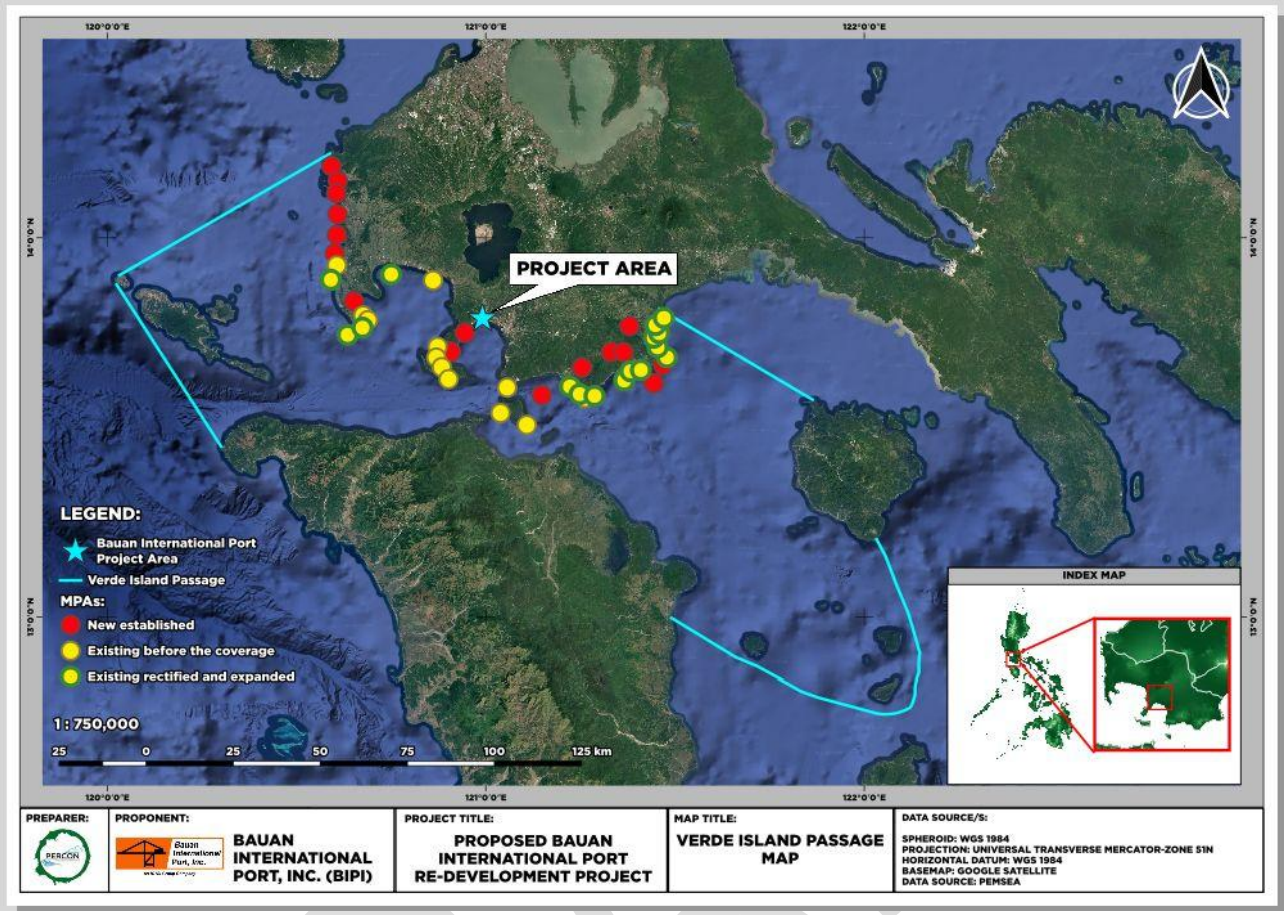


Figure 4-12 Relative Location of Project Area and Protected Areas NIPAS



Source: PEMSEA

Figure 4-13 Relative Location of Project Area and Verde Island Passage

4.2 Project Rationale

The proposed redevelopment of BIPI constitutes a strategically significant infrastructure initiative aimed at enhancing maritime transport efficiency, strengthening regional and national logistics connectivity, and supporting inclusive and sustainable economic growth. The project responds to increasing domestic and international trade demand, evolving shipping industry requirements, and the need to modernize port infrastructure to meet contemporary operational, safety, and environmental standards.

Consistent with the objectives of the Philippine Development Plan, the National Ports Development Framework, and local land use plans, the project is aligned with national priorities for trade facilitation, industrial development, and infrastructure modernization. At the international level, the redevelopment is consistent with the AIIB ESF, IFC Performance Standards, and global best practices on sustainable infrastructure, emphasizing environmental stewardship, social inclusion, climate resilience, and stakeholder engagement.

Key Drivers for the Port Redevelopment

Growing Demand for Port Services

The Philippines continues to experience sustained growth in international and inter-island trade, driven by industrial expansion, population growth, and increased integration into regional and global supply chains. Bauan International Port plays a critical role in facilitating the movement of bulk cargo, containerized goods, and industrial inputs supporting the Batangas industrial corridor and adjacent economic zones. The proposed upgrading and expansion will enable the port to accommodate increased cargo volumes, reduce congestion, and improve service reliability, consistent with national logistics and trade competitiveness objectives.

Accommodation of Larger and Modern Vessels

Global shipping trends demonstrate a shift toward larger, more efficient vessels to achieve economies of scale and reduced per-unit emissions. These vessels require deeper berths, improved quay structures, wider maneuvering areas, and modern terminal facilities. The redevelopment of Bauan International Port will enable the facility to safely accommodate vessels ranging from approximately 50,000 DWT to 188,000 DWT, ensuring compliance with international maritime safety standards and maintaining competitiveness within the regional port network.

Economic Development and Employment Generation

Ports serve as economic catalysts, generating direct and indirect employment and stimulating investment in logistics, manufacturing, and support services. The proposed redevelopment is expected to enhance the port's operational capacity, attract new shipping lines and cargo owners, and strengthen regional value chains. During both construction and operational phases, the project will create employment opportunities and contribute to local revenues through taxes, fees, and associated economic activities, in line with inclusive growth principles under national and international development frameworks.

Addressing Existing Infrastructure Constraints

The current port infrastructure faces limitations related to berth capacity, terminal space, and operational efficiency, which can result in vessel queuing, cargo handling delays, and increased logistics costs. The proposed upgrading will address these constraints through improved berth configurations, expanded container yard facilities, modernized operational support infrastructure, and enhanced internal circulation and connectivity to the existing road network. These improvements are expected to significantly enhance port efficiency, safety, and service quality.

Strategic Location and Regional Connectivity

Bauan International Port benefits from a strategic geographic location within Batangas Province, proximate to major industrial zones, manufacturing hubs, and key shipping routes. Enhancing the port's capacity and operational capabilities will strengthen its role as a regional logistics hub, improve connectivity between production centers and domestic and international markets, and contribute to the resilience and efficiency of national supply chains.

Environmental Sustainability and Climate Resilience

The port redevelopment will incorporate environmental and social safeguards consistent with Philippine environmental laws and AIIB ESF requirements, including pollution prevention, resource efficiency, biodiversity protection, and community health and safety measures. The project will integrate mitigation measures to minimize environmental impacts, promote sustainable construction and operational practices, and enhance resilience to climate-related risks such as extreme weather events and sea-level rise. This approach supports long-term environmental stewardship and compliance with both national regulations and international best practices.

Function and Purpose of the Project

The primary purpose of the redevelopment is to provide safe and efficient berthing facilities for large vessels, supported by the construction of a new container yard behind the quay and associated operational buildings and utilities. The project also includes internal circulation improvements and enhanced connectivity to existing road infrastructure to optimize cargo movement and reduce logistical bottlenecks within the terminal.

In summary, the redevelopment of Bauan International Port is justified by the need to respond to growing trade demand, accommodate modern shipping requirements, address infrastructure limitations, leverage strategic location advantages, and promote sustainable and inclusive economic development. The project supports national development objectives while adhering to international environmental and social standards, thereby contributing to long-term regional growth and enhanced trade competitiveness.

4.3 Project Existing Components

The Bauan International Port Redevelopment Project builds upon an existing operational port facility with established marine and land-side infrastructure. The current configuration comprises major port facilities and a range of supporting facilities authorized under the existing ECC. These components collectively support cargo handling, vessel berthing, terminal operations, logistics circulation, safety, and administrative functions. The planned redevelopment and expansion will optimize these facilities to meet increasing operational demands, improve efficiency, and align with modern port standards.

4.3.1 Major Facilities

Container Yard (Approximately 22 Hectares)

The existing container yard, covering approximately 22 hectares, serves as the primary land-side cargo handling and storage area of the port. It accommodates containerized cargo for domestic and international trade, providing space for container stacking, temporary storage, and cargo marshaling prior to loading and unloading operations. The container yard is designed to support efficient terminal operations, minimize cargo dwell time, and facilitate smooth circulation of trucks and handling equipment.

From an ESIA perspective, the container yard is a key source of operational impacts, including traffic generation, noise, air emissions from cargo handling equipment, stormwater runoff, and occupational health and safety risks. Its size and configuration are critical in determining operational efficiency, congestion levels, and environmental performance.

Wharf (Approximately 750 Meters in Length)

The existing wharf extends approximately 750 meters and provides berthing facilities for cargo vessels calling at the port. It is designed to accommodate a range of vessel sizes and supports loading and unloading activities through quay-side operations. The wharf is a critical marine infrastructure component, directly influencing vessel turnaround time, navigational safety, and overall port capacity.

Environmental considerations associated with the wharf include potential impacts on marine water quality, sediment disturbance, underwater noise, and marine ecology, particularly during maintenance and operational activities. The wharf also plays a central role in ensuring compliance with international maritime safety standards.

4.3.2 Supporting Facilities

Existing Supporting Facilities (As Authorized under the ECC)

The existing supporting facilities provide essential operational, administrative, and logistical functions necessary for day-to-day port operations:

- Road Network and Terminal Access Roads – Includes internal circulation roads and a four-lane terminal access and exit road, facilitating efficient movement of cargo trucks, service vehicles, and personnel between the port and the external road network.
- Parking and Open Spaces – Designated areas for vehicle parking and operational buffers, contributing to orderly traffic management within the terminal.
- Administrative Building – Houses port management, administrative offices, and coordination functions.
- Truck Parking Areas – Dedicated spaces for truck queuing and staging, reducing congestion on public roads.
- Marine Operations Building – Supports vessel traffic coordination, marine safety, and port control operations.
- Engineering Building and Workshop – Facilities for maintenance, repair, and technical support of port equipment and infrastructure.
- Customs Building – Dedicated facility for customs clearance, inspection, and regulatory compliance, supporting international trade operations.

These facilities are integral to the port's operational integrity and are covered under existing environmental approvals, forming the baseline condition for the ESIA.

Full Development Implementation (Within the Existing Project Footprint)

The full development implementation represents the enhanced configuration of the port facilities to improve operational efficiency, safety, and service capacity while remaining within the approved development framework. This phase includes the following components:

- Upgraded Road Network and Internal Circulation – Improved Road layout to support higher traffic volumes and safer vehicle movement.
- Expanded Parking and Open Spaces – Additional areas for operational flexibility and improved traffic management.
- Administrative Building – Enhanced facilities to accommodate expanded port operations and staffing.
- Motorpool Area – Dedicated area for port vehicles and equipment storage and maintenance.
- Truck Holding Areas and Heavy Machinery Lanes (HMLs) – Designed to manage truck queues efficiently and segregate heavy equipment movements.
- Substation Building – Electrical infrastructure to support increased power demand, ensuring reliable and safe energy supply.
- Engineering Building and Workshop – Expanded maintenance capacity to support modernized port equipment.
- Operations Building – Centralized facility for terminal operations management and coordination.
- Welfare Building – Provides amenities for workers, supporting labor welfare and compliance with occupational health and safety standards.
- Customs Building – Continued support for regulatory and trade facilitation functions.
- Four- to Six-Lane Ingress and Egress Access Gates – Improved access control and traffic flow at terminal entry and exit points.
- Drainage System – Designed to manage stormwater runoff, reduce flooding risk, and prevent contamination of surrounding environments.
- Potable Water Supply System / Deep-well – Ensures reliable water supply for operational and domestic use.
- Fuel Station – Supports refueling of port vehicles and equipment, with appropriate safety and environmental controls.
- Fire Protection System – Includes fire detection, suppression, and emergency response infrastructure to enhance safety.
- Electrical and Communications Network – Supports terminal operations, security systems, and data connectivity.
- Reefer Towers – Dedicated power supply infrastructure for refrigerated containers, supporting cold-chain logistics.
- Approximately 10 Hectares of Car Staging Areas – Provides space for vehicle staging and logistics operations, improving cargo flow efficiency.

These facilities collectively enhance operational reliability, safety, labor conditions, and environmental performance, consistent with AIIB ESS requirements on infrastructure safety, labor standards, and community health.

4.3.3 Dredging Scope and Methodology

Dredging activities are required to remove accumulated sediments within the existing port basin and navigation areas to achieve the required operational depth. Based on engineering design and environmental considerations, dredging will be conducted using controlled mechanical dredging methods. These methods are selected to minimize sediment resuspension, turbidity generation, and disturbance to surrounding marine waters.

Sediment characterization undertaken under the Toxicity Characteristic Leaching Procedure (TCLP) indicates that dredged materials are classified as non-hazardous and suitable for disposal at approved disposal sites, subject to regulatory clearance.

4.3.4 Piling, Backfilling and Marine Structures

Piling works will be undertaken to support quay structures and port facilities. Piling activities will be scheduled and managed to minimize underwater noise, vibration, and disturbance to marine fauna. Marine traffic management measures will be implemented to ensure navigational safety during piling and dredging operations.

Backfilling activities will involve the controlled placement of fill materials within defined areas adjacent to existing port structures, undertaken as part of quay strengthening and coastal protection works. The scope of backfilling is limited to structural support and stabilization of existing facilities and does not involve the creation of new operational areas or changes to the overall project layout. The activity is implemented as an auxiliary component of the original project, consistent with approved port development works.

Associated marine structures will be integrated with existing port infrastructure and constructed to support operational and structural requirements. All piling and backfilling works will be implemented in accordance with approved engineering designs, construction sequencing, and applicable regulatory approvals.

4.3.5 Construction Schedule and Permitting

Dredging works are currently planned to commence in February 2026 and conclude by August 2027. All required environmental permits, clearances, and maritime authorizations will be secured prior to commencement of dredging and marine construction works.

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Figure 4-14 Existing Site Development Plan

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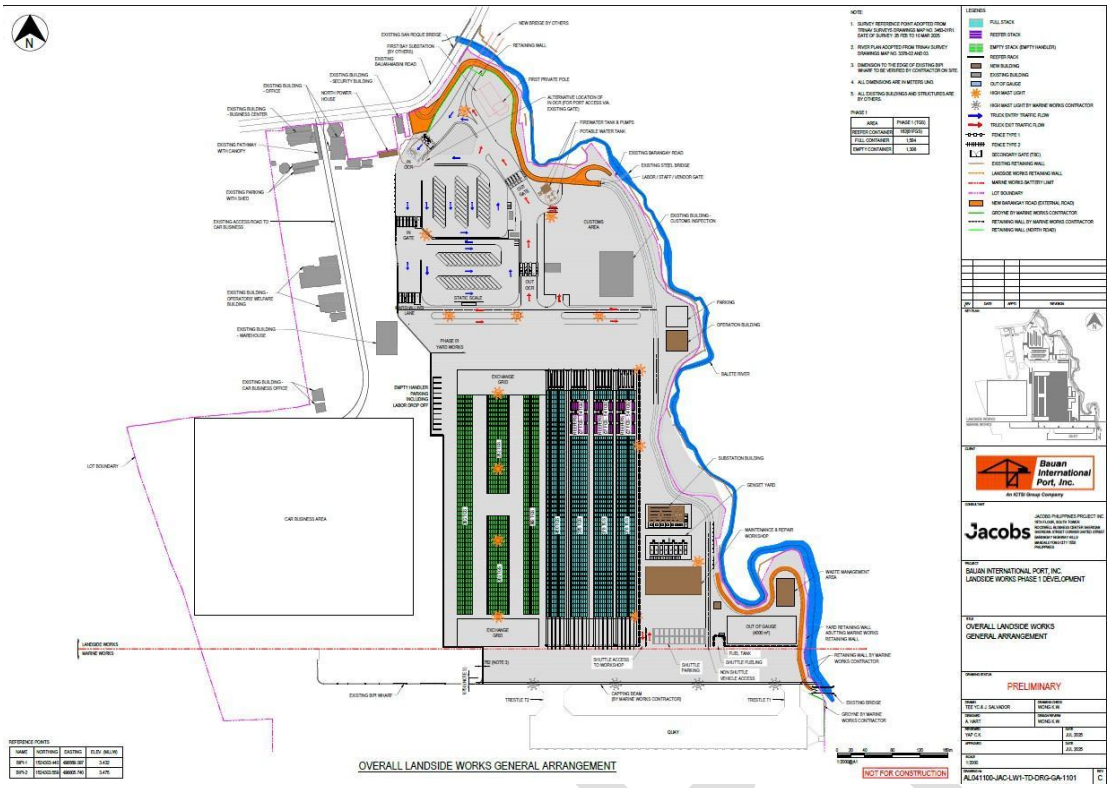

Figure 4-15 Proposed Site Development Plan

4.4 Process Technology and Terminal Operating System (TOS)

4.4.1 Integrated Terminal Operating System (TOS)

BIPI will operate a highly integrated, state-of-the-art Terminal Operating System (TOS) designed to provide comprehensive coverage of all terminal operations. The TOS will function as the central digital backbone of the port, enabling end-to-end planning, execution, monitoring, and optimization of terminal activities under a single, unified operational platform.

This integrated approach supports operational efficiency, data accuracy, safety management, environmental compliance, and transparency. Through centralized data management and real-time monitoring, the TOS will support implementation of environmental and social management measures, incident reporting, compliance tracking, and continuous improvement throughout port operations, in line with internationally recognized good practice.

The system integrates operational planning, real-time control, Electronic Data Interchange (EDI), and Key Performance Indicator (KPI) dashboards to support informed decision-making, continuous improvement, and compliance monitoring. The TOS architecture is designed to be scalable and adaptable, allowing the terminal to respond to evolving regulatory requirements, customer demands, and technological advancements.

4.4.2 Core Components of the TOS

The main components of the Terminal Operating System include:

- TOS Core System – The primary platform for vessel, yard, and gate planning, as well as real-time operational control and execution.
- Ancillary Software Systems – Specialized support systems interfaced with the TOS to enhance equipment automation, monitoring, and safety.
- EDI and Internet Interfaces – Secure, customer-centered interfaces enabling seamless information exchange with shipping lines, agents, customs authorities, and other external stakeholders.

- Administration Systems – Back-end systems supporting billing, documentation, compliance tracking, and regulatory reporting.
- Business Intelligence and Reporting Tools – Advanced analytics and reporting capabilities for operational performance, compliance monitoring, and management oversight.
- Technology Support Essentials – Redundant systems, cybersecurity measures, and technical support solutions ensuring continuous operational availability and data integrity.

4.4.3 Ancillary TOS Systems and Equipment Integration

Where operationally required, the TOS will be supported by additional software and hardware systems provided by accredited equipment suppliers. These ancillary systems enhance safety, efficiency, and regulatory compliance:

Weighing System (SOLAS Compliance)

In compliance with the International Convention for the Safety of Life at Sea (SOLAS) and applicable Philippine maritime regulations, BIPI will implement an automated container weighing system to ensure accurate determination of the Verified Gross Mass (VGM) of containers. VGM data will be recorded directly into the Terminal Operating System (TOS) as a mandatory operational requirement.

Container weighing may be achieved through:

- Embedded weighing sensors integrated into container handling equipment (CHE) spreaders or twist locks; and/or
- Fixed weighing scales installed at designated gate lanes.

Automated weight recording enhances operational efficiency, reduces human error, improves vessel stability and navigational safety, and strengthens overall port safety performance. These measures support effective management of operational, occupational, and community safety risks and are consistent with applicable national regulations and the requirements of Environmental and Social Standard 1 (ESS 1) of the AIIB ESF, which addresses environmental and social risk management, including safety-related aspects of project operations.

Reefer Monitoring System

A centralized Reefer Monitoring System will be integrated into the Terminal Operating System (TOS) to continuously monitor refrigerated containers. This system eliminates the need for manual inspections, reduces human error, enhances personnel safety by minimizing time spent in reefer yards, and protects cargo integrity through an early-warning alarm protocol for temperature deviations. The system supports compliance with international cargo handling standards and contributes to occupational health and safety and labor risk management in accordance with ESS1 of the AIIB ESF.

4.4.4 Gate Operations and Terminal System Integration

In-Gate and Out-Gate Operations

The container terminal will deploy a fully integrated gate management module within the TOS to manage all inbound and outbound truck movements. This system supports operational workflow control, real-time monitoring, security screening, and data verification, ensuring high levels of efficiency, traceability, and regulatory compliance.

- Flexible Gate Flow Configuration
- The gate complex is designed with a modular and flexible configuration, consisting of the following stages:

- Optical Character Recognition (OCR) at entry
- In-Gate checkpoint
- Optional inspection or service zones
- Exit OCR
- Out-Gate checkpoint

The TOS allows dynamic configuration of gate flows based on truck type, cargo classification, or regulatory requirements. Dedicated lanes may be assigned for specialized services such as container washing, hazardous cargo inspection, or secondary screening. This adaptability supports compliance with Customs, Port Authority, and safety regulations, and enables efficient response to operational or regulatory changes.

4.4.5 Truck and Driver Identification

Upon arrival, each truck visit is digitally registered and verified through the TOS using key identifiers, including:

- Truck license plate number
- Booking reference or visit identification number (e.g., BAT number)

This digital identification ensures full traceability of truck movements throughout the terminal, enhancing security, and auditability.

4.4.6 Gate Transaction Handling and Monitoring

All gate transactions are managed through a centralized TOS interface, linking truck visits to associated container movements. The system enables:

- Recording of hazardous cargo classifications and reefer conditions
- Transaction cancellation or reprocessing when required
- Comprehensive logging of all gate activities for auditing, performance analysis, and compliance reporting

A real-time Gate Lane Monitoring system provides live status updates for each lane, enabling immediate identification and resolution of data discrepancies or operational issues. Trucks with incomplete or incorrect information can be diverted for correction, minimizing congestion and downtime.

4.4.7 Integrated Inspection Capabilities

The TOS supports configurable digital inspection workflows for inbound and outbound containers. Inspection criteria can be tailored to terminal policies and regulatory requirements and may include:

- Seal number verification
- Container condition and damage assessment
- Hazardous materials placard verification
- Identification of over-dimensional cargo
- Reefer temperature, ventilation, and alarm checks
- Grouped or bundled inspection processing

All inspection results are electronically recorded and linked to the corresponding truck visit, ensuring traceability and compliance with Customs, safety, and environmental regulations.

4.4.8 Track and Trace System

To enhance transparency and customer service, BIPI will implement an online Track and Trace system that provides real-time visibility of container movements from vessel discharge to gate-out, and vice versa. The system includes:

- Container Search Module – displaying movement history, billing status, and hold status
- Truck Search Module – monitoring truck entry, dwell time, and exit

This system aligns with international best practices for port transparency and supports stakeholder engagement and information disclosure.

4.4.9 Yard and Vessel Process Automation and EDI Connectivity

The TOS enables full EDI-based Business-to-Business (B2B) and Business-to-Government (B2G) real-time communication with shipping lines, agents, customs authorities, and port authorities. This includes automated exchange of:

- BAPLIE – vessel stowage positions
- MOVINS – stowage instructions
- COARRI – container discharge/loading reports
- CODECO – gate-in and gate-out reports
- COPRAR – discharge/loading orders
- COREOR – container release orders
- Automated alerts for container damage and reefer alarms

These capabilities enhance operational efficiency, regulatory compliance, and data accuracy while minimizing manual processing and errors.

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5 Associated Facilities and Environmental Management

5.1 Water Supply

Domestic water requirements for the Bauan International Port Redevelopment Project will be sourced either from a licensed deep well or from the local water concessionaire, subject to applicable permits and abstraction limits. Potable drinking water will be procured exclusively from DOH-accredited and LGU-licensed refilling stations, ensuring compliance with national drinking water quality standards and protection of worker and public health.

Estimated water consumption during the construction phase is approximately 1,000 liters per day for domestic use and 120 liters per day for potable drinking water, reflecting workforce size and temporary facility requirements. During the operational phase, daily water demand is projected at approximately 1,200 liters for domestic use and 220 liters for drinking water, associated with permanent terminal operations and administrative functions.

The Project will implement water use efficiency and conservation measures, including installation of low-flow fixtures, routine leak detection and repair, monitoring of water consumption, and awareness programs for employees and contractors. Water abstraction and usage will be managed to avoid adverse impacts on local water availability and to ensure compliance with applicable national regulations.

5.2 Power Supply

Electrical power for land-based equipment, terminal operations, and office facilities will be supplied by FIRSTBAY, the designated power service provider. Power supply arrangements will comply with national electrical safety standards and regulatory requirements.

The Project will pursue energy efficiency and emission reduction measures, including the use of energy-efficient lighting and appliances, optimization of operational schedules to reduce peak loads, and preventive maintenance of electrical systems. Where technically and economically feasible, renewable energy options (such as solar power for auxiliary systems) will be evaluated to reduce greenhouse gas emissions, enhance energy resilience, and support long-term operational sustainability.

5.3 Air Pollution Management

BIPI is committed to environmental protection and full compliance with Republic Act 8749 (Philippine Clean Air Act of 1999) and its implementing rules and regulations. Current port operations generate minimal air emissions, primarily associated with vehicle movements and standby power generation.

A standby generator set, covered by a valid DENR Permit to Operate, is maintained for emergency and contingency use only. To minimize air emissions and protect worker and community health, the Project will implement the following air quality management measures:

- Strict enforcement of a No-Idling Policy for all vehicles and equipment within terminal premises;
- Optimization of service vehicle routing and scheduling to reduce unnecessary trips and congestion;
- Regular preventive maintenance of vehicles, equipment, and generators to ensure efficient combustion and emission control;
- Use of energy-efficient appliances and equipment;
- Promotion of low-emission technologies where feasible; and
- Strict implementation of a No Smoking Policy within all terminal facilities.

These measures being implemented contribute to the protection of air quality, reduction of greenhouse gas emissions, and safeguarding of worker and community health.

5.4 Waste and Wastewater Management

Domestic sewage generated from offices and terminal facilities is conveyed to and treated in septic vault systems designed in accordance with local sanitation and building standards. These systems will be retained during redevelopment and upgraded as necessary to accommodate increased demand and ensure continued compliance. Site drainage systems are designed to prevent uncontrolled discharge and contamination of adjacent land and water bodies.

BIPI has an approved Implementing Guidelines on Proper Solid, Liquid, and Hazardous Waste Management Plan dated 03 January 2022, which complies with RA 9003 (Ecological Solid Waste Management Act) and RA 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act). The Plan covers waste segregation at source, secure storage, labeling, transport, and disposal through DENR-accredited haulers and treatment, storage, and disposal (TSD) facilities.

The Waste Management Plan will be fully implemented during both the construction and operational phases to ensure environmentally sound waste handling and to minimize risks to workers, communities, and the environment.

5.5 People (Safety) Management

The Bauan International Port Redevelopment Project places strong emphasis on the health, safety, and welfare of employees, contractors, passengers, and port users. Safety management systems are aligned with Republic Act 11058 (Occupational Safety and Health Standards Act), relevant DOLE Department Orders, and established national safety requirements.

Key measures include hazard identification and risk assessment, implementation of safe work procedures, provision and enforcement of appropriate personal protective equipment (PPE), proper storage and disposal of materials, and continuous safety training and awareness programs. Emergency preparedness and response procedures will be established, implemented, and periodically reviewed to address fire incidents, spills, accidents, and other emergency situations.

These measures will be implemented throughout both the construction and operational phases of the Project, ensuring protection of workers and surrounding communities.

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6 Analysis of Alternatives

6.1 Site Selection

The proposed redevelopment of the Bauan International Port will be undertaken entirely within the footprint of the existing terminal, in accordance with the approved zoning classification as reflected in the official zoning map prepared by the Municipal Planning and Development Office (MPDO) of Bauan, which designates the Project site as part of an Industrial Zone. The existing site provides strategic advantages for port operations, including direct marine access, established land-based transportation linkages, and proximity to major industrial and economic centers. These factors ensure operational efficiency, reduced logistical complexity, and optimized connectivity to national and regional supply chains.

From an environmental perspective, the reuse of an existing port site aligns with the avoidance principle under the AIIB ESS 1. By redeveloping within the existing terminal, the Project minimizes disturbance to previously undeveloped or ecologically sensitive areas, reduces potential impacts on terrestrial and marine biodiversity, and avoids unnecessary conversion of natural habitats. This approach is consistent with the mitigation hierarchy principles, which emphasize avoidance, minimization, restoration, and offsetting as key steps in environmental risk management.

From a social perspective, redevelopment within the existing port footprint reduces or eliminates the need for new land acquisition, thereby limiting the risk of involuntary resettlement and associated livelihood disruptions. This approach helps preserve existing community structures, cultural features, and public utilities, mitigating potential social conflict and supporting community acceptance of the Project. By concentrating development within a previously disturbed industrial area, the Project also reduces potential exposure of nearby communities to construction-related impacts such as noise, dust, and traffic congestion. These measures are consistent with the principles of resettlement avoidance and social risk minimization under the AIIB ESF, particularly ESS 1, and informed by screening under ESS 2.

A comprehensive review of potential alternative sites, considering technical, operational, environmental, and social criteria, concluded that no other location offered greater viability or sustainability than the existing terminal. This site selection approach reflects a best-practice balance between operational requirements, environmental protection, and social responsibility, consistent with national regulations and international good practice.

In conclusion, redevelopment within the existing port footprint exemplifies the Project's commitment to sustainable infrastructure development, responsible resource use, and adherence to the AIIB ESF mitigation hierarchy, IFC Performance Standards, and national planning and environmental regulations.

6.2 Technology and Design Alternatives

The redevelopment of the Bauan International Port prioritizes the upgrading and enhancement of existing facilities while maintaining the core operational processes and terminal technologies currently in place. No fundamental changes to the existing operational workflow, container handling systems, or terminal operating systems are proposed. This approach reflects a deliberate technology and design optimization strategy that emphasizes the use of proven port technologies, internationally recognized standards, and established industry practices.

By retaining the existing operational framework and introducing incremental, well-tested technological improvements, the Project minimizes environmental and social risks while ensuring continuity of port services during both construction and operational phases. The continued use of established port technologies—such as automated container weighing systems, reefer monitoring, integrated gate management, and real-time terminal operating systems—reduces the likelihood of system failures, operational disruptions, and safety incidents. This approach allows potential environmental and social impacts to be readily identified, assessed, and managed using existing controls and management systems.

From an environmental perspective, reliance on proven technologies reduces uncertainty and the risk of unanticipated impacts that may arise from untested or experimental systems. Potential impacts related to air emissions, wastewater generation, noise, and resource use are well understood under the existing operational regime and can therefore be effectively managed through established mitigation measures and monitoring programs required under the Project's environmental and social management instruments. This risk-informed approach supports the avoidance and minimization hierarchy.

From a social perspective, maintaining familiar operational processes supports workforce stability and reduces the need for extensive retraining or adaptation to unfamiliar equipment, thereby lowering the risk of operational errors and occupational incidents. Predictable operational procedures and controlled port activities also contribute to minimizing potential risks to surrounding communities and port users, including traffic-related safety concerns and exposure to operational hazards.

Overall, the adoption of established technologies and conservative design enhancements represents a precautionary and risk-based alternative that supports regulatory compliance, operational reliability, and effective environmental and social risk management. This strategy aligns with the AIIB ESF and international good practice by ensuring that potential impacts are anticipated, manageable, and addressed through existing institutional capacity, thereby supporting the long-term sustainability of port operations.

6.3 Dredging and Piling

The assessment considered technical feasibility, environmental and social risks, and the application of the mitigation hierarchy, with particular emphasis on minimizing impacts on marine water quality, sediment dynamics, noise and vibration, marine ecology, navigational safety, and community health and safety.

6.3.1 Dredging Method Alternatives

Alternative dredging methods considered included cutter suction dredging, backhoe (mechanical) dredging, grab dredging, and trailing suction hopper dredging (TSHD). Mechanical dredging methods were evaluated due to their operational precision in confined areas; however, these methods generally result in higher localized turbidity, increased sediment resuspension during excavation and material handling, and greater reliance on barge movements, thereby increasing navigational and occupational safety risks. TSHD was also considered but was assessed as less suitable due to space constraints within the port basin and reduced control over sediment plume dispersion in shallow nearshore conditions.

Cutter suction dredging was identified as the preferred option as it allows controlled excavation, continuous sediment removal, and effective integration of mitigation measures such as silt curtains, staged dredging, and real-time turbidity monitoring.

6.3.2 Piling Method Alternatives

Piling alternatives assessed included impact hammer piling, vibratory piling, and bored (drilled) piling. Impact piling was screened out due to its potential to generate high levels of underwater noise and vibration, which could adversely affect nearby communities and sensitive marine receptors. Vibratory piling was considered as an alternative; however, prolonged vibration impacts may still occur depending on subsurface conditions.

Where technically feasible, bored piling was identified as the preferred method due to its significantly lower noise and vibration levels, reduced disturbance to surrounding sediments, and improved control during installation.

6.4 "No Project" Scenario

Under the "No Project" scenario, the proposed redevelopment of Bauan International Port would not proceed. While this scenario would avoid the environmental and social impacts associated with construction and expanded port operations, it would also result in a range of adverse economic, social, and operational implications. These consequences must be considered as part of a comprehensive assessment of alternatives.

Port Capacity Constraints and Trade Limitations

In the absence of the Project, the port would continue to operate under existing physical and operational constraints, limiting its ability to accommodate increasing cargo volumes and larger vessels. These constraints would reduce operational efficiency and competitiveness relative to other regional ports, potentially constraining inter-island and international trade. Prolonged congestion within the port and along surrounding transport corridors may persist, indirectly affecting access, mobility, and safety for local communities.

Stifled Investment and Regional Economic Growth

Without the redevelopment, the port's capacity to support planned and future industrial and commercial activities in Bauan and the wider Batangas area would remain constrained. The lack of improved port infrastructure may reduce investor confidence and limit opportunities for industrial expansion and economic diversification. These foregone development benefits have broader implications for local livelihoods and regional economic resilience, which form part of the social baseline and impact assessment.

Loss of Local Revenue and Economic Spillovers

Local Government Units and surrounding communities would forego potential revenues associated with port redevelopment, including construction-related economic activity, increased business transactions, and longer-term gains from improved trade efficiency. The absence of these benefits could limit public investment in local services and infrastructure, with indirect implications for community well-being.

Foregone Employment and Livelihood Opportunities

The Project would generate direct and indirect employment during both construction and operational phases. Under the "No Project" scenario, these employment and livelihood opportunities would not be realized. While no land acquisition or physical displacement would occur in this scenario, the absence of the Project also means that potential socio-economic benefits that could offset or enhance local livelihoods would not materialize.

Continued Logistical Inefficiencies and Trade Diversion

Existing inefficiencies in cargo handling and terminal operations would persist under the "No Project" scenario, leading to longer vessel turnaround times and continued congestion. These inefficiencies may indirectly contribute to higher emissions from idling vessels and trucks, increased traffic pressures, and localized environmental disturbance. Such indirect environmental effects are relevant to the assessment of alternatives.

Although the "No Project" scenario avoids direct environmental and social impacts associated with construction and expanded operations, it would also constrain the strategic role of Bauan International Port in supporting regional and national trade, limit employment generation, and reduce long-term economic and social benefits. The comparative analysis of alternatives indicates that proceeding with the Project—subject to appropriate environmental and social management measures—offers a more balanced and sustainable outcome than the "No Project" scenario, as it enables the realization of significant socio-economic benefits while allowing risks and impacts to be effectively managed.

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7 Baseline Environmental and Social Data

This chapter presents a summary of the baseline environmental and social conditions relevant to the assessment of environmental and social risks and impacts of the Proposed Bauan International Port Re-Development Project. In accordance with the AIIB ESF and the indicative ESIA outline, baseline information is proportional to the scale and nature of potential impacts and focuses on physical, biological, socioeconomic, and cultural components within the project's AoI.

Baseline information is derived from technical studies, desktop biodiversity screening outputs, secondary data sources, and publicly available government datasets. Detailed methodologies, laboratory results, spatial analyses, while this chapter synthesizes the key findings relevant to impact prediction, significance evaluation, and mitigation planning.

7.1 Physical Environment

7.1.1 Land

7.1.1.1 Land Use and Land Classification

This section describes the existing land classification and land uses within the project AoI, the key impacts of the project, and the corresponding mitigation measures. The present land tenure is also discussed, Environmentally Critical Areas (ECAs) including RAMSAR-listed wetlands and other nationally significant sites within and around the project influence area, are screened, mapped, and discussed in terms of proximity and potential interaction with project activities.

The Project Site (

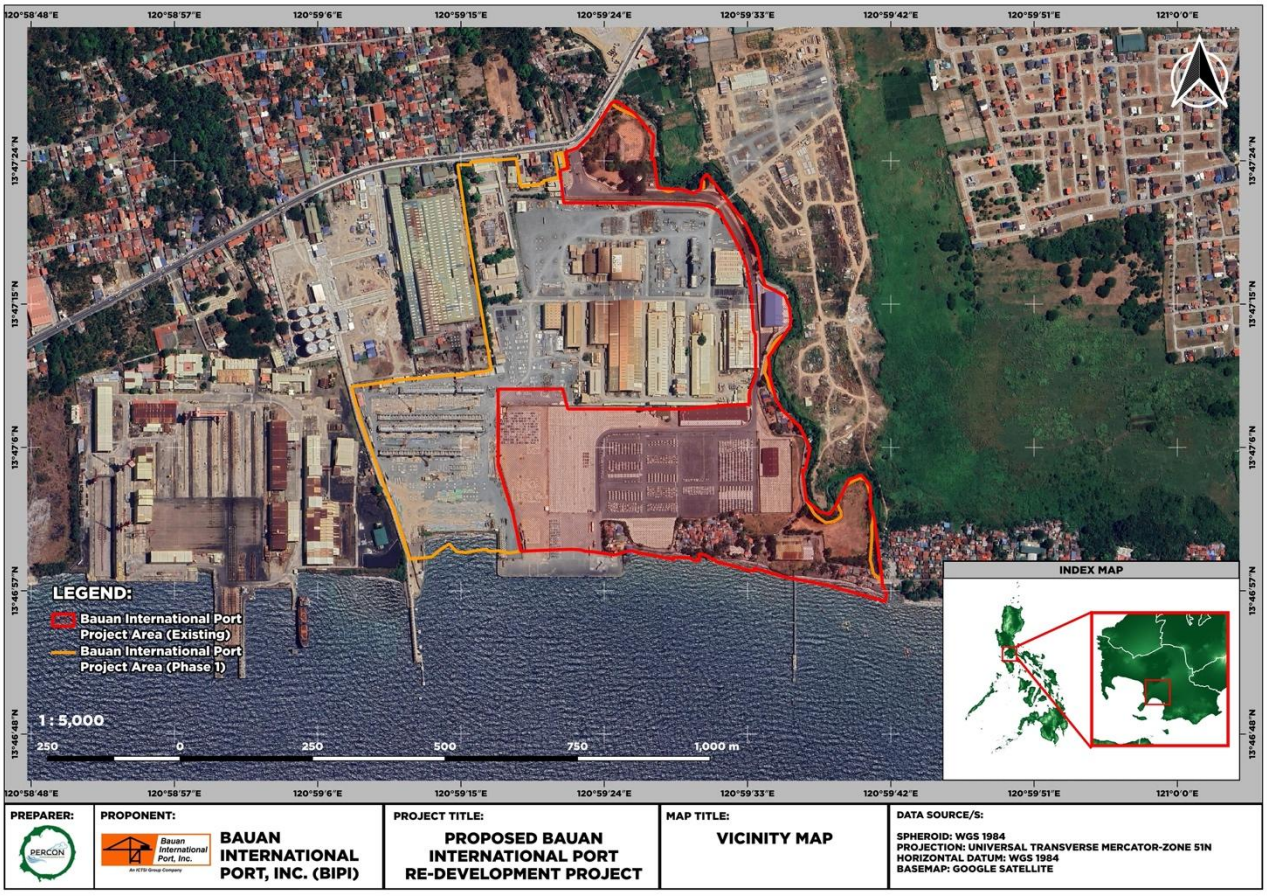

Figure 7-1) is situated along the southwestern coastline of the Municipality of Bauan, directly fronting Batangas Bay. The site lies within the barangay of San Andres Uno and is bounded on its seaward side by existing reclaimed areas and port facilities.

The land use and land classification in this section is described at the municipal level (Municipality of Bauan). The Municipality of Bauan covers a total land area of 6,673.34 hectares, with major land uses categorized primarily into agricultural, residential, industrial, forest areas, institutional, infrastructure/utilities, commercial, agri-industrial, tourism, and water bodies.

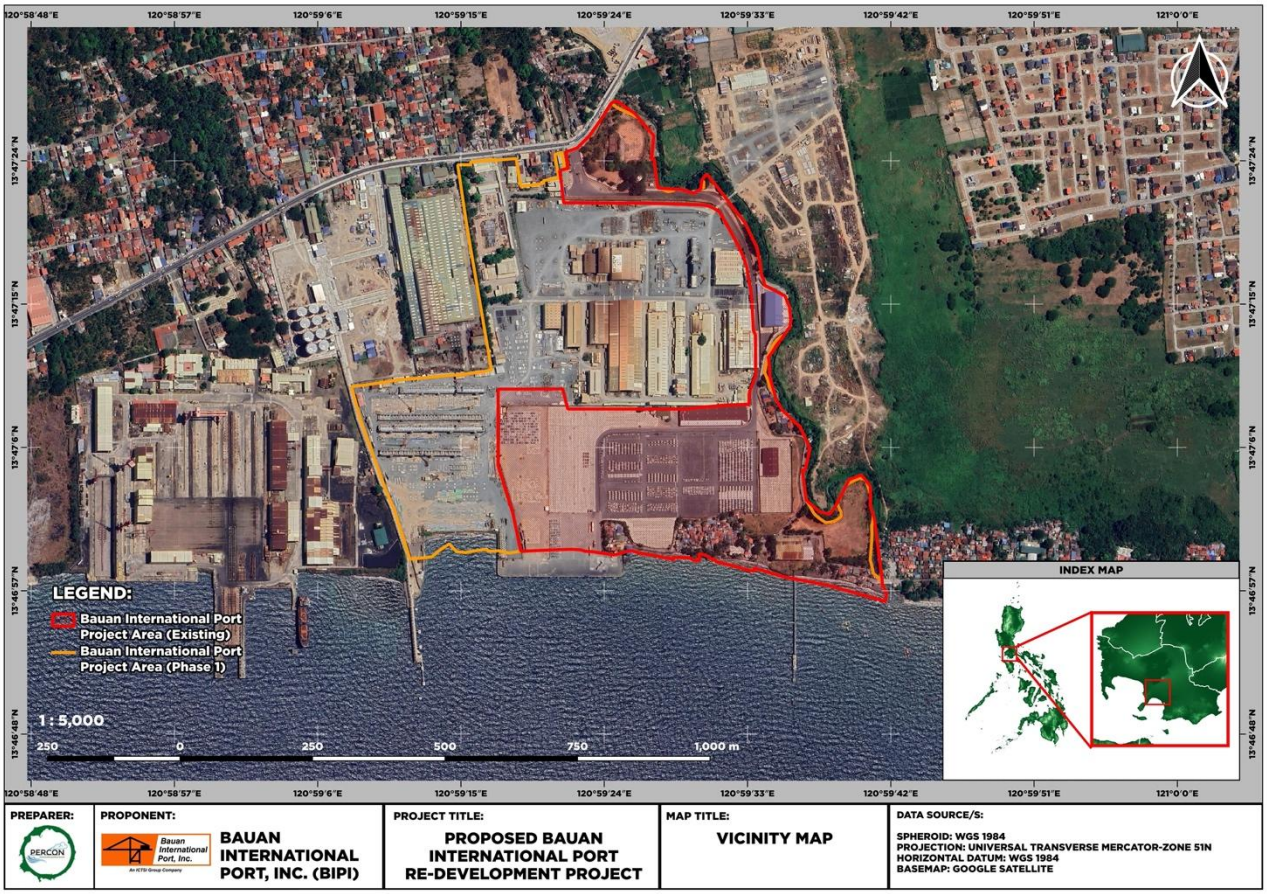

Figure 7-1 Vicinity Map to the Project Site

Agricultural lands represent the largest portion, comprising approximately 33.81% (2,256.01 hectares) of the total area, predominantly dedicated to crop production and livestock/poultry production. Within this classification, Strategic Agriculture and Fisheries Development Zones (SAFDZ) occupy around 11.63%, strategically allocated for agricultural production in selected barangay.

Residential areas constitute 19.43% (1,296.91 hectares) of the municipality, making it the second-largest category. It includes a small allocation (0.32%) for socialized housing. Industrial lands cover about 8.58% (572.30 hectares), located in key barangays such as San Pedro, Sta. Maria, San Miguel, and others.

Forest areas occupy approximately 1.75% (117.05 hectares), providing essential ecological balance, though there are no officially classified forest lands.

Infrastructure and Utilities account for approximately 2.50% (166.69 hectares), facilitating essential services across Bauan. Commercial areas are relatively minor, representing only 2.17% (145.08 hectares), mainly concentrated within the urban barangay of Poblacion.

Institutional areas occupy 0.44% (29.39 hectares), while parks and recreational spaces contribute 0.27% (18.33 hectares).

Agri-industrial and Tourism areas represent minor portions, at 0.61% (40.73 hectares) and 0.69% (45.93 hectares), respectively. The municipality also hosts significant **inland water bodies** totaling 17.26% (1,151.64 hectares). Additionally, **reclaimed areas** of 13.33 hectares are situated in selected barangays such as Sta. Maria, San Pedro, and San Miguel.

The host municipality further includes a **marine protected area** (240.82 hectares) extending along its coastal barangays, featuring marine sanctuaries and fishery reserves which support traditional fishing, snorkeling, and diving activities.

Figure 7-2 identifies the **project area primarily as Industrial Land**, interspersed with reclaimed portions, and directly contiguous with other large-scale industrial facilities, port infrastructure, and open storage areas. The immediate vicinity features mixed-use zones, with residential neighborhoods and commercial establishments located to the north and northeast.

The coastal edge of the project site consists of developed seafronts utilized for port-related activities. Reclaimed lands within the site and adjacent areas are already serving industrial and logistical functions, minimizing the requirement for new land conversion. Existing infrastructure networks, including national and municipal roads, support efficient connectivity between the port and regional transport corridors.

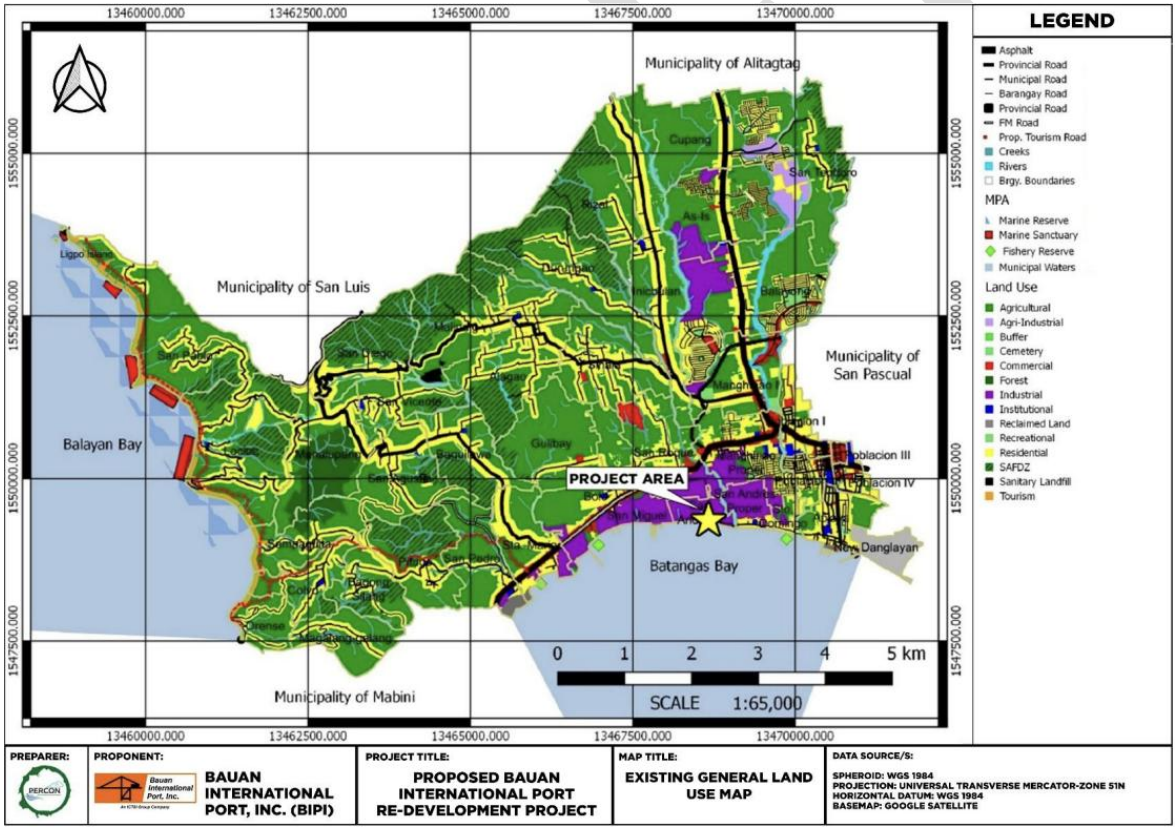

Figure 7-2 Existing Land Use Map of Bauan in Relation to the Project Site

7.1.1.2 Classification as an Environmentally Critical Area (ECA)

The Revised Guidelines for Coverage Screening and Standardized Requirements (EMB Memorandum Circular 2014-05) defined Environmentally Critical Areas (ECA) in twelve categories. An ECA is an environmentally sensitive area declared through Proclamation 2146 of 1981 where significant environmental impacts are expected if certain thresholds of proposed projects are located, developed, or implemented in it.

Assessment of project's encroachment in ECAs is presented in Table 7-1 Types of ECAs within the Vicinity of the Project Site. Figure 7-3 shows the locations of ECAs within and surrounding the project.

The project site is in at least three (3) ECA categories:

- **ECA Category 1:** Areas declared by law as national parks, watershed reserves, wildlife preserves, and sanctuaries;
- **ECA Category 6**: Areas frequently visited or hard-hit by natural calamities;
- **ECA Category 10**: Water bodies characterized by one or any combination of the following: tapped for domestic purposes; within the controlled and/or protected areas declared by appropriate authorities; which support wildlife and fishery activities.

The existing project site, in preparation for the planned development, is not located within any of the protected areas.

Table 7-1 Types of ECAs within the Vicinity of the Project Site

No.	ECA Category	Presence within the Project Site	Description and Distance (in aerial km)
1	Areas declared by law as national parks, watershed reserves, wildlife preserves, and sanctuaries	Verde Island Passage network boundary is adjacent to the project site. ***Note:*** *By jurisprudence, the Bauan Port and Project exist prior to the filing of the Senate and House Bills.*	**Verde Island Passage** as Initial NIPAS under Bill of 2022 and House Bill No. 132 (VIPPS Act of 2025), within the Network Boundary. **Taal Volcano Protected Landscape (TVPL)** as legislated NIPAS approx. 7.765 aerial km north of Project Site. **Mount Makiling Forest Reserve** as legislated NIPAS, approx. 53.31 aerial km northeast of the Project Site. **Mt. Banahaw- San Cristobal Protected Landscape** as legislated NIPAS approx. 54.72 km northeast of the Project Site. **Mts.Palay-Palay-Mataas-na-Gulod Protected Landscape** as legislated NIPAS approx. 56.69 aerial km northwest of the Project Site.
2	Areas set aside as aesthetic, potential tourist spots	Not present within the project site.	Nearest tourism site identified is the **Church of the Immaculate Concepcion** approx. 2.3 aerial km distant.
3	Areas that constitute the habitat of any endangered or threatened species of indigenous Philippine wildlife (flora and fauna)	Not present within the project site.	Zooplankton and fish species present are classified as migratory.
4	Areas of unique historic, archaeological, geological, or scientific interests	Not present within the project site.	**Church of Bauan** approx. 1.7 aerial km east of the Project Site.

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No.	ECA Category	Presence within the Project Site	Description and Distance (in aerial km)
			Basilika Menor ng Immaculada Concepcion approx. 8 aerial km southeast distant from the Project Site.
5	Areas that are traditionally occupied by cultural communities or tribes	Not present within the project site.	**No IP communities within or adjacent to the project site.**
6	Areas frequently visited and/or hard hit by natural calamities (geologic hazards, floods, typhoons, volcanic activity, etc.)	Present within the project site.	**Ground Rupture:** Safe; approximately 10.2 km northeast of the Batangas Bay Fault **Ground Shaking:** Prone **Liquefaction:** Moderately Susceptible **Earthquake Induced Landslide:** Low Susceptible **Tsunami:** Prone; Inundation depth: <1 meter **Volcano Permanent Danger Zone:** Outside **Volcanic Tsunami:** Safe **Volcanic Ashfall:** Prone
7	Areas with critical slope	Not present within the project site.	The slope category of the area falls under 0-8 % (level to undulating).
8	Areas classified as prime agricultural lands	Not present within the project site.	Not Applicable
9	Recharge areas of aquifers	Not present within the project site.	No recharged areas of aquifers within and adjacent the project site, however, there are at least one (1) Groundwater Extraction site is within the project site.
10	Water bodies are characterized by one or any combination of the following: tapped for domestic purposes; within the controlled and/or protected areas declared by appropriate authorities; which support wildlife and fishery activities.	Present within the project site.	**Baliti River** east to the northeastern part of the project site. **Batangas Bay** within the proposed planned development of the Project Site.
11	Mangrove areas are characterized by one or any combination of the following conditions: with primary pristine and dense young growth; adjoining mouth of major river systems; near or adjacent to traditional productive fry or fishing grounds; areas which act as natural buffers against shore	Not present within the project site.	The are no identified Mangrove areas within the 5 km buffer zone of the Project Site.

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No.	ECA Category	Presence within the Project Site	Description and Distance (in aerial km)
	erosion, strong winds and storm floods; areas on which people are dependent for their livelihood.		
12	Coral reefs characterized by one or any combination of the following conditions: - With 50% and above live coralline cover. - Spawning and nursery grounds for fish. - Act as natural breakwater of coastlines	Not present within the project site.	No known coral species is identified with the project site.

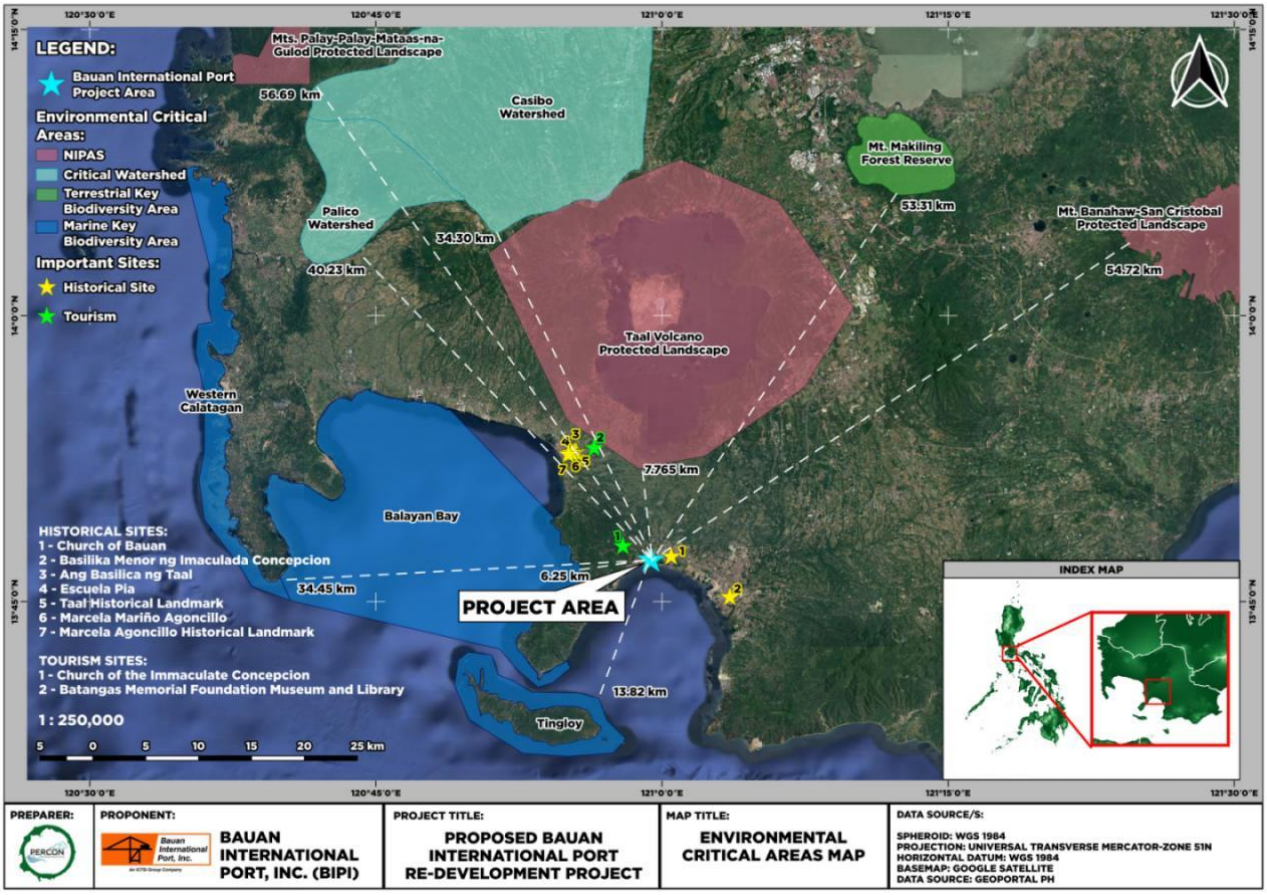

Figure 7-3 Environmental Critical Areas Map in Relation to the Project Site

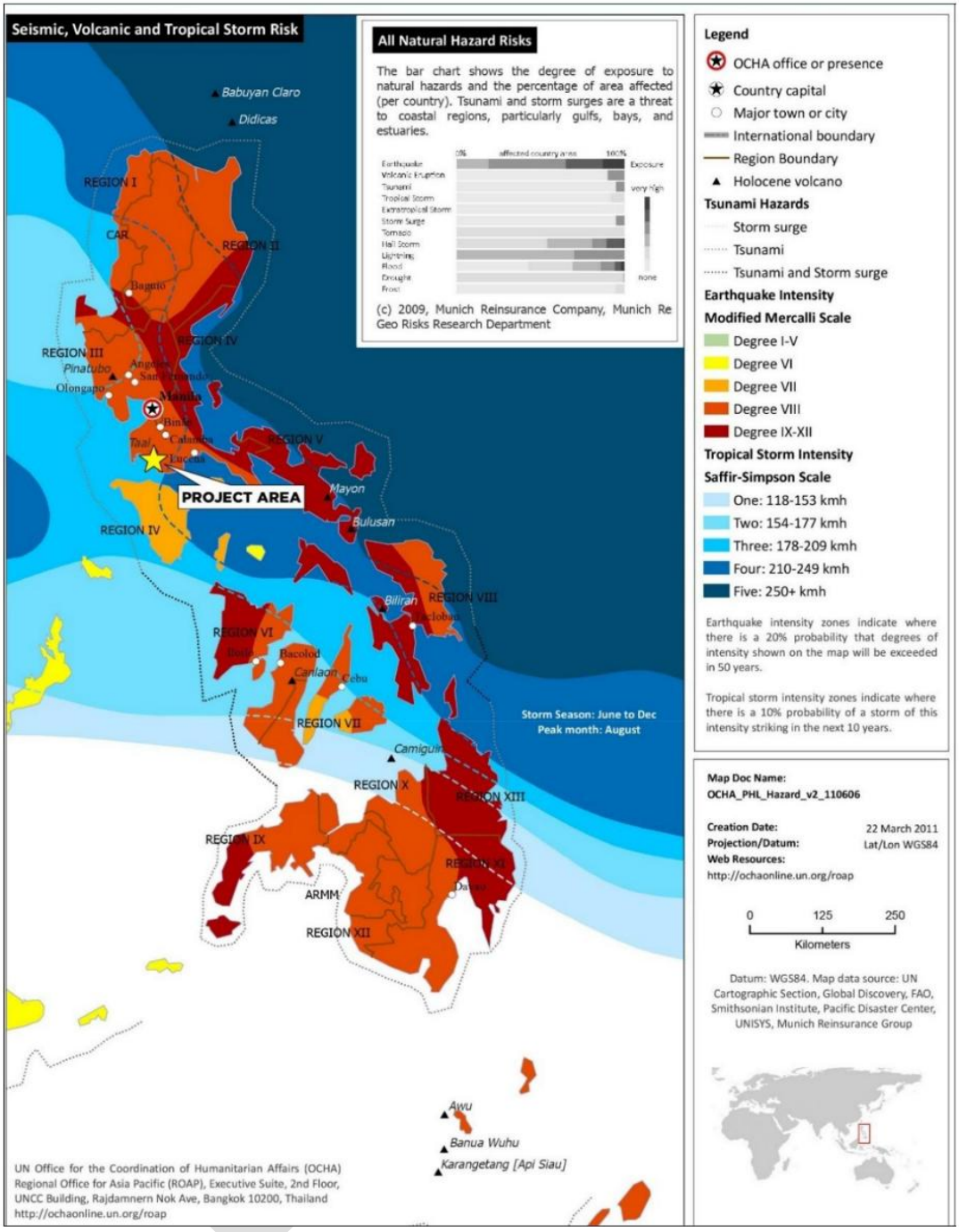

Figure 7-3 Natural Hazards Risk Map of the Philippines

7.1.1.3 Land Tenure

The project footprint is within Alienable and Disposable (A&D) land as indicated by the municipal land classification map (Figure 7-4) and coincides with an established coastal built-up corridor fronting Batangas Bay. No forestland tenure classes intersect the site (Figure 7-5).

Consistent with NCIP jurisdictional mapping, there are no issued Certificates of Ancestral Domain Title (CADT) or Certificates of Ancestral Land Title (CALT) covering the area, nor are there CADC/CALC claims. DENR and CLUP datasets likewise indicate no Comprehensive Agrarian Reform Program (CARP) communities within or immediately adjacent to the project footprint.

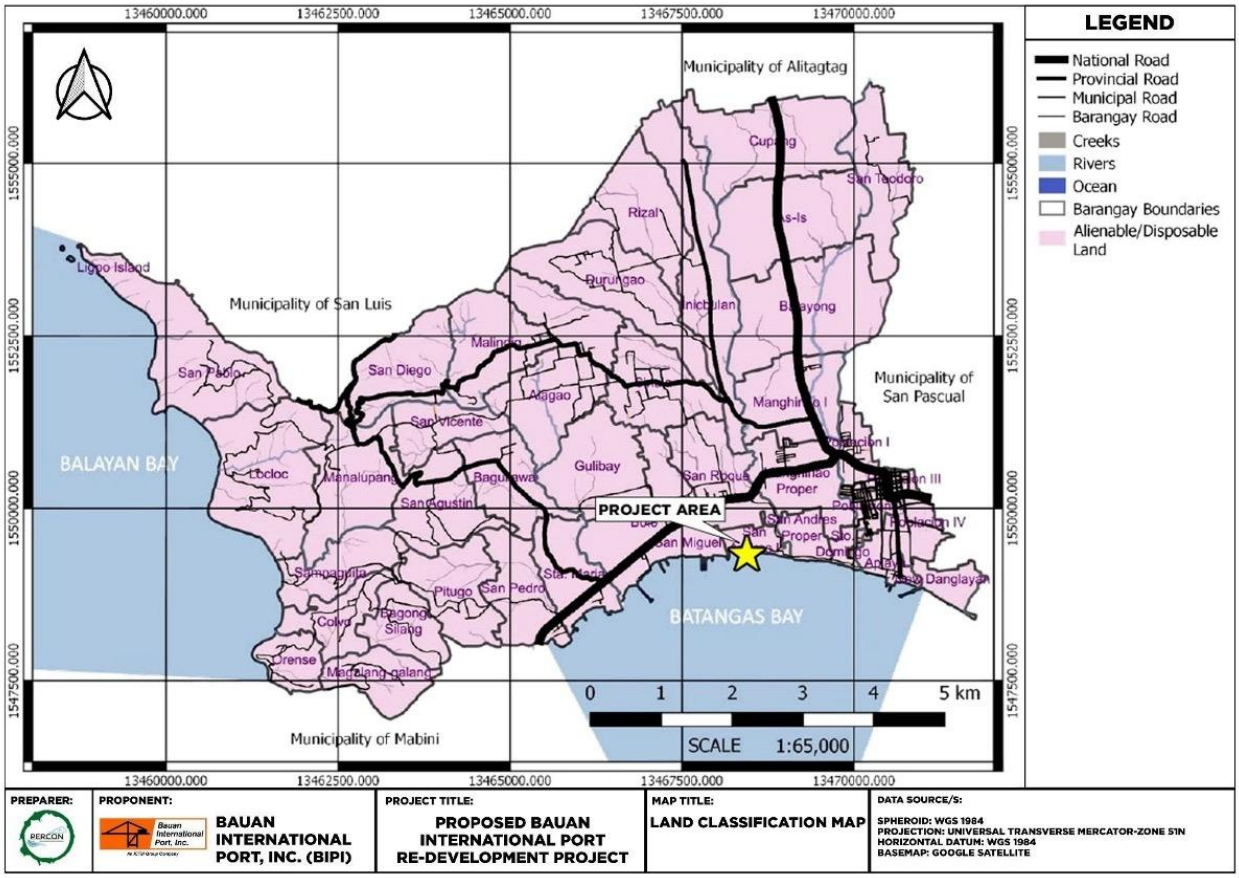

Figure 7-4 Municipal Land Classification Map in Relation to the Project Site

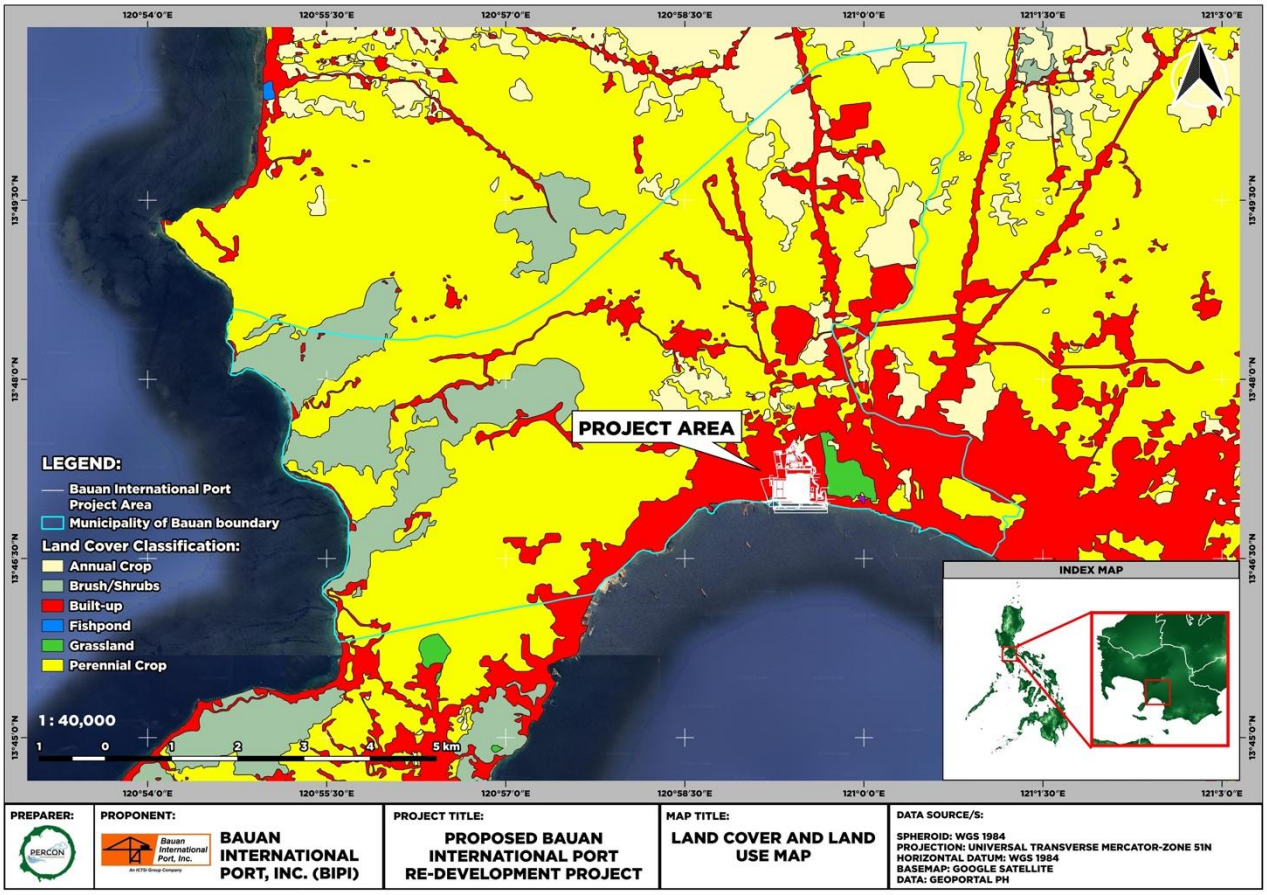

Figure 7-5 Land Cover Map of Portion of Batangas in Relation to the Project Site

7.1.1.4 Visual Aesthetics

The Project Site lies on the Batangas Bay shoreline within the jurisdiction of Bauan, Batangas, inside an established project footprint operated by BIPI. Land cover is predominantly paved operational surfaces and built structures, with remaining open areas used for laydown, short-term storage, and vehicle parking, indicating a low to moderate visual sensitivity typical of an industrial waterfront.

Figure 7-6 North of Project Site

Figure 7-7 Perspective Facing West of Site

Figure 7-8 East of Project Site

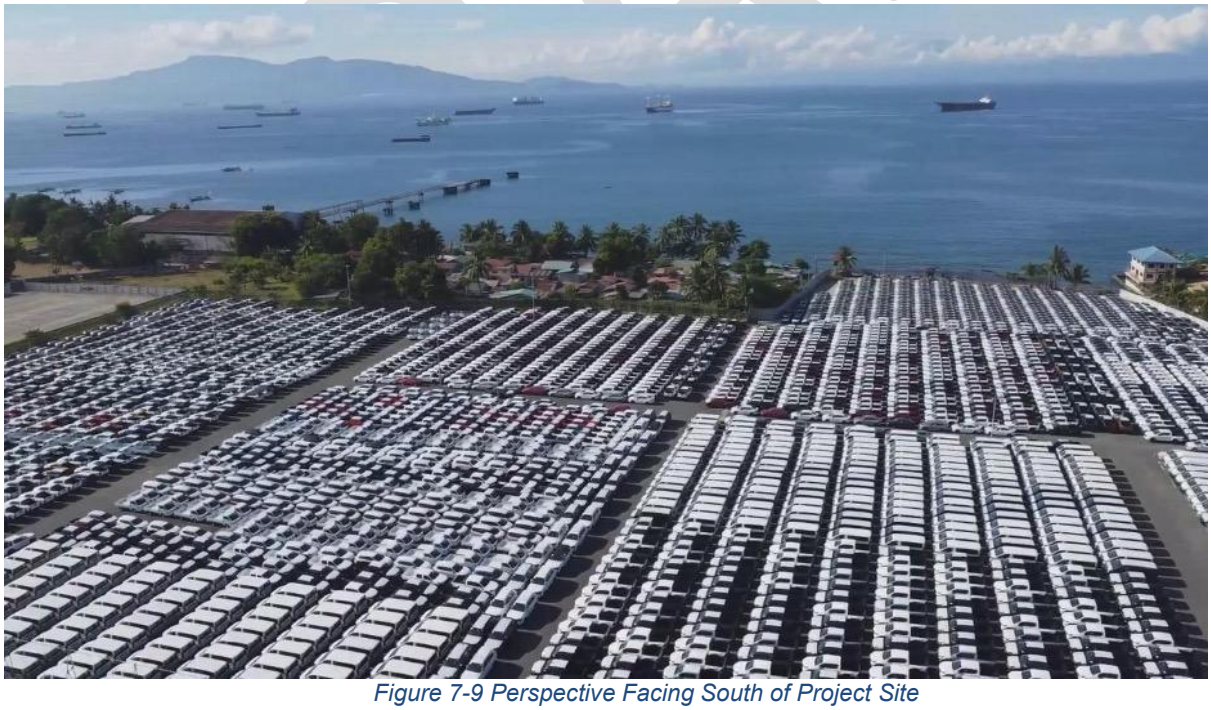

Figure 7-9 Perspective Facing South of Project Site

7.1.2 Geology and Geomorphology

7.1.2.1 Geomorphology and Slope

Geomorphology of the Project Site

The project lies on the inner margin of the Batangas Bay embayment (Figure 7-10). The shoreline fronting the estate is already engineered with quay walls, revetments, and reclaimed hardstands, replacing the original back-beach and intertidal flats. Immediately inland, a narrow anthropogenic coastal plain transitioned to low coastal terraces before rising onto dissected uplands that frame the bay to the west and northeast.

Bathymetric soundings on the Topographic Map indicate a gently shelving inner bay floor that deepens quickly offshore. Dredged berth pockets and approach lanes create distinct negative-relief features against this natural gradient; these pockets interrupt longshore sand ribbons and act as preferred traps for fluvially supplied fines during calm seasons. Along hardened frontages, wave energy is partly reflected, promoting localized toe scour where armor or wall continuity is imperfect, while leeward zones of breakwaters and quay corners accumulate siltier facies.

Relief and landform breaks are clear on the Terrain Map (Figure 7-11) Ground levels within the port estate are only a few meters above mean sea level and are effectively planar due to filling and platform construction. *Cross-sections A–A'* and *B–B'* show a very gentle coastal plain punctuated by the incision and low fan of the Baliti River, then a rapid rise to hill slopes and ridgelines inland. These profiles confirm a short upslope catchment delivering runoff and fine sediment directly to the foreshore and nearshore.

The Slope Map (Figure 7-12) places the project footprint entirely within the 0–3% class, with adjacent built-up areas mostly 3–8%. Slopes steepen rapidly beyond the first kilometer inland into the 18–30% and 30–50% classes, and locally >50% on ridge crests. This steep-to-gentle downslope sequence explains the dense network of short, reactive drainages and the tendency for concentrated storm runoff to debouch at a few low coastal outlets.

The *Rivers and Creeks Map (*Figure 7-13) illustrates regional drainage. A dendritic set of low-order streams converges toward Batangas Bay, with the Baliti River being the principal local control on coastal sedimentation at the site. Its engineered lower reach now behaves as a small estuarine wedge: cohesive overbank and levee deposits occur landward, grading bay ward into silty sand and muddy sand across subtidal flats just east and west of the mouth. During high-intensity rainfall, overflow and backwater effects can spread fine sediment across the low backshore before settling in structural lees along the quay walls.

Largely, four dominant mappable geomorphic units within and adjacent to the Project Site:

a. engineered shoreline structures and reclaimed platforms on a level coastal plain;
b. residual beach–foreshore pockets with medium to coarse sand;
c. fluvial–estuarine deposits of the Baliti River occupying the low corridor through the coastal plain; and
d. a modified nearshore seabed comprising natural sand sheets and dredged pockets/fairways.

Finally, this present configuration reflects an embayed, microtidal coast whose morphology is now governed primarily by port infrastructure and maintenance dredging, seasonally reversing monsoonal longshore transport, and episodic fluvial inputs from the steep, short catchments upslope.

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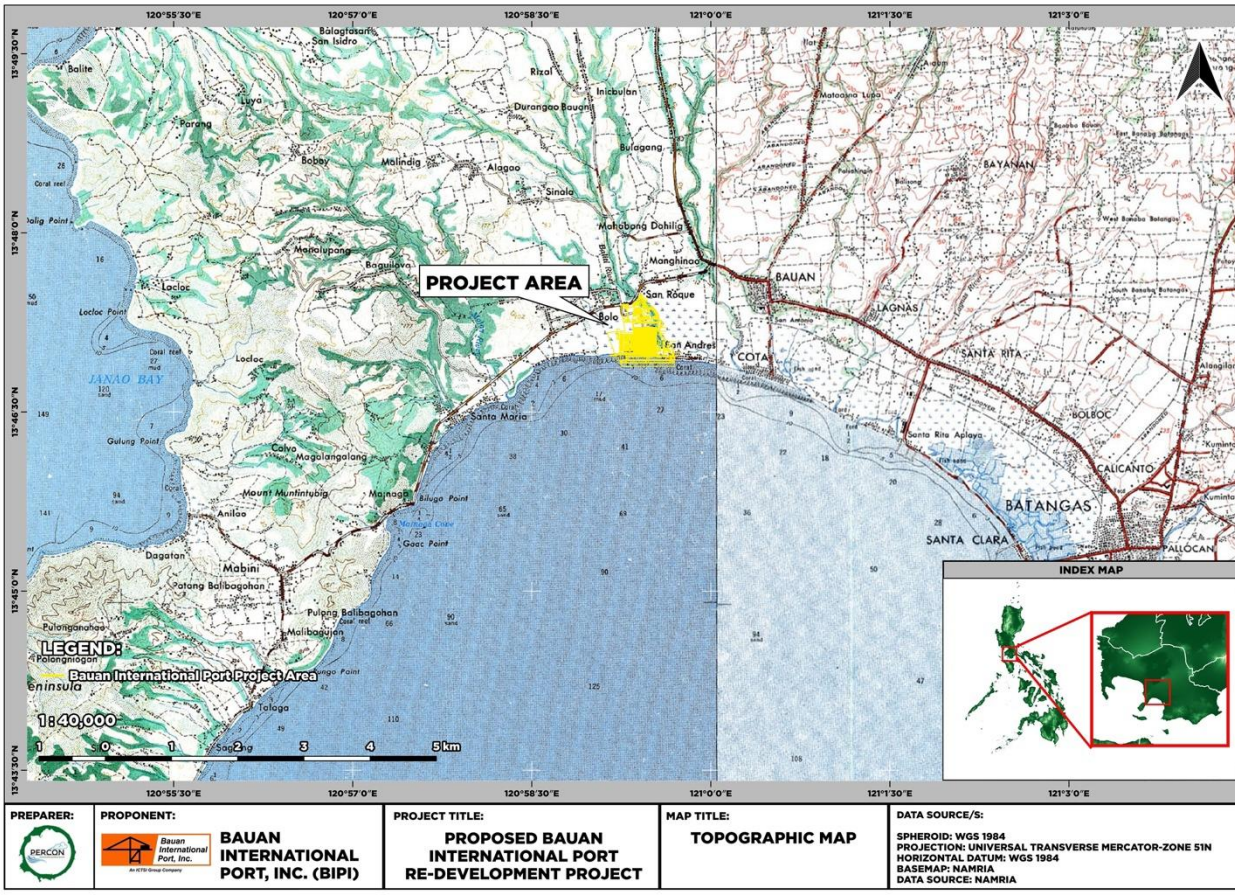

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Figure 7-10 Topographic Map

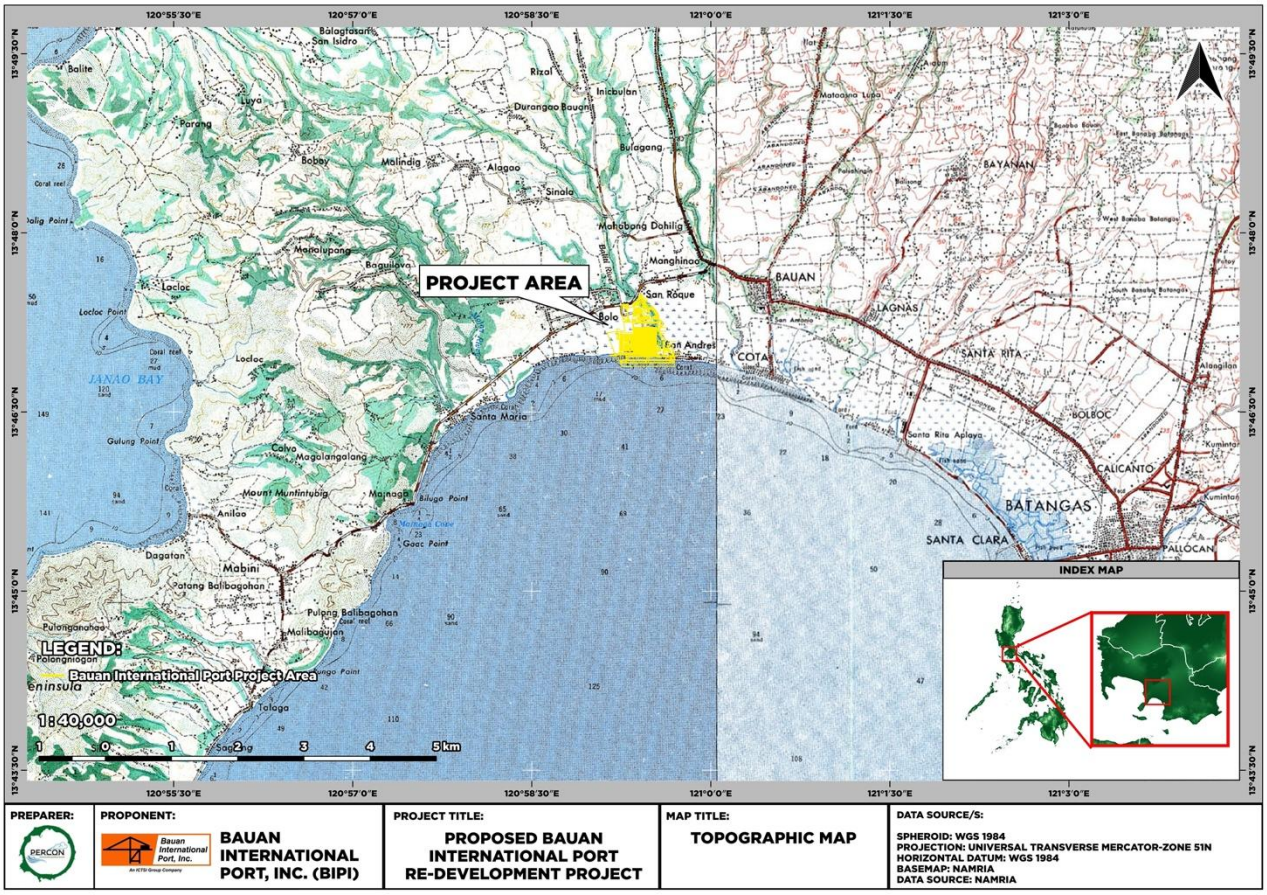

Figure 6-11 Topographic Map

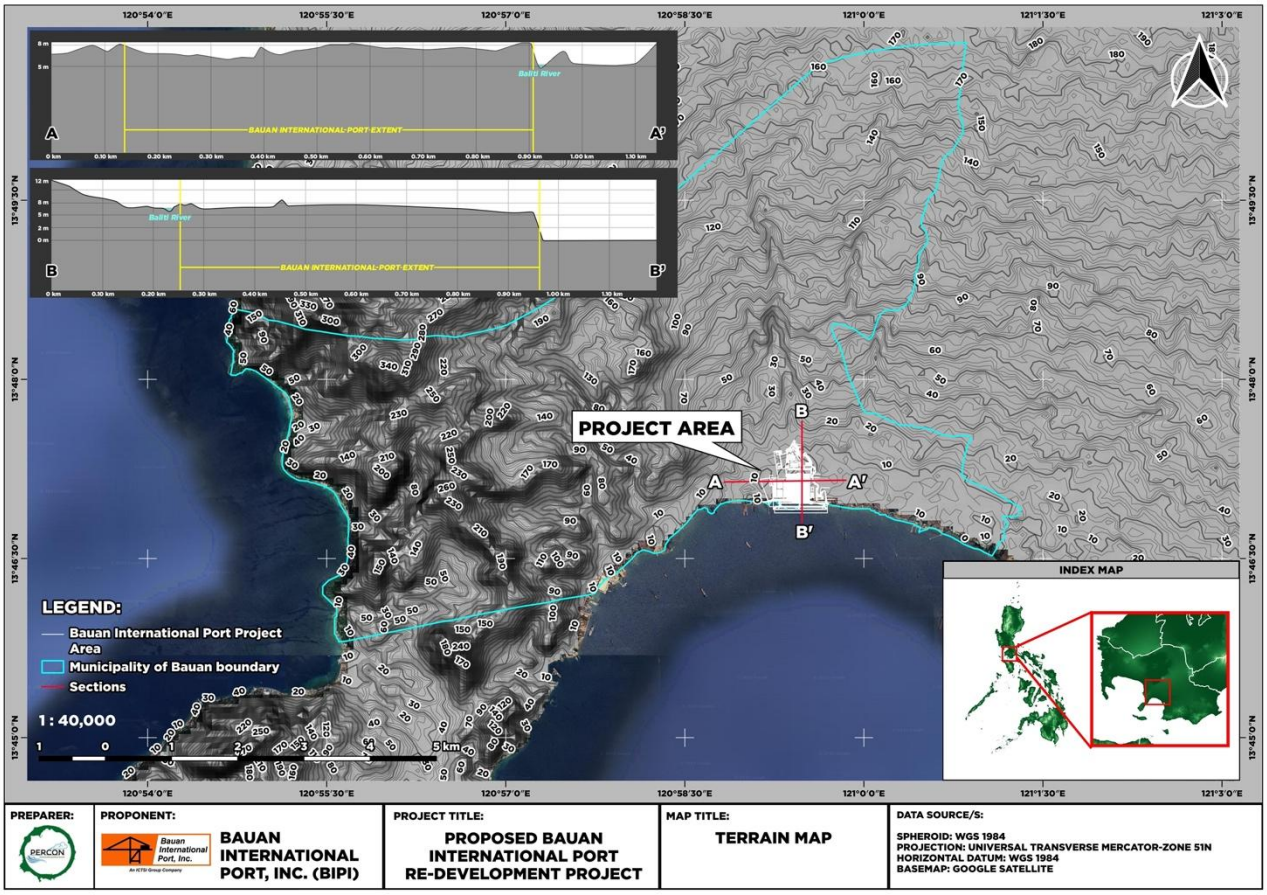

Figure 7-11 Terrain Map of the Project Site and Vicinities

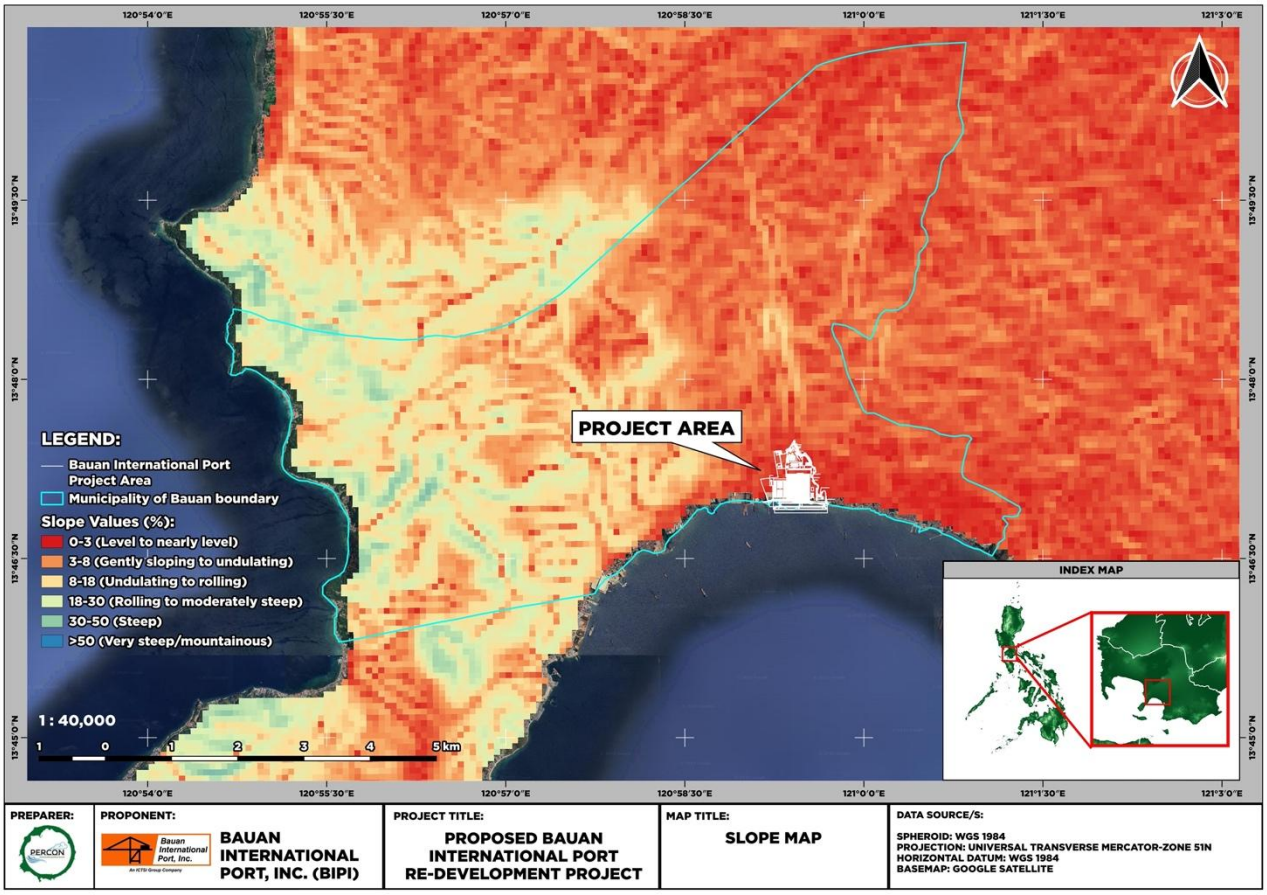

Figure 7-12 Slope Map of the Project Site and Vicinity

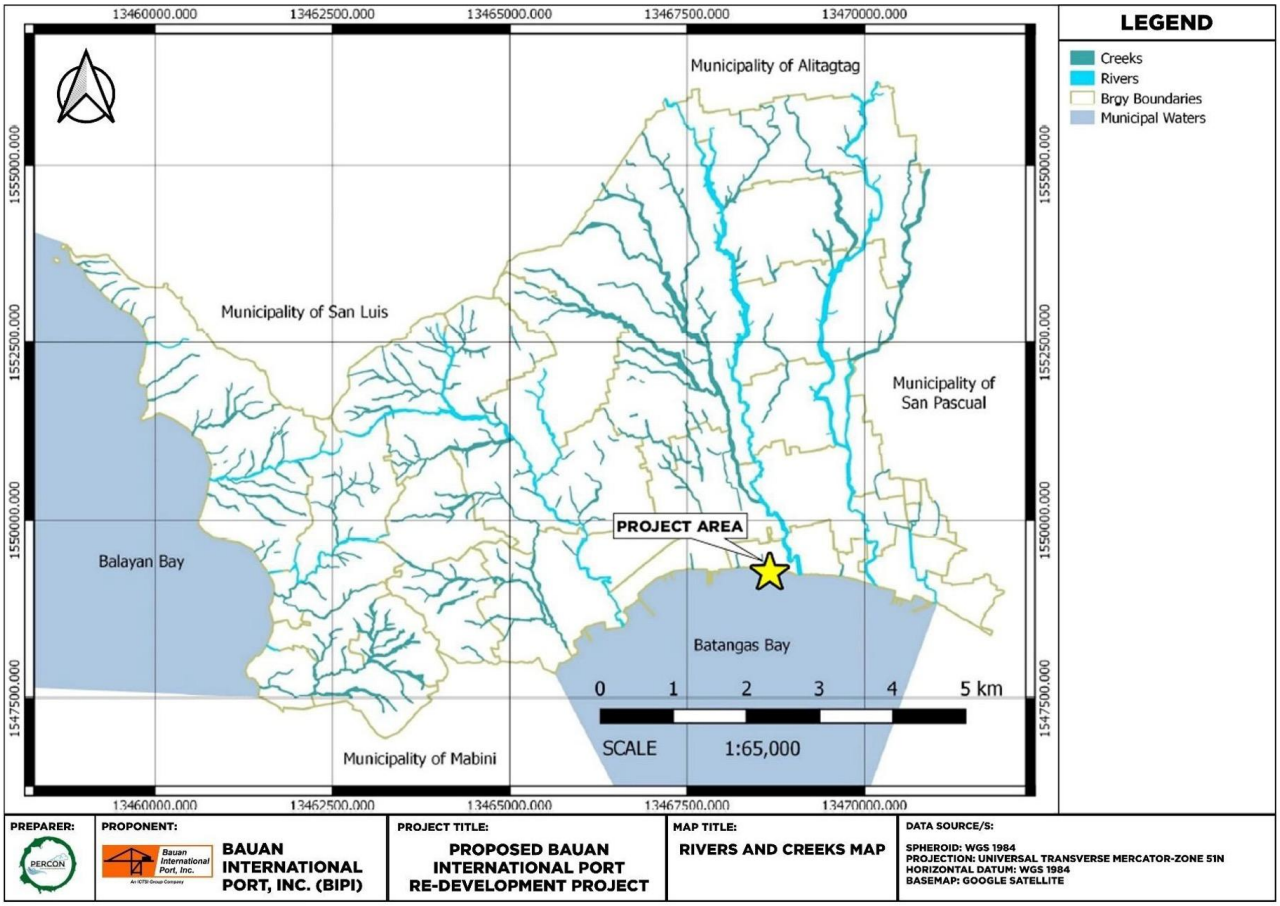

Figure 7-13 Drainage Map of the Project Site and Vicinity

7.1.2.2 Sub-surface Geology/Underground Conditions

Regional Geology and Tectonics

The tectonic setting of the Philippines is unusual in several respects: it is characterized by opposite-facing subduction systems on its east and west sides; the archipelago is cut by a major transform fault, the Philippine Fault; and the arc complex itself is marked by active volcanism, faulting, and high seismic activity. Subduction of the Philippine Sea Plate occurs at the eastern margin of the archipelago along the Philippine Trench and its northern extension, the East Luzon Trough

The East Luzon Trough is thought to be an unusual example of a subduction zone in the process of formation, as the Philippine Trench system gradually extends northward (Hamburger et al., 1983). On the west side of Luzon, the Sunda Plate subducts eastward along a series of trenches, including the Manila Trench in the north, the smaller less well-developed Negros Trench in the central Philippines, and the Sulu and Cotabato trenches in the south (Cardwell et al., 1980). At its northern and southern terminations, subduction at the Manila Trench is interrupted by arc-continent collision, between the northern Philippine arc and the Eurasian continental margin in Taiwan and between the Sulu-Borneo Block and Luzon at the island of Mindoro.

As seen in Figure 7-14, the Bauan International Port sits on the southern Luzon margin fronting Batangas Bay, immediately north of the Verde Island Passage. This corridor marks the onshore–offshore transition between SW Luzon and northern Mindoro, where several strike-slip faults, young volcanic centers, and the broader subduction system interact.

Southwest Luzon is part of the Philippine Mobile Belt, influenced by west-dipping subduction along the Manila Trench and the oblique convergence between the Sunda/Eurasian and Philippine Sea plates. Forearc and

overriding-plate deformation vary along strike, with active shortening, strike-slip shearing, and arc volcanism accommodated across a narrow belt in Batangas and the Verde Island Passage. (Armada, et al, 2020; Hsu, YJ., 2016)

Moreover, the area lies on the southwest fringe of the Macolod Corridor—an approx. tens-of-kilometerswide volcanic–tectonic belt that cuts across south-central Luzon. Taal Volcano, immediately east of the project's hinterland, is the most active center in this belt and expresses ongoing magmatic and volcanotectonic deformation that interacts with regional faults. The corridor indicates a crustal domain prone to extensional to trans-tensional faulting superimposed on an overall strike-slip regime. (Austria, RSP., 2023; Zlotnicki, J., 2018; PHIVOLCS, n.d.)

Offshore and around Batangas Bay–Verde Island, active structures form a conjugate network broadly left lateral E–W faults (e.g., the Lubang–Verde Passage system) linked with NW-trending right-lateral to oblique faults (e.g., Balayan, Calatagan, Batangas Bay, Marikaban, and Aglubang River faults). Recent marine geophysical work refined and added traces in Batangas Bay and the Verde Island Passage, improving on older maps that showed only the Verde Passage Fault. These results better explain the sources of the 1994 Mindoro and 2017 Batangas earthquake sequences.

South of the Verde Island Passage, the Central Mindoro Fault (CMF) and associated strands accommodate sinistral (left lateral) motion and uplift within the Mindoro collision zone. These structures interact kinematically with the Lubang–Verde Passage system across the strait, contributing to the high strain gradients around the project's offshore vicinity. (Rimando, R., 2025).

The April 2017 Batangas earthquake sequence (M~6 main events) occurred within this offshore/onshore network and was attributed by PHIVOLCS to movement along local faults proximal to Batangas Bay and the Verde Island Passage, with the Lubang Fault also recognized as a capable offshore earthquake source. Coupled with Verde Island Passage -mapped faults, this underscores the likelihood of strong ground shaking at the coastline and the need to consider secondary hazards such as liquefaction and minor tsunami potential from local offshore sources in detailed design.

Finally, Bauan coast occupies a tectonically active margin shaped by (i) oblique subduction at the Manila Trench, (ii) strike-slip partitioning across the Lubang–Verde Passage–Batangas fault network, and (iii) Macolod Corridor volcanism centered on Taal.

For the project's engineering and risk sections, treat: (a) site-specific PGA and response spectra anchored to PHIVOLCS/NSCP zonation; (b) geotechnical screening for liquefaction and cyclic softening in reclaimed/fill or deltaic sediments; (c) port-structure detailing for fault-generated strong motion and nearsource effects; and (d) operational planning for ashfall and unrest scenarios at Taal (low-frequency but credible), coordinated with official advisories.

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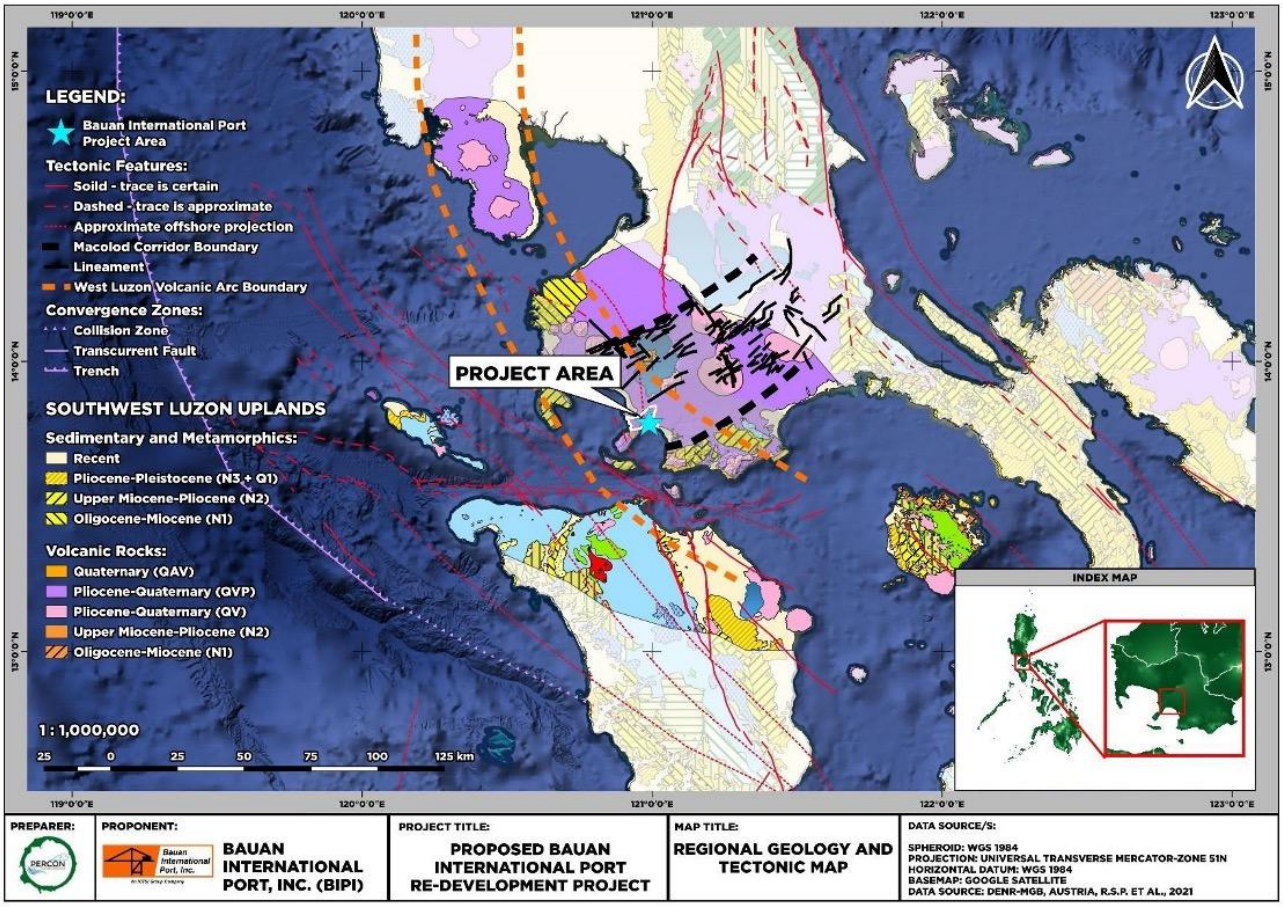

Figure 7-14 Regional Geologic and Tectonic Map Section of the Philippines in Relation to the Project Site

Regional Stratigraphy

The area where the project lies belongs to the Southwest Luzon Uplands Stratigraphic Group (SG7), defined by Lexicon of Philippine Stratigraphy by Pena, 2008 and the Geology of the Philippines by MGB, 2010. From oldest at depth to youngest at surface, the project area sits within a well-established Southwest Luzon succession that records Paleogene marine deposition, Neogene arc growth, and Quaternary volcanism linked to the West Luzon Volcanic Arc and the Macolod Corridor. The units shown on Figure 6-16 summarize the column as follows.

San Juan Formation (Early–Late Oligocene; ~33.9–23.0 Ma)

Regionally extensive marine clastics—tuffaceous sandstones, siltstones and shales—with local conglomeratic beds. This is the oldest sedimentary basement in western Batangas and provides the foundational substrate beneath younger arc units.

Tolos Quartz Diorite (Early Miocene; ~20.4–16.0 Ma)

Calc-alkaline intrusive body/bodies emplaced into the Oligocene section. The diorite marks early arc magmatism: where shallow, it yields competent rock heads and contact-metamorphosed aureoles affecting overlying clastics.

Dagatan Wacke (Miocene, chiefly Middle)

Thick-bedded graywacke, siltstone and shale interpreted as arc-derived turbidites. It gradually overlies the Oligocene section and is an important sediment sink during active arc uplift.

Nasugbu Volcanic Complex (Middle–Late Miocene; ~13.7–7.3 Ma)

Andesitic to dacitic lavas, breccias and pyroclastics that build much of the Batangas highlands. These volcanic and volcaniclastic packages interfinger with contemporaneous marine clastics along the margins of Balayan Bay and Batangas bay.

Corregidor Formation (Late Miocene to earliest Pliocene)

Brown to gray marine sandstones and siltstones with tuffaceous intervals, representing renewed basin filling following peak Miocene volcanism. Acts locally as a regional aquitard and forms subdued topography along bay fringes.

Calatagan Formation (Early–Middle Pliocene; ~5.3–2.6 Ma)

Shelf to nearshore siliciclastics with limestone lenses and subordinate tuffs. Around western Batangas this unit records alternations of carbonate productivity and volcaniclastic influx; it underlies many of the low relief coastal terrains.

Pinamucan Formation (Late Pliocene–Early Pleistocene)

Polymict conglomerates, sandstones and siltstones deposited in fan-delta to littoral settings as relief increased toward the Quaternary. Along Batangas Bay these coarse clastics locally form the shallow subsurface beneath modern alluvium.

Mataas-na-Gulod, Banahaw, and Macolod Volcanic Complexes (Pleistocene–Holocene) Quaternary arc–rift volcanism tied to the Macolod Corridor superposes the Neogene pile.

- **Mataas-na-Gulod Volcanic Complex (Early Pleistocene)**: basaltic-andesitic lavas and pyroclastics.
- **Banahaw Volcanic Complex (Middle–Late Pleistocene)**: voluminous calc-alkaline products.
- **Macolod Volcanic Complex (Late Pleistocene–Holocene)**: includes the Taal Volcanic Complex; widespread pyroclastic fall, surge and laharic deposits mantle the lowlands and bay margins.

Holocene coastal–alluvial veneer
Beach-ridge sands and gravels, back-reef carbonates, floodplain/alluvial silts, and artificial fill fringe the present shoreline and form the immediate geotechnical horizon for port infrastructure.

The workable near-surface section along the Bauan International Port waterfront is typically Holocene coastal/alluvial materials resting on Late Pliocene–Pleistocene Pinamucan-type clastics and/or Quaternary pyroclastics sourced from the Macolod/Taal system. The Neogene bedrock (Calatagan–Corregidor clastics or Miocene volcanics) is shallow on headlands but deepens beneath the bay-margin plains.

Finally, the intrusive Tolos quartz diorite and older San Juan clastics constitute the regional basement and may be encountered only at depth or in uplifted blocks.

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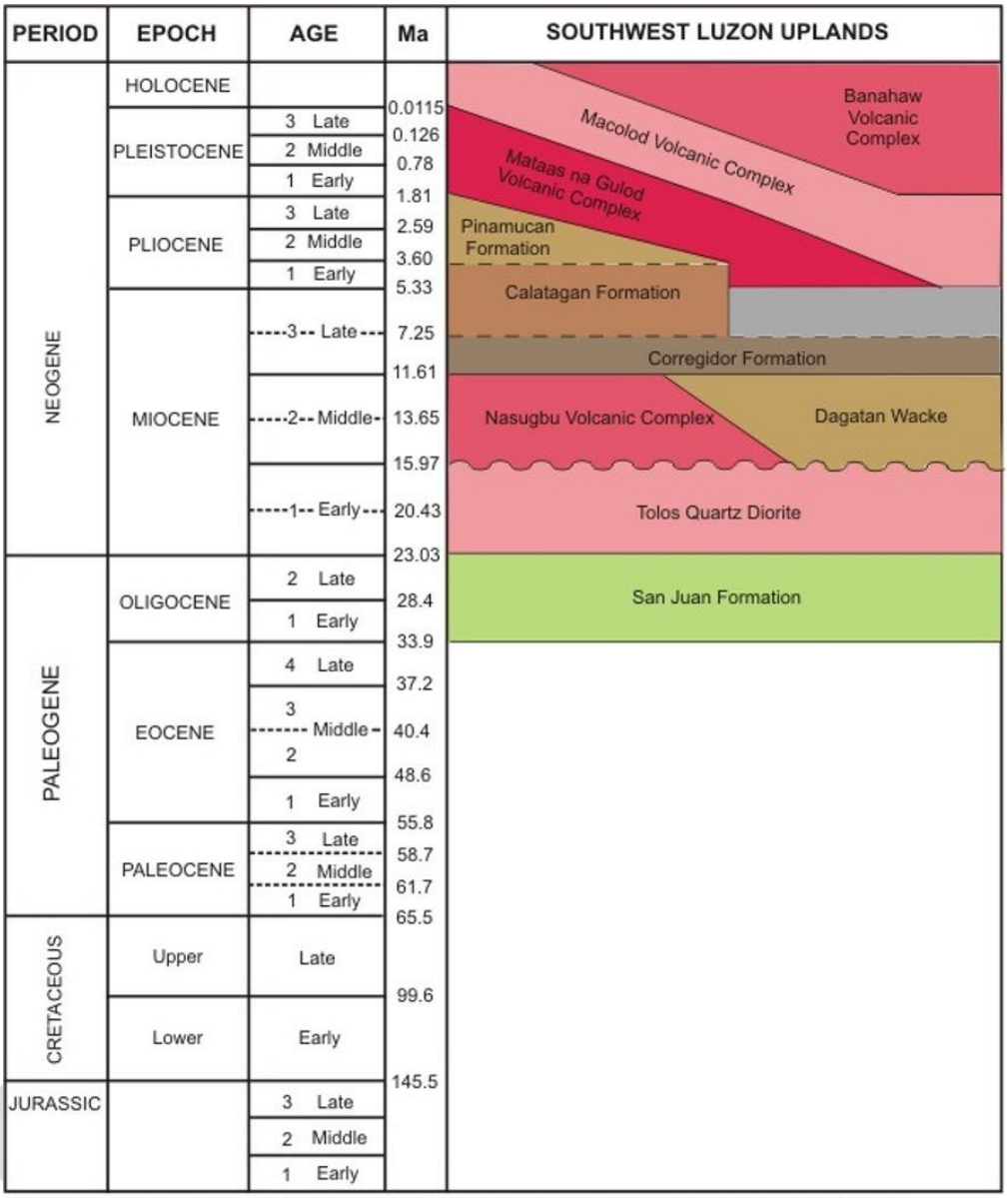

Equivalent Ma values for boundaries of periods, epochs and ages adopted from Geological Time Scale 2004 (Gradstein and others. 2004)

Source: Mines and Geosciences Bureau-Geology of the Philippines, 2010.

Figure 7-15 Stratigraphic Column of Southwest Luzon Uplands (SG 7)

Local Geology

The Project Site as seen in Figure 7-16 occupies the narrow Recent (R) coastal belt at the head of Batangas Bay. This belt is the youngest wedge on the map (tan polygon) and consists of man-placed fill over Holocene beach-ridge sand and gravel, tidal-flat silty sand to clay, and Baliti River mouth alluvium. The coastal wedge is patchily mantled by reworked Macolod/Taal ash and lapilli, deposited by late Pleistocene–Holocene eruptions and later redistributed by waves and floods. Thickness is variable across the platform due to past reclamation and grading.

Immediately landward, Quaternary volcanic deposits (QAV) and Pliocene underlie the low uplands and back-shore plains–Quaternary volcanics (QVP) (purple/orange map units). These include lava flows, scoria and agglomerate, welded to weakly indurated tuff, laharic breccia, and tuffaceous sandstones. The older QVP is more lithified; the younger QAV is more porous and variably weathered. These volcanic/volcaniclastic sequences form the shallow bedrock beneath the Recent wedge and crop out along the first inland rises.

No mapped major fault transects the reclaimed platform on the provided sheet; however, the bedrock fabric follows the NE–SW Macolod Corridor grain. Bedding/flow contacts and joints in the volcanics locally step the rock head beneath the plain, creating lateral changes in founding level over short distances.

Working subsurface model across the port margin

From surface downward the expected sequence is compacted fill (to a few meters) over Holocene coastal and fluvial sediments with interbeds of pumiceous ash/lapilli (typically several meters, locally more in leveled areas), grading to dense gravelly sand and conglomeratic facies at the bay margin. This veneer rests on tuffaceous sand–silt and laharic beds of the QAV/QVP, with lava or indurated tuff forming competent horizons at shallow to moderate depth inland and at greater depth beneath the quay. The interface between recent sediments and volcanic ground is irregular, reflecting paleo-channels of the Baliti River and wave-reworked shoreface bars.

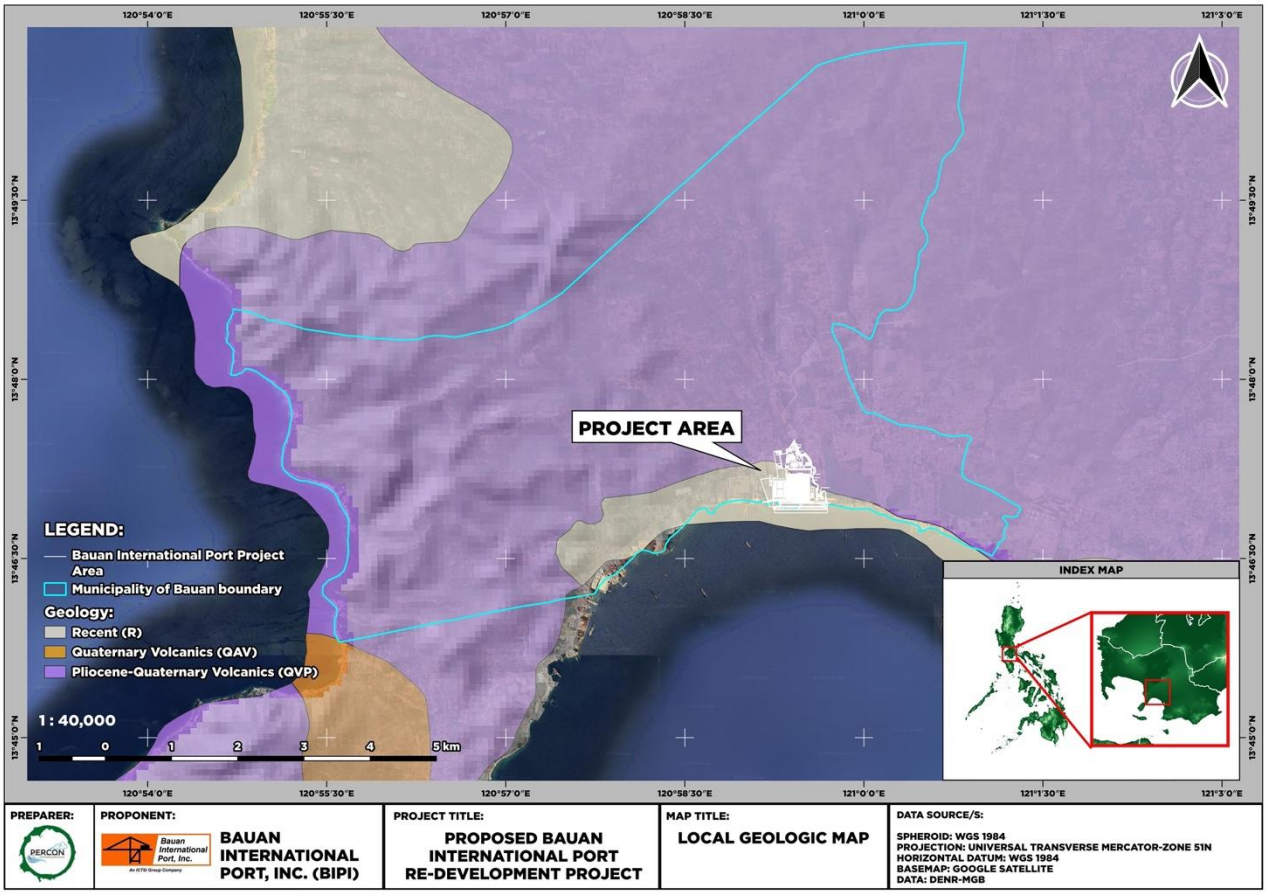

Figure 7-16 Local Geologic Map of the Project Site and Vicinities

7.1.2.3 Inducement of subsidence, liquefaction, landslides, mud/ debris flow, etc.

Geohazards

The existing conditions to assess the impacts were discussed by presenting the potential geohazards that may affect the project and the site.

Earthquake-Related Hazards

The most prominent geohazard recognized in the project site and vicinity is seismic hazard due to the presence of earthquake generators enumerated in Table 7-2:

Table 7-2 Fault and Fault Systems within and adjacent to the Batangas Bay

Fault / System	Nearest distance (km)	Direction from Project Site	Note
Batangas Bay Fault	9.8 km	S	Closest dashed strand in midbay.
Marikaban (Maricaban) Fault	16.5 km	SSW	Nearest segment off Mabini Peninsula.
North Verde Fault System	23 km	SSE	Offshore, on the north side of Verde Passage.
Calatagan Fault	25.9 km	W–WSW	Offshore of Calatagan Peninsula.
Lubang Fault	26.1 km	WSW	Northern offshore of Lubang Island.
Central Mindoro Fault	30.2 km	S–SSE	Across the passage, northern Mindoro.
Verde Fault System (central/main strands)	32.5 km	SSE	Farther south, along the passage.
Aglubang (Aglubang River) Fault	43.6 km	SE–SSE	NE Mindoro/Calapan sector.
Manila Trench *(regional)*	180 km	W–WNW	Not shown on this sheet; regional context distance.

- **Batangas Bay Fault (Batangas Bay Fault System, BBFS)** – A set of short, active strike-slip faults mapped inside Batangas Bay and toward the Mabini–Tingloy area; these were implicated as the closest local sources during the 2017 Batangas sequence. With regard to the BIPI Project, this fault zone controls near-field shaking right across the bay.

- **Maricaban (Marikaban) Fault** – NW-trending strike-slip breaks interpreted across Maricaban Island and adjacent seabed; recent offshore mapping shows scarps cutting Maricaban, consistent with the BBFS/Verde conjugate system. Relative to the Project Site, this fault serves as a nearby local source south of the site that can generate strong, short-range shaking.

- **North Verde Fault System** – An offshore strand/cluster north of the main Verde Passage corridor, newly resolved in high-resolution bathymetry as part of the Verde domain. Relevance to BIPI Project Site sits just S–SE across the passage; contributes to background seismicity.

- **Verde Fault System (Verde Passage Fault)** – A major left-lateral strike-slip corridor running WNW–ESE along the Verde Island Passage, connecting eastward and interacting with regional structures. Relevance to BIPI Project Site: a principal regional crustal source immediately offshore; design for strong shaking but not surface rupture at the port.

- **Calatagan Fault** – A NW-striking right-lateral fault zone off the Calatagan Peninsula; activity highlighted by the 24 July 2021 Calatagan M6.6 earthquake sequence. Relevance to BIPI Project Site: regional shaking source to the W–WSW that can produce long-period motions relevant to wharf walls and moored vessels.

- **Lubang Fault** – Western segment of the Lubang–Verde Passage system; studies indicate branching near Verde Island and continuation toward Lubang. Motion is dominantly left-lateral strike-slip. Relevance to BIPI Project Site: offshore regional generator; included in probabilistic hazard alongside the Verde strands.

- **Manila Trench** – Active subduction boundary west of Luzon capable of great earthquakes (M8+) and basin-wide tsunamis; it is the dominant far-field tsunami source for Batangas Bay. Relevance to BIPI Project Site: primary tsunami drivers include evacuation/vertical refuge planning, and mooring/quick-release provisions.

- **Central Mindoro Fault (CMF)** – An active sinistral (left-lateral) fault trending NW–SE across northern Mindoro; modern work refines its geometry and linkages within the Verde–Lubang system. Relevance to BIPI Project Site sits just across the passage; moderate-to-large CMF events will transmit damaging shaking into Batangas Bay.

- **Aglubang (Aglubang River) Fault** – A right-lateral strike-slip fault in NE Mindoro; it produced the 15 Nov 1994 M7.1 earthquake with ~35 km surface rupture and a tsunami that affected Mindoro and Batangas coasts. Relevance to BIPI Project Site: major historical source near the bay mouth— include its contribution to both shaking and tsunami scenarios.

The possibility exists that a strong, near-surface earthquake may be generated from the above faults and may cause some impact to the project site and vicinity. This is considered in the hazard assessment under Ground Acceleration. Other earthquake-related hazards such as ground shaking, ground rupture, liquefaction, and subsidence, and their direct impact on the project site are discussed in the succeeding sections.

In the past, the Seismological Observation and Earthquake Prediction Division of the Philippine Institute of Volcanology and Seismology (PHIVOLCS-SOEPD) and the United States Geological Survey (USGS) Earthquake Catalogue have recorded multiple minors, light, moderate, and strong earthquakes within and surrounding the area.

Figure 7-17 presents the nearest active fault relative to the Project Site. While Figure 7-18 provides the seismic events for magnitude 5.0 and above for the years 1900-2025 modified after the Earthquake Catalogue of USGS.

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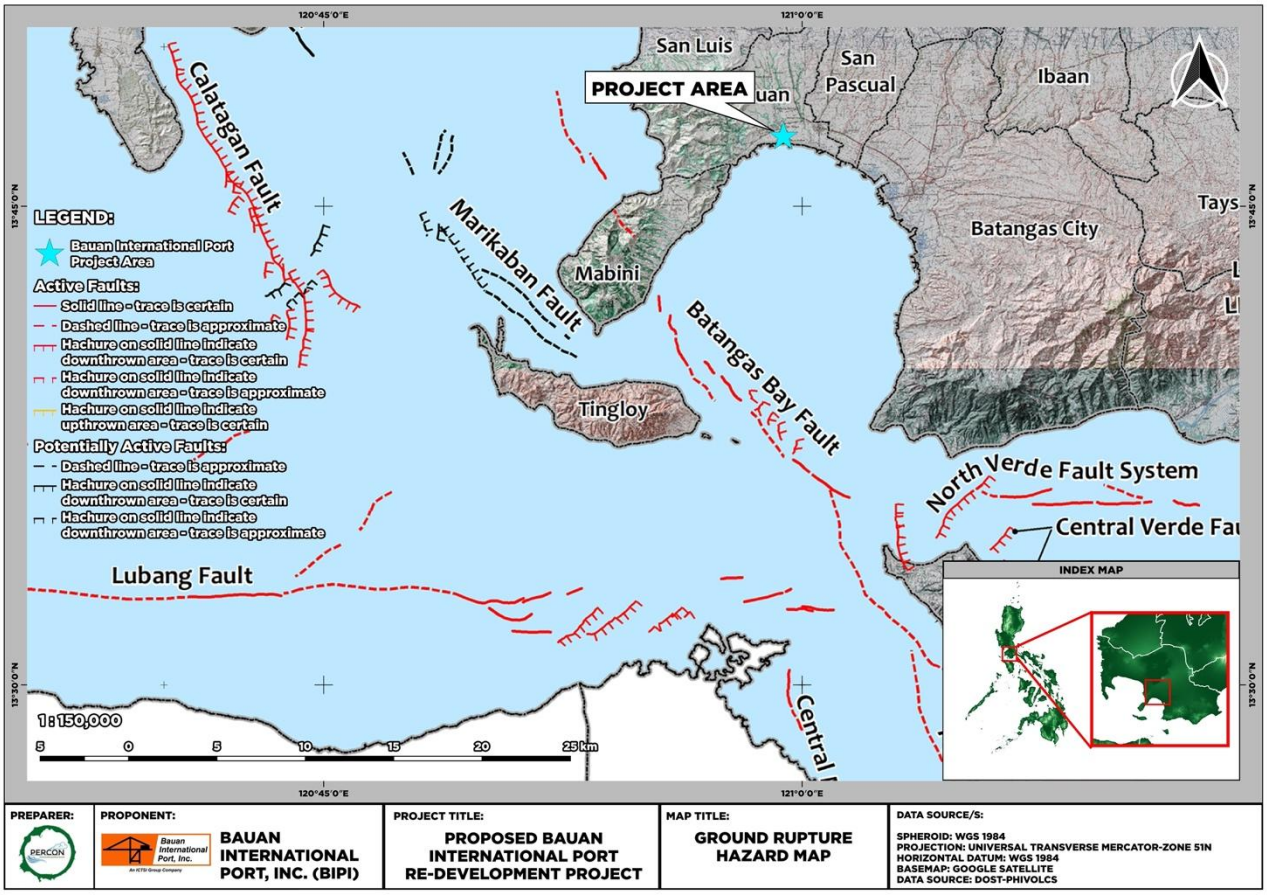

Figure 7-17 Active Fault Map in Relation to the Project Site and Vicinities

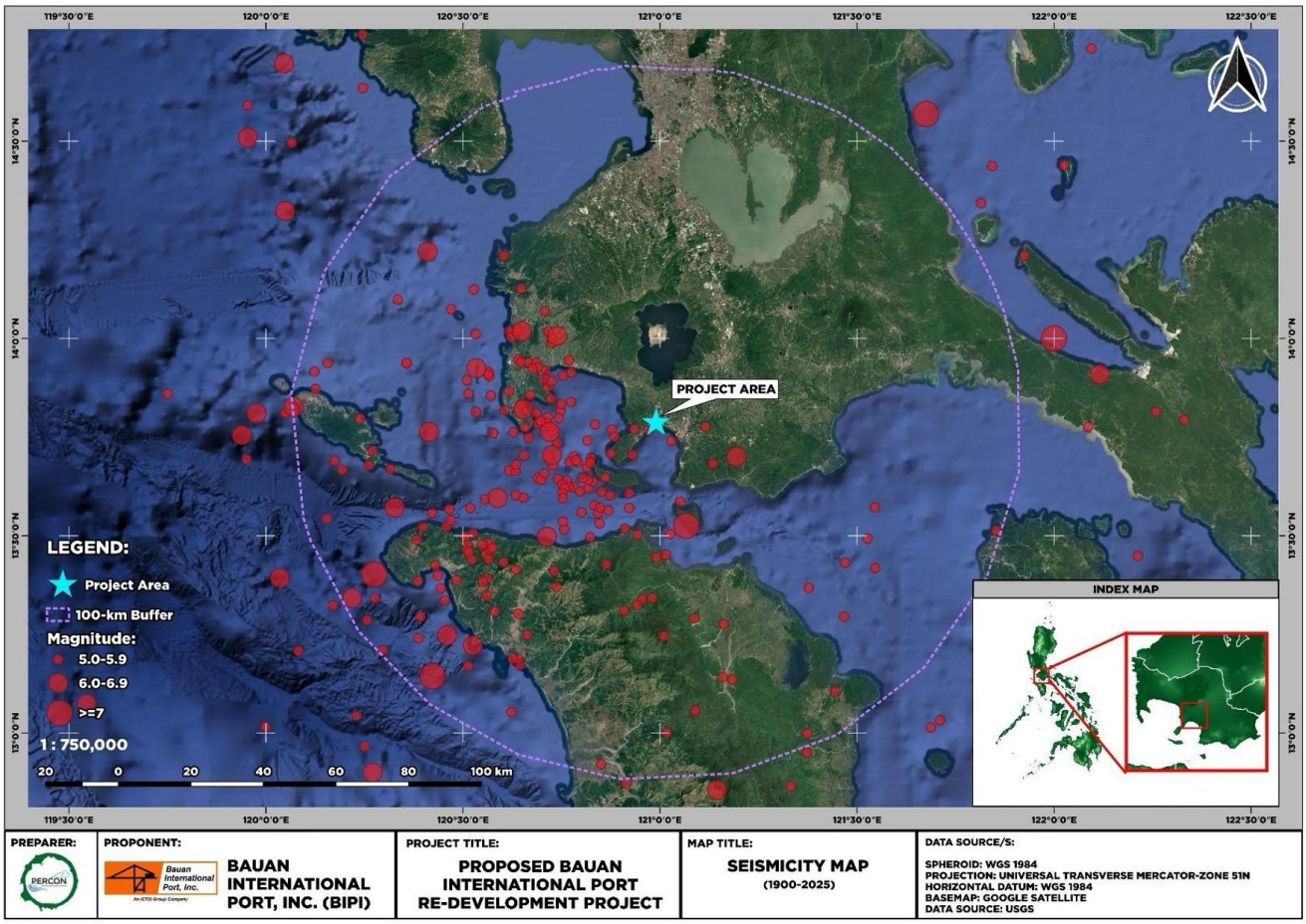

Figure 7-18 Seismicity Map of the Project Site and Vicinities (1900-2025)

Ground Acceleration

The ***peak acceleration*** is the largest increase in velocity recorded by a particular station during an earthquake. It is the measure of how hard the earth shakes at a given geographic point. Moreover, areas with expected PGA values higher than 0.4 are classified as very high damage risk zones as per National Structural Code of the Philippines (NSCP), 2015.

Only the nearest four active faults within the vicinity of the Project Site are utilized for the computation. A probable M7.1 and 7.4 were assigned for Batangas Bay Fault and Lubang Fault, while M6.6 and 6.8 were assigned for North Verde Fault System and Calatagan Fault, correspondingly. A method of calculating aseismic design value is the deterministic approach using the attenuation relationship equation developed by Fukushima and Tanaka in 1990. A design earthquake is assumed to occur at a point along the causative fault that is nearest to the site. Since this formula calculates peak acceleration at the surface, correction is required when this formula is applied to estimating ground motion on bedrock. Correction factors are applied to the mean peak acceleration depending on the type of foundation material: rock, 0.6; hard soil, 0.87; medium soil, 1.07; and soft soil, 1.39. The results of the computation of peak ground acceleration are summarized in Table 7-3 .

The ***Deterministic Method*** developed by Fukushima and Tanaka (1990) was used to assess the worst-case scenario of ground shaking:

$$Log10A = 0.41M - \log_{10}(R + 0.32 \times 10^{0.41M}) - 0.0034R + 1.30$$

Where: A = mean peak acceleration (cm/sec2)
R = shortest distance between site and fault (km)
M = surface-wave magnitude

Table 7-3 Peak Ground Acceleration Values based on Fukushima and Tanaka (1990)

Seismic Source			g	Calculated PGA (g) Values			A (cm/sec^2)
Fault	Magnitude (M)	Distance (km), R		g Rock	g Hard Soil	g Soft Soil	
Batangas Bay Fault	7.1	9.8	0.428	0.257	0.372	0.525	419.703
North Verde Fault System	6.6	23	0.220	0.132	0.191	0.306	215.694
Calatagan Fault	6.8	25.9	0.224	0.134	0.195	0.311	219.554
Lubang Fault	7.4	26.1	0.295	0.177	0.257	0.411	289.754

For a magnitude 7.1 earthquake along the Batangas Bay Fault that is approximately 9.8 km away from the Project Site, calculations resulted in a peak ground acceleration of 419.703 cm/sec^2 and an aseismic value of 0.428 g. On the other hand, for a magnitude 6.6 earthquake, whose trace to the project site is approximately 23 km away, resulted in a peak ground acceleration of 215.694 cm/sec^2 and an aseismic value of 0.220 g.

Based on results derived from the computation (Table 7-4), average peak ground acceleration values computed for a M7.1 MCE generated by the Batangas Bay Fault can potentially generate the strongest shaking in the project area site ranging from 0.257 (rock) to 0.525 (soft soil) *g*.

Table 7-4 Correlation of the Intensity Scale with the Richter Scale and Instrumental Scale. (Data adapted from Elbadawy, 2014)

Moment Magnitude (Richter)	Instrumental Intensity	Acceleration (g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
Under 2.0	I	< 0.0017	< 0.1	not felt	none
2.0 – 2.9	II – III	0.0017 – 0.014	0.1 – 1.1	weak	none
3.0 – 3.9	IV	0.014 – 0.039	1.1 – 3.4	light	none
4.0 – 4.9	V	0.039 – 0.092	3.4 – 8.1	moderate	very light
5.0 – 5.9	VI	0.092 – 0.18	8.1 – 16	strong	light
6.0 – 6.9	VII	0.18 – 0.34	16 – 31	very strong	moderate
7.0 – 7.9	VIII	0.34 – 0.65	31 – 60	severe	moderate to heavy
8.0 or higher	IX	0.65 – 1.24	60 – 116	violent	heavy
	X +	> 1.24	> 116	extreme	very heavy

Based on Table 7-4, a PGA value of 0.257 g to 0.525 g corresponds to an instrumental intensity of VII to VIII, categorized as “VERY STRONG” to SEVERE” shaking with the potential for moderate to heavy structural damage.

Moreover, the Probabilistic Seismic Hazards Analysis (PSHA) model maps of PHIVOLCS in relation to the Project Site are provided below.

Figure 7-19 shows the probabilistic peak ground acceleration at *rock site model* (Soil Class C, Vs30=760 m/sec) with 10% probability of exceedance in 50 years and indicates the maximum site acceleration response from a most probable earthquake. The PGA ratio (PGA value in g/ 1g) approximates the seismic coefficient, Ca in the National Structural Code of the Philippines (NSCP) used in the seismic design of regular structures.

Figure 7-20 shows the probabilistic peak ground acceleration at *soft rock or stiff soil site model* (Soil Class D, Vs30=360 m/sec) with 10% probability of exceedance in 50 years.

These PSHA-PGA maps of the Philippines are calculated from the available historical and instrumental seismicity plotted in the Philippines (Mw5.2 and above), updated active faults, area sources and trenches parameters, recent paleoseismic studies and geophysical monitoring results.

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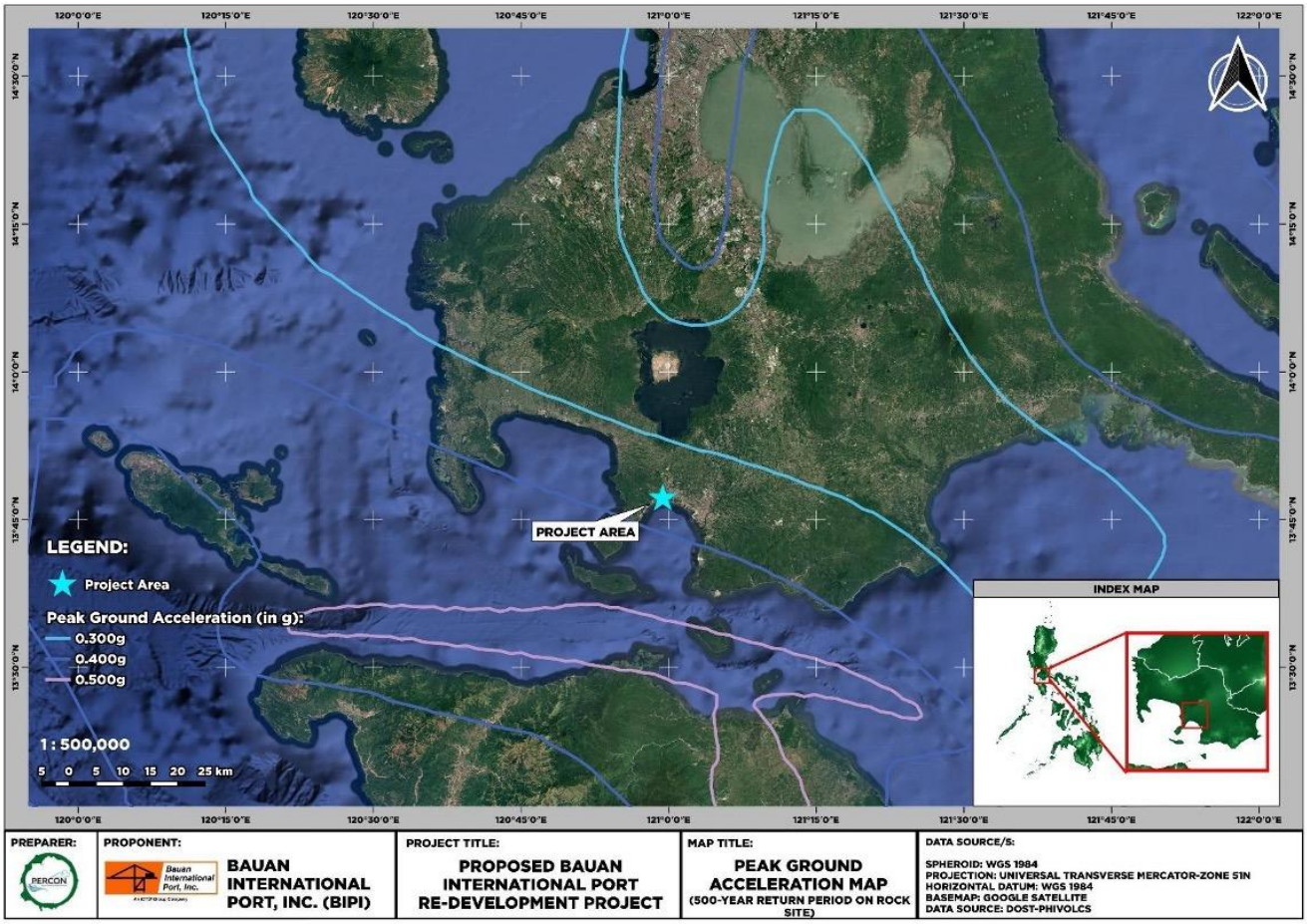

Figure 7-19 Probabilistic PGA at Rock Site Model of Project Site

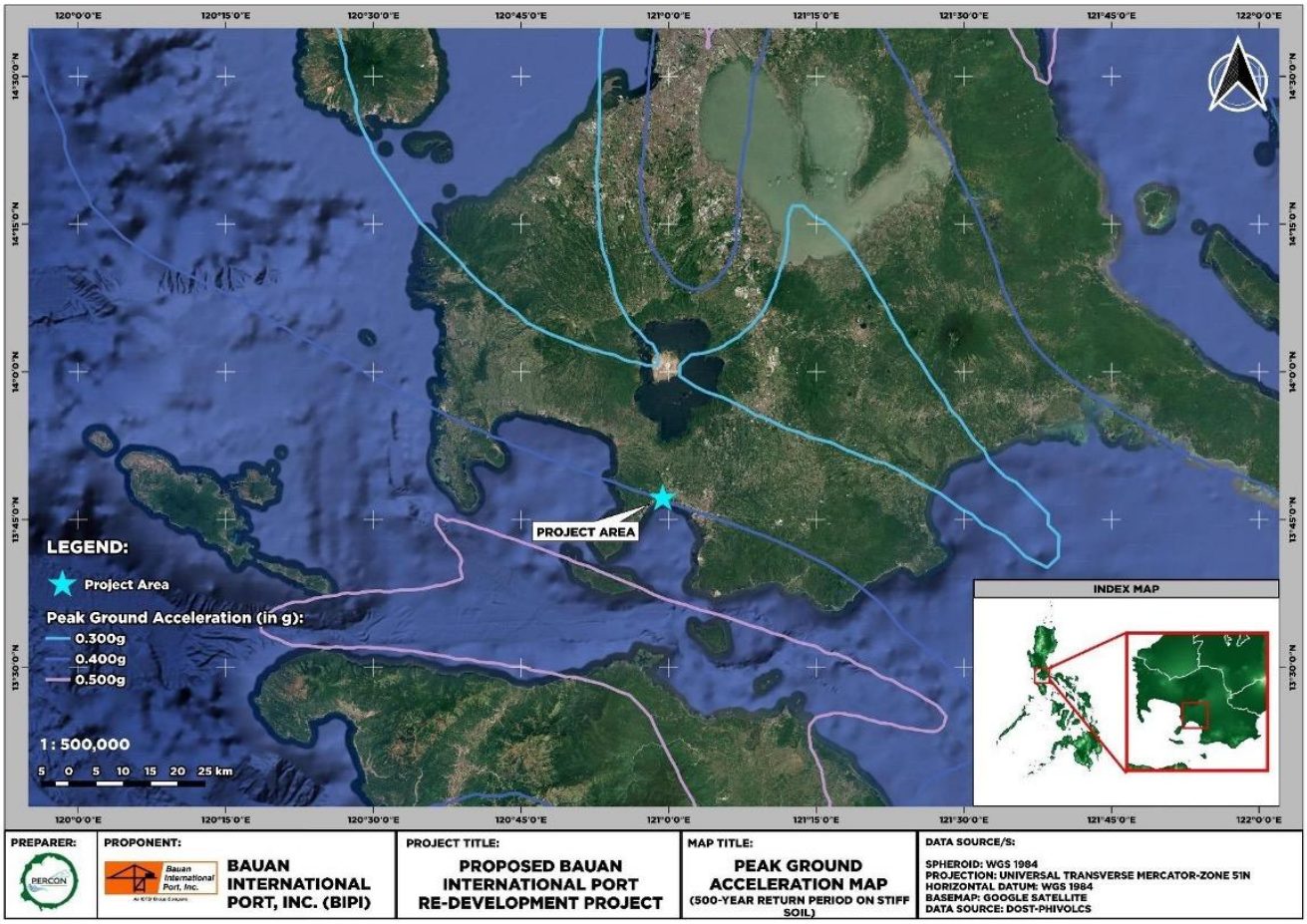

Figure 7-20 Probabilistic PGA at Soft Rock or Stiff Soil Site Model or Project Site

Ground Shaking

Ground shaking is caused by seismic waves and is the primary hazard associated with earthquakes. During large earthquake events, seismic waves can either radiate underground as body waves or move above ground as surface waves. Typically, the ground motion felt in earthquakes are body waves, which are described as the kind of shaking where furniture moves laterally, and unstable objects fall to the ground. Even more destructive are surface waves, wherein ground moves in a wavelike manner, briefly changing the shape of the surfaces they pass through, resulting in extreme damage (Punongbayan and Torres, 1990).

The most serious direct effect of an earthquake in terms of buildings and structures is ground shaking (Bell, F.G., 2002). In this aspect, the ground conditions, such as the surface and bedrock geology, of the foundation of the buildings must be investigated. Previous studies have found out that earthquake intensities vary in areas which have different geology. The intensity decreases in areas where harder rocks, such as granite and basalt, are prevalent. Conversely, the intensity increases in areas where loose and wet sediments are common.

Figure 7-21 presents the ground shaking hazard map of the Project Site and vicinity.

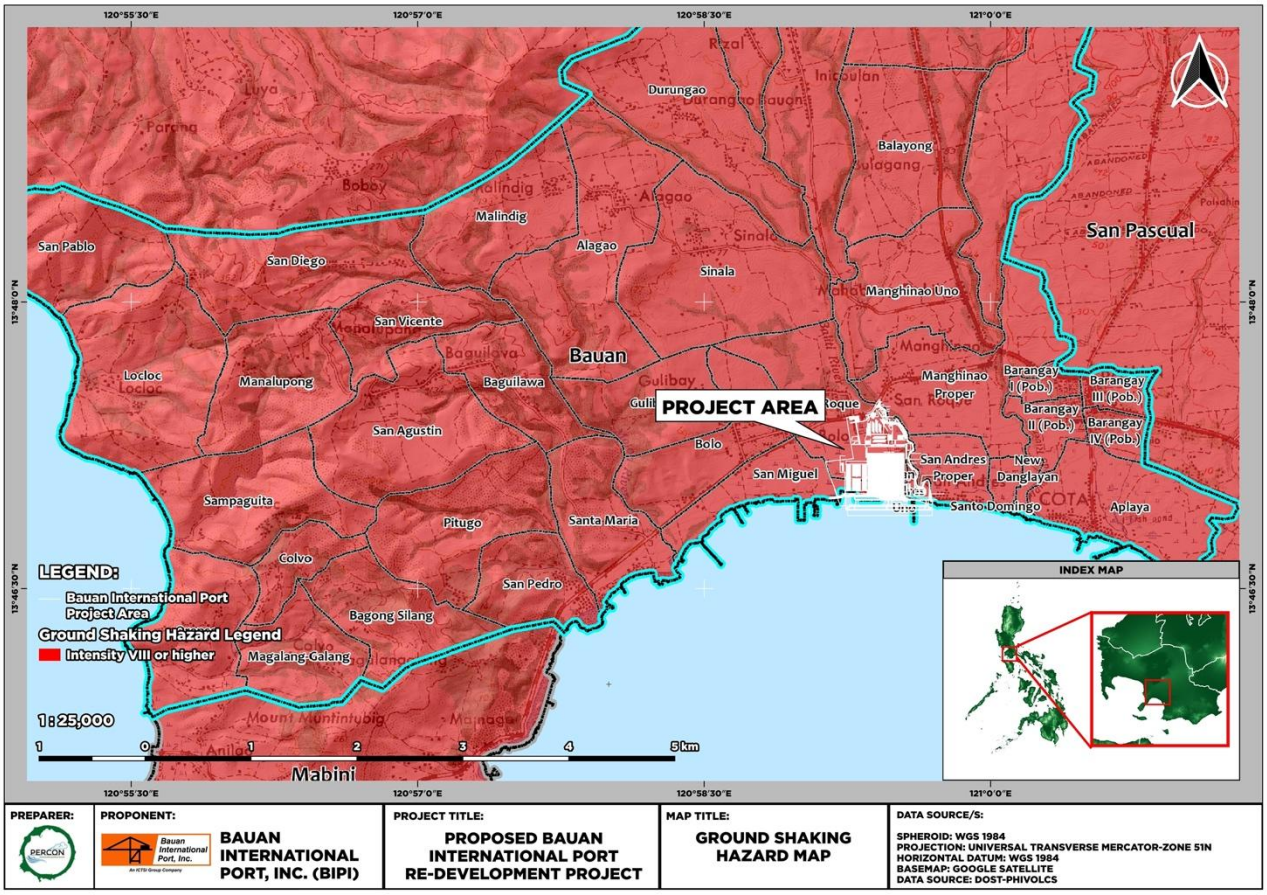

Figure 7-21 Ground Shaking Hazard Map of the Project Site and Vicinity

Ground Rupture

Ground rupture is a seismic phenomenon involving the physical displacement of the earth's surface along fault lines during an earthquake. Depending on fault characteristics, this displacement can occur vertically, horizontally, or in an oblique manner, often leading to severe structural damage for buildings and infrastructure directly located along or near the fault trace.

The Bauan International Port sits on the northern margin of Batangas Bay. Based on current PHIVOLCS active-fault resources (Figure 7-17) no mapped on-land active fault trace crosses the port footprint. In this sector of southwestern Luzon, the nearest seismogenic structures are offshore, including the Batangas Bay Fault System within southern Batangas Bay and several Verde Island Passage faults (North/Central/South Verde systems) mapped from recent marine geophysical work. These offshore strands hosted the 2017 Batangas earthquake sequence near Mabini–Tingloy and link kinematically with the Aglubang and Central Mindoro faults farther south. Practically, this means the dominant seismic risk at the site is strong shaking, not surface rupture on land.

Liquefaction

Liquefaction is a phenomenon where water-saturated sands and mud lose significant strength during sudden ground shaking, transforming into a fluid-like slurry (Kusky, 2008). Any infrastructure built on these liquefied sediments risks abruptly sinking as if situated upon thick liquid. Factors influencing liquefaction include earthquake magnitude, ground acceleration, proximity to the epicenter, duration of shaking, sediment density, seismic activity history, and the sediment's age (Seed, 1979; Torres et al., 2001).

Figure 7-22 presents the liquefaction hazard map of the Project Site and vicinities, the coastal strip from San Roque through San Miguel and San Andres (Proper and Uno) to Santo Domingo—coincident with the Bauan

International Port footprint and extension—is classified as high susceptibility (red), with an immediate back-shore belt of moderate susceptibility (violet) and smaller low-susceptibility pockets (yellow) farther inland on older uplands; the mouth and lower floodplain of the Baliti River also register as high, widening the high-risk zone where river-reworked sands and recent fills occur.

The high susceptibility classification of the Project Site emanates from its young, water-saturated coastal wedge consisting of reclaimed fill over Holocene beach-ridge sands, tidal-flat silty sands, and river-mouth alluvium; these materials are typically loose to medium-dense, underlain by shallow groundwater at approximately sea level, and contain non-plastic silts and fine sands, a combination that readily builds excess pore pressure and loses strength during strong shaking.

Under design-level motions, the ground may suffer bearing-capacity loss and settlements affecting shallow foundations, pavements, container yards, and storage pads; lateral spreading toward the bay and along river banks can impose significant horizontal strains that distort quay walls, sheet-pile bulkheads, crane rails, and backfill; buried structures such as manholes, vaults, and pipelines may uplift or float as pore pressures rise; differential settlements are likely at transitions between improved and unimproved ground, at interfaces of older and newer reclamation, and along expansion joints of pavements and wharves; and post-liquefaction reconsolidation can produce additional settlement in the weeks to months after the event.

Waterfront structures—including sheet piles, tie-back systems, mooring and berthing fixtures, apron slabs, and crane rails—are most sensitive, followed by reclaimed platforms and yards such as container stacks, fuel or chemical drum areas, and warehouses with slabs-on-grade, while lifelines like buried water and fire mains, fuel lines, electrical and information-communication conduits, and storm drains are particularly vulnerable where they traverse reclamation boundaries or riverine deposits.

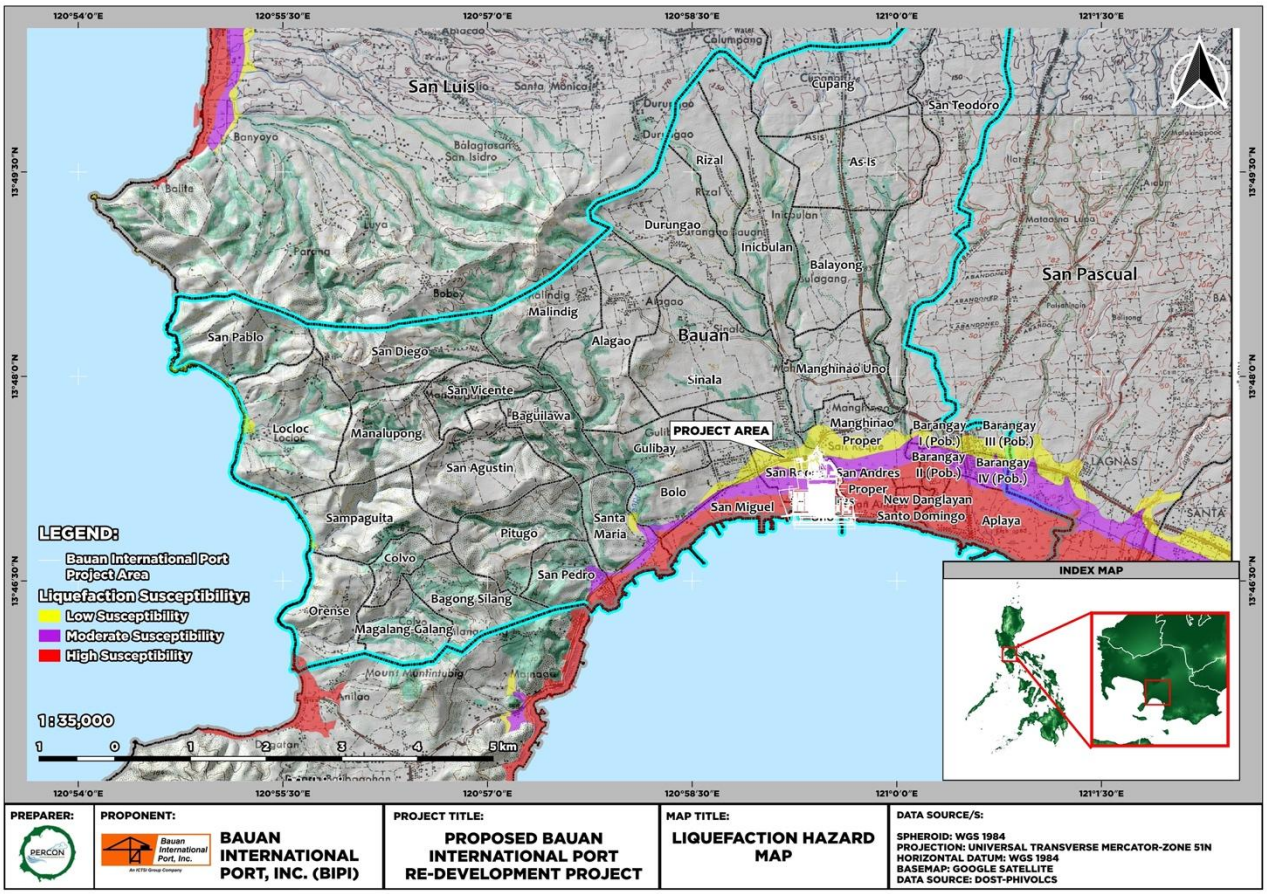

Figure 7-22 Liquefaction Hazard Map of the Project Site and Vicinity

Earthquake-Induced Landslide

According to the Earthquake-Induced Landslide Susceptibility Map created by DOST-PHIVOLCS, as depicted in Figure 7-23 below, the project site is free from any risks from landslides caused by earthquakes. This assessment is attributed to the project site's general vicinity which is generally flat lying. Any modifications from the project area will not cause any new risks or exposures from earthquake-induced landslides.

Tsunami

A tsunami is a series of large ocean waves generated by a sudden and significant movement in the Earth's crust, usually caused by underwater geological events such as earthquakes, volcanic collapse, landslides, or meteorite impacts. Tsunamis can also be referred to as "seismic sea waves." Unlike regular ocean waves, which are typically generated by wind, tsunamis have much longer wavelengths and can travel across entire ocean basins at high speeds.

The Bauan International Port as seen from Figure 7-24 lies along a coastal belt that the map classifies within the 1–2 m to 2–3 m tsunami inundation heights immediately at the shoreline, tapering inland as ground rises; the band is narrow but continuous along the north shore of Batangas Bay, with slightly higher pockets at low-lying river mouths such as Baliti.

By contrast, the outer headlands around the bay mouth show the highest modeled inundations (up to about 5–6 m), indicating that the project area, being inside the bay, is moderate relative to these more exposed coasts but still clearly within the inundation zone.

For the Project Site, this means a credible event could overtop the waterfront and flood reclaimed backlands by one to a few meters, drive strong currents along the quay line and through drainage outfalls, and induce buoyancy on buried utilities and tanks. Tsunami generation is expected primarily from Batangas Bay Fault System and the Verde Island Passage Fault System (short warning times), with additional albeit lower frequency potential from the Manila Trench and faults within the vicinity of Mindoro Island.

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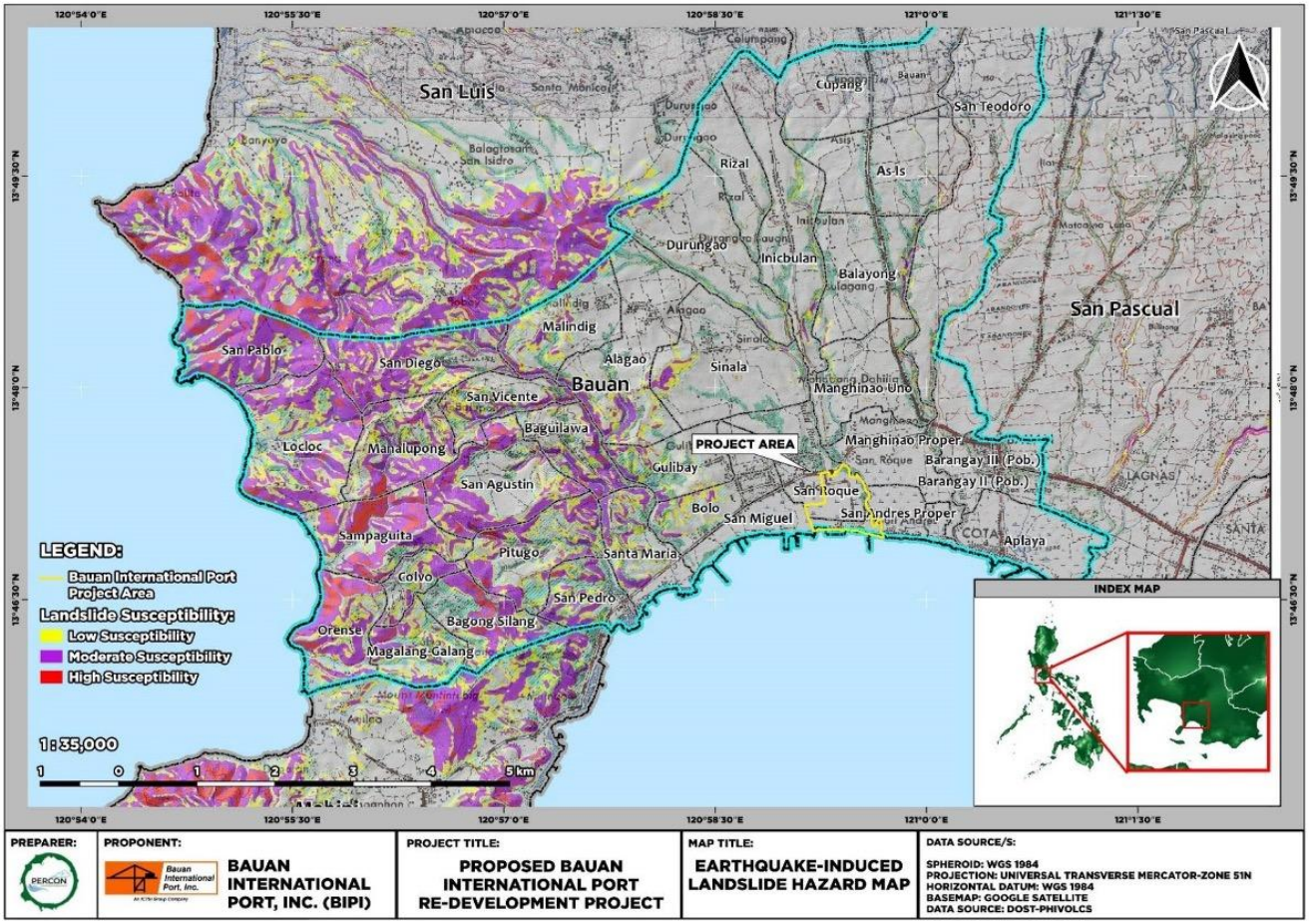

Figure 7-23 Earthquake-Induced Landslide (EIL) Hazard Map of the Project Site and Vicinity)

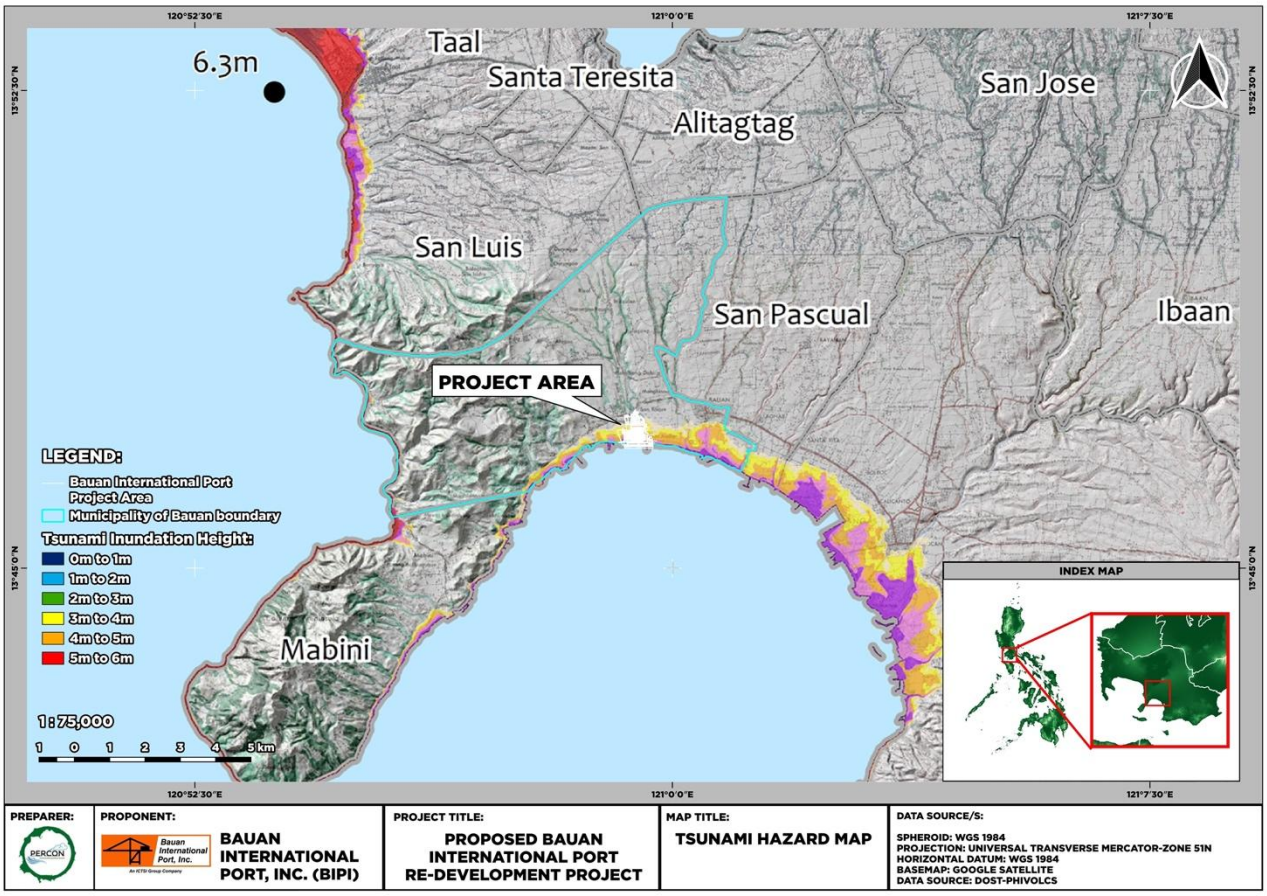

Figure 7-24 Tsunami Hazard Map of the Project Site

following: (1) rivers or streams overflow their banks, (2) excessive rain, (3) ruptured dam or levee, etc. Floods can develop quickly (flash floods) or may take hours or days, which can give residents time to evacuate the area.

Available data from the Mines and Geosciences Bureau (MGB) flooding and landslide hazard map (Figure 7-25), the proposed BIPI project is deemed to have a moderate susceptibility to flooding. The project lies on the narrow coastal plain fronting Batangas Bay where the map shows moderate flood susceptibility along the shoreline apron that includes the existing yard and the proposed extension, with localized high-susceptibility pockets at low-lying drainage swales and near the Baliti River mouth. Inland of the port, the susceptibility remains moderate across the backshore plain, while the steeper uplands carry landslide—not flood—concerns and are outside the footprint.

For the port, the dominant flood drivers are short-duration, high-intensity rainfall and river overbank flow that can pond on reclaimed ground and back up through outfalls during high tide or storm surge, making drainage blockage and shallow sheet flooding the realistic modes at the site.

Assessing the Flood Hazard Map from UPRI-NOAH (Figure 7-26, Figure 7-27, Figure 7-28), it is further confirmed that exposure to flood hazards remains low.

On the **5-year** map, flooding is mostly confined to localized ponding behind the port and along minor channels, with little encroachment onto the elevated quay and apron.

On the **25-year** map, inundation spreads across the coastal lowland north and east of the port and approaches the facility margins, indicating increased exposure of access roads and peripheral yards, especially where site drains discharge to the bay.

On the **100-year** map, the broader Bauan coastal plain is widely inundated along river courses and depressions, and while the core reclaimed platform remains comparatively less affected by overland flow, the principal risk shifts to backwater through drainage outfalls and the Baliti River system, which can cause sustained ponding inside the port unless protected by check valves, gates, or pump-assisted drainage.

The proposed activities and modifications for the project areas pose no new risks nor threats from flooding and levels of hazard remain low.

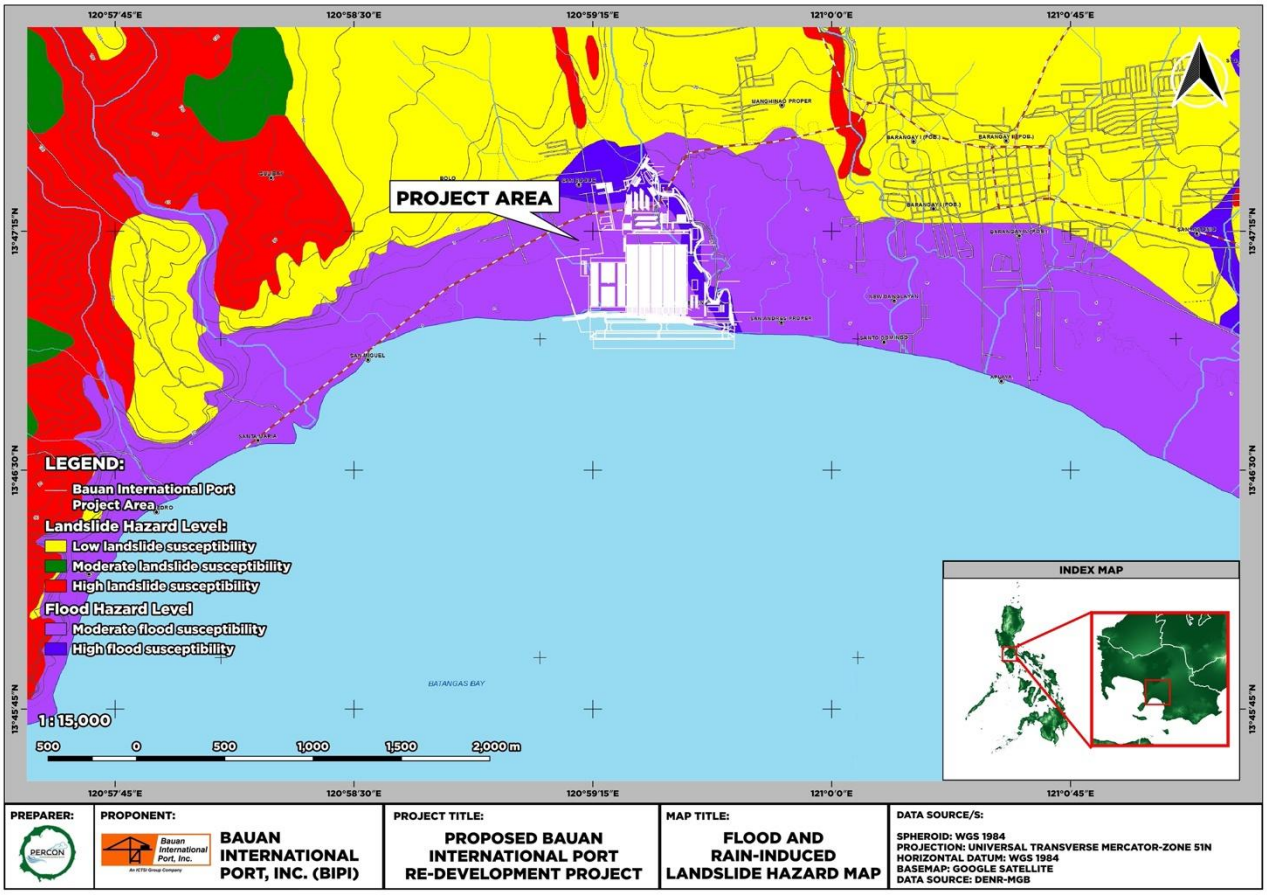

Figure 7-25 Flood and Landslide Hazard Map of the Project Site, Adapted from MGB

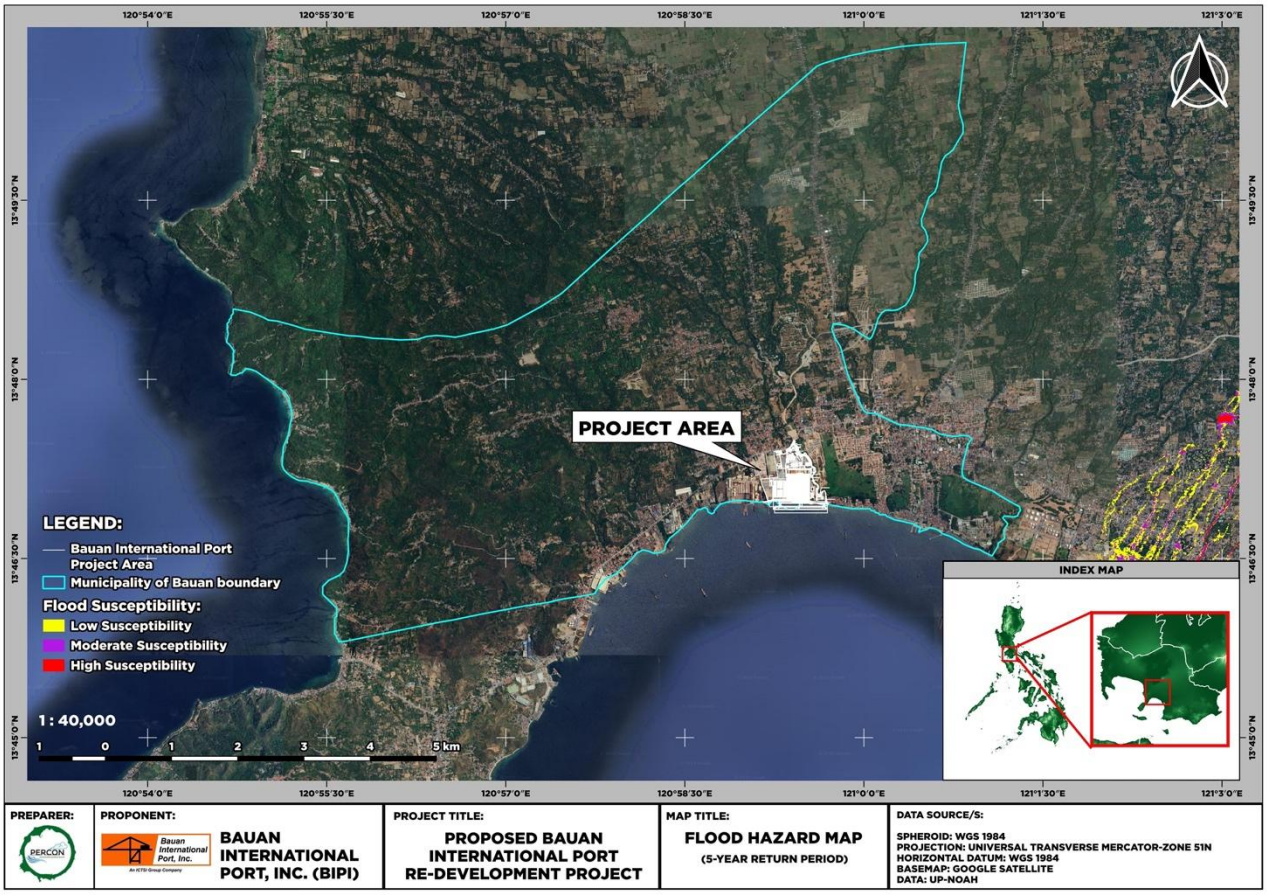

Figure 7-26 5 Yr Flood Hazard Map of the Project Site, Adapted from UPRI-NOAH

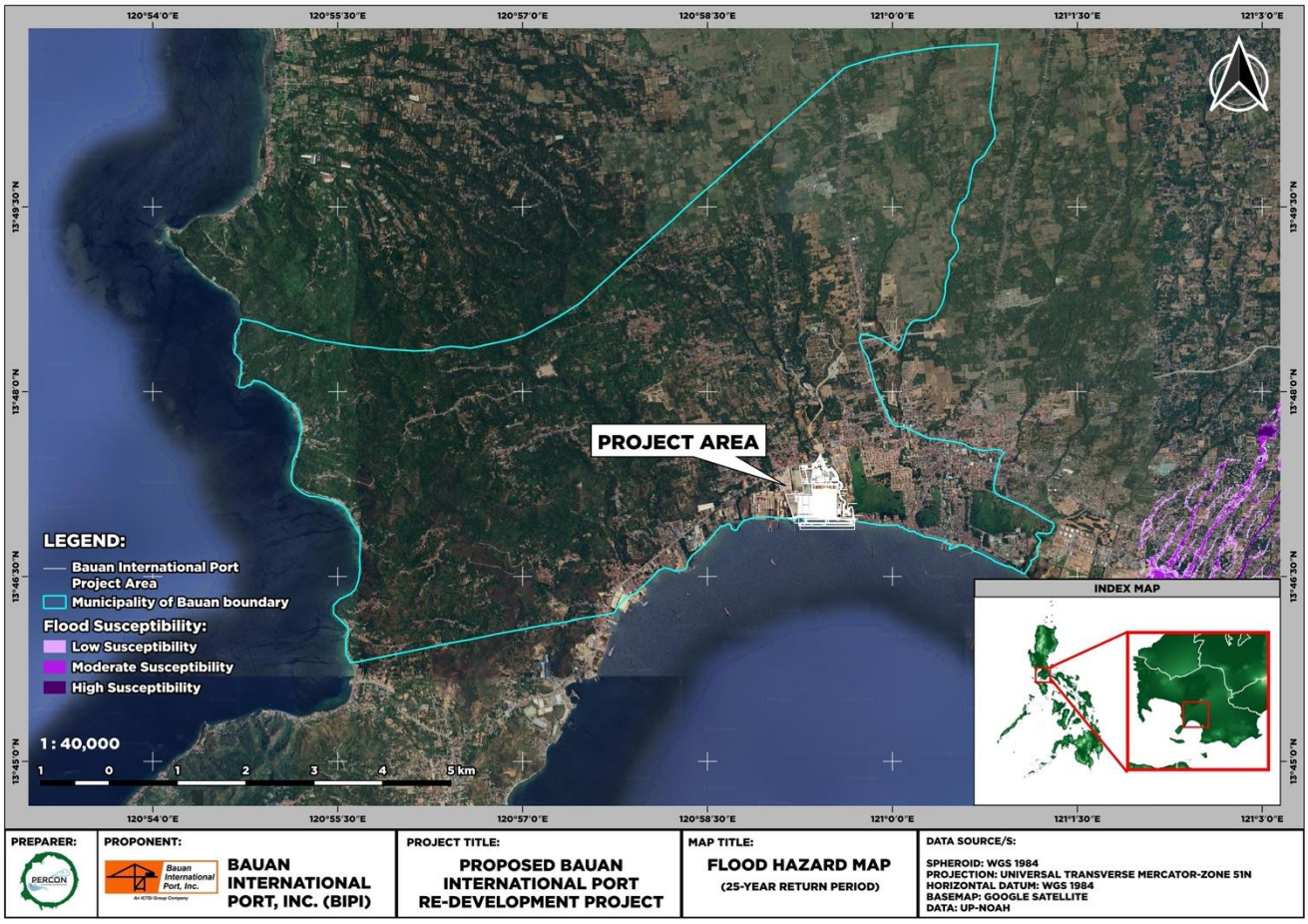

Figure 7-27 25 Yr Flood Hazard Map of the Project Site, Adapted from UPRI-NOAH

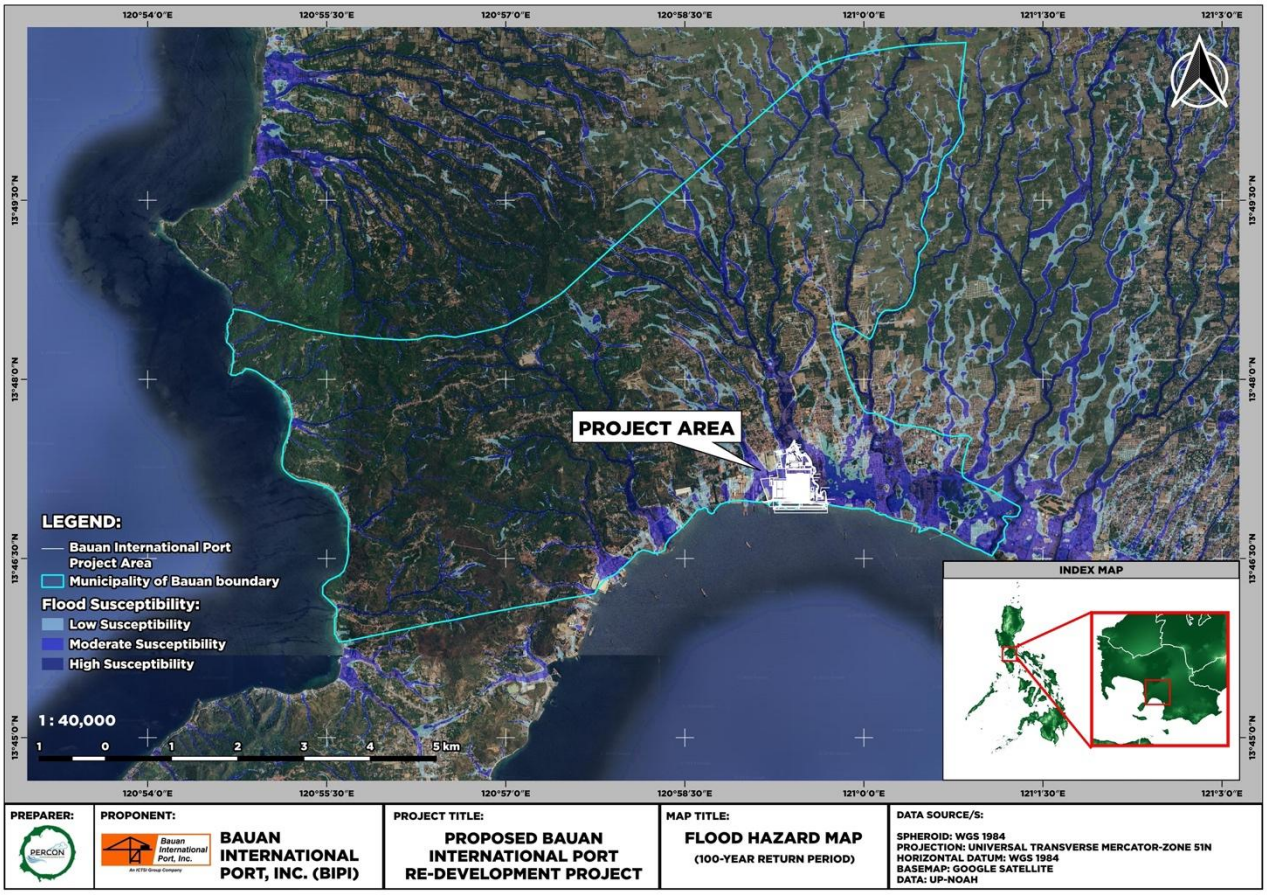

Figure 7-28 100 Yr Flood Hazard Map of the Project Site, Adapted from UPRI-NOAH

Storm Surge

A storm surge is a sudden and dramatic increase in sea level along a coastline, primarily driven by the powerful winds associated with severe weather events such as tropical cyclones or strong extratropical cyclones. These surges result in a temporary and significant rise in sea level, often leading to the flooding of low-lying coastal areas. They are characterized by strong winds pushing water toward the coast, creating a bulge of water that rushes inland when it encounters shallower coastal regions. The magnitude and impact of a storm surge can be influenced by various factors, including the intensity of the storm's winds, atmospheric pressure, coastal topography, and its timing in relation to tides. Coastal areas prone to storm surges typically have preparedness measures and early warning systems in place to reduce their destructive potential, enabling residents to evacuate vulnerable areas and minimize damage to property and lives.

According to the UPRI – Nationwide Operational Assessment of Hazard (UPRI– NOAH) Storm Surge Map Figure 7-29, coastal regions are particularly susceptible to storm surges, with the storm surge simulation based on the worst-case scenario in Storm Advisory No. 1.

The proposed Project Site is within the continuous coastal surge belt, with the port reach mostly in the low to moderate susceptibility bands (yellow to orange) and small high-susceptibility pockets (red) near lowlying segments and river mouths such as the Baliti channel.

Being inside the north shore of Batangas Bay allows some shielding compared with the more exposed headlands toward the bay mouth, yet a severe typhoon can still elevate water levels enough to overtop the quay line, drive strong along-shore currents, and cause backflow through drainage channels, leading to short-duration inundation of the apron and reclaimed backlands.

The hazard is greatest when surge coincides with spring tide and intense rainfall, producing compound flooding and temporary loss of operability; in design and operations this calls for finished platform and coping elevations with freeboard above the mapped advisory level, tide- and surge-proofed outfalls with flap or duckbill valves and pump-out capacity, and mooring, equipment, and evacuation procedures tailored for surge events.

In Bauan Bay, coastal and riverside areas have been marked on where storm surge advisory #1 level events may reach. It is important to adhere to these warnings and plan accordingly. Storm surges could not be prevented by any engineering measure and will also have ample lead time given the availability of forecasting in the Philippines.

The modifications within the project area will not incur new risks and hazard potential of the site remains the same due to its proximity to Bauan Bay.

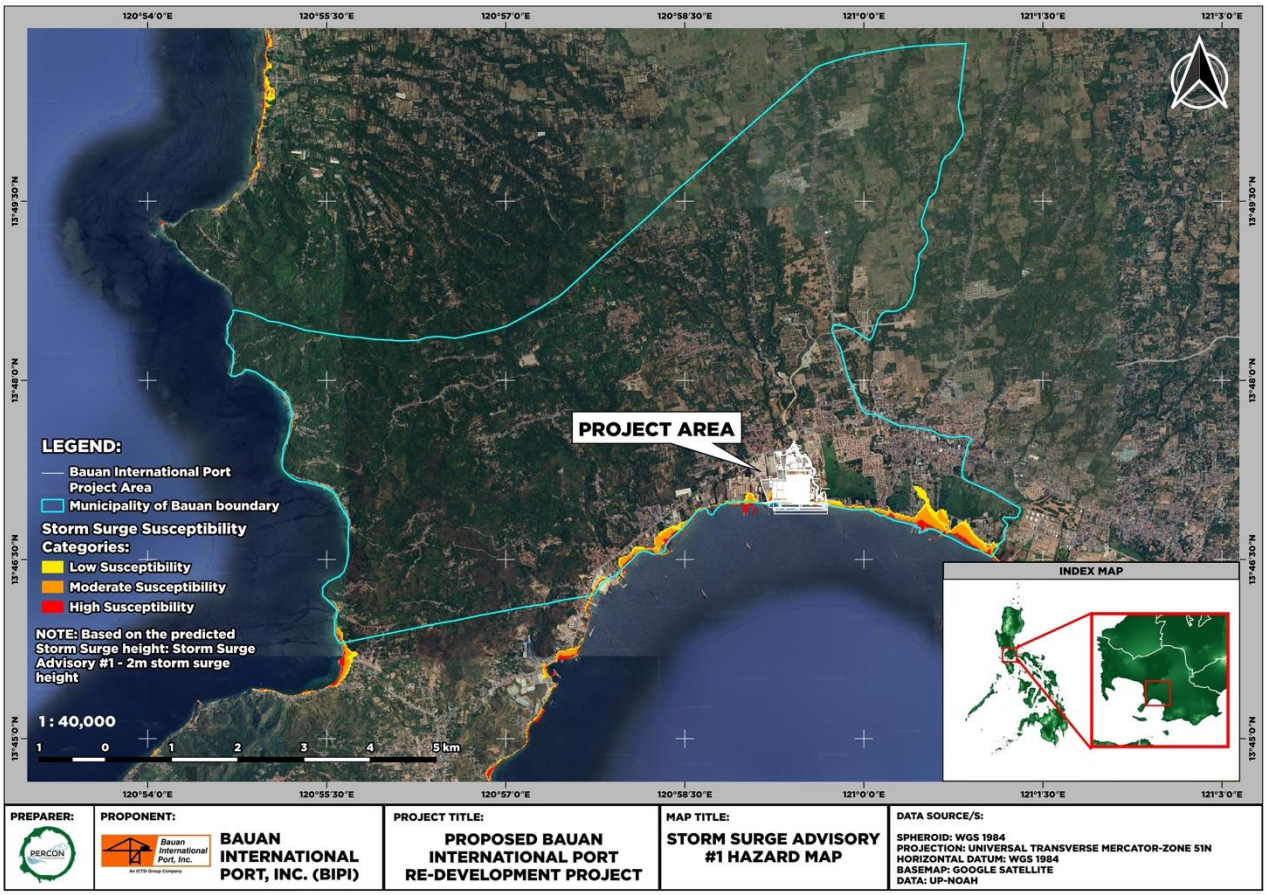

Figure 7-29 Surge Hazard Map of the Project Site

Volcanic Hazards

Being situated in the Pacific Ring of Fire, the Philippines hosts numerous volcanic cones. These volcanic manifestations are classified according to their historical activities: active volcanoes, potentially active volcanoes and inactive volcanoes. Active volcanoes, being more prone to recent and future activities, pose more of a risk compared to potentially active and inactive volcanoes. Ranging from quiet, effusive to loud, explosive eruptions, volcanoes can produce various hazards according to their explosivity. Eruptions can produce ballistic projectiles that shoot from their vents, base surges and pyroclastic density currents which spread out along their vicinity, volcanic tsunami due to their eruption's disturbance to waterbodies, and ashfall which are ejected up into the atmosphere and spread out and fall into a wider area.

The Project Site lies on the north shore of Batangas Bay at roughly 23–25 kilometers south-southwest of the Taal Main Crater, clearly outside the 14- and 17-kilometer danger/evacuation zones shown in Figure 7-30 At

that distance the project is not expected to be affected by primary eruptive hazards such as pyroclastic density currents, base surges, lava fountaining, or ballistic blocks, but it remains exposed to ashfall during Taal unrest, with severity controlled by plume height and wind direction. Ashfall at the port can temporarily reduce visibility, foul air intakes and mechanical equipment, increase slip hazards on pavements, load roofs and canopies, and contaminate drainage and nearshore waters; short-lived volcanic earthquakes associated with Taal activity may also be felt at the site. Indirectly, post-eruption lahar flushing from the Pansipit River toward Balayan Bay can increase suspended sediments and floating pumice in the bay, potentially affecting water quality and navigation, though effects at the Bauan frontage are expected to be diluted and episodic.

The regional volcano map (Figure 7-31) places other active or potentially active centers such as Banahaw–San Cristóbal and Mariveles much farther from the project area; their influence at BIPI Project would be limited to fine, trace ashfall under unusual wind conditions. Overall, the credible volcano-related impact for the port is intermittent ashfall from Taal, for which monitoring of PHIVOLCS alerts, operational ashfall procedures, and housekeeping/filtration measures should be maintained.

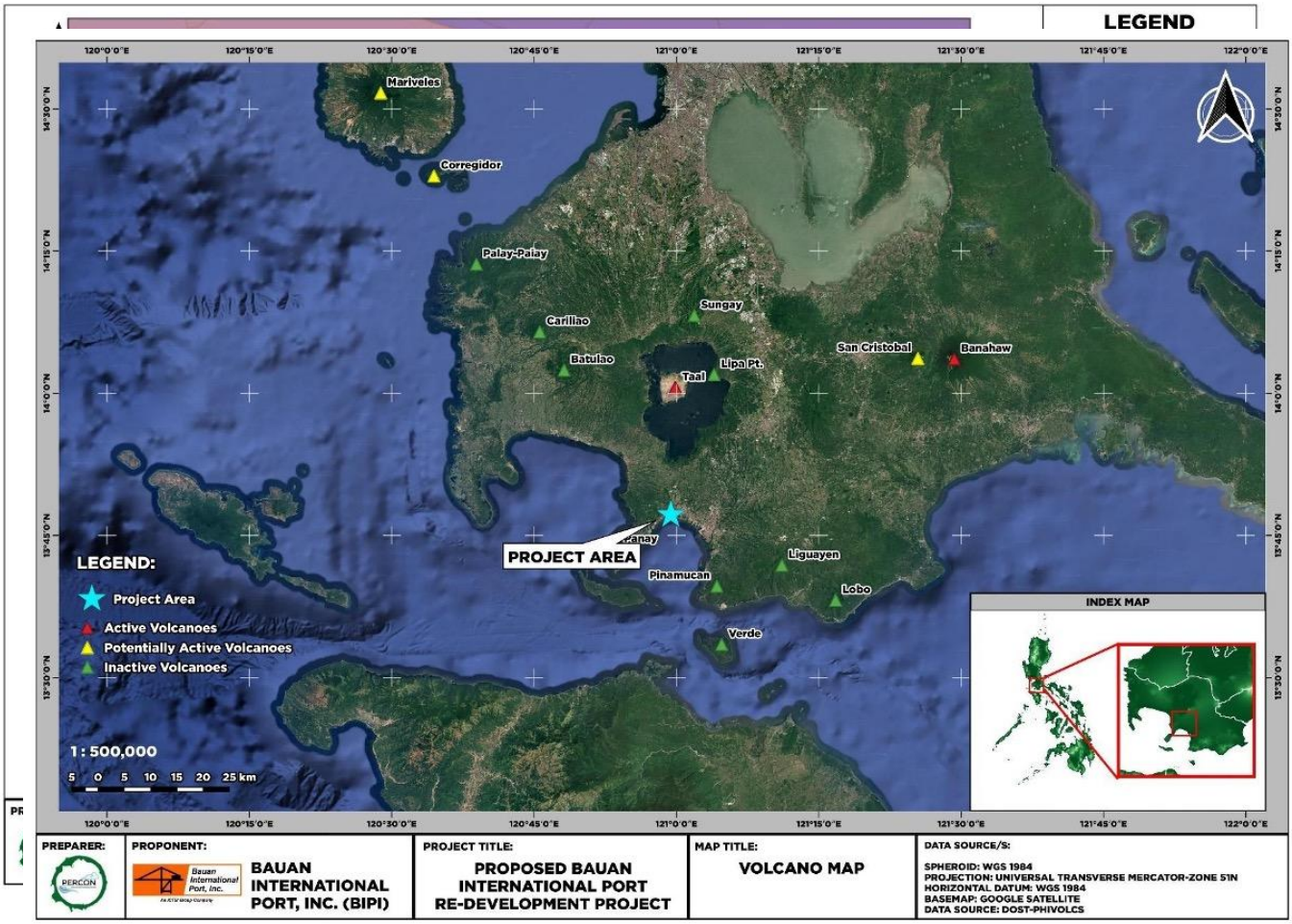

Figure 7-31 Active and Potentially Active Volcanoes of the Philippines

Table 7-5 Summary of Geologic Hazards in Relation to the Project Site provides a summary of geologic hazards with respect to the Project Site including the corresponding hazard rating.

Table 7-5 Summary of Geologic Hazards in Relation to the Project Site

Natural/ Geologic Hazard	Hazard Rating	Explanation	Source
Typhoons	**Prone**	The site is within a typhoon-affected belt; equivalent to Saffir– Simpson Category 3 winds (~178–209 km/h; see Fig. 6-4).	OCHA
Flood	Moderate Susceptibility; shallow (<0.5–1.0 m) and short duration (≤1 day)	MGB flood–rain-induced landslide map shows a moderate susceptibility of the coastal apron at the port and localized higher pockets near the Baliti River mouth (Figs. 6-26; 6-27; 6-28; 6-29).	MGB, UP NOAH
Storm Surge	**Prone**	UP NOAH Storm Surge Advisory #1 (≈2 m) maps a continuous surge belt along the project shoreline; low–moderate susceptibility at the frontage with small high-susceptibility pockets near outfalls (Fig. 6-30).	UP NOAH
Earthquake	**Prone**	The region is seismically active due to nearby Batangas Bay/Verde Island Passage faults and regional sources (e.g., Manila Trench); strong events have affected Batangas in recent decades (Figs. 6-18; 6-19; 6-20; 6-21).	PHIVOLCS USGS
Tsunami	**Prone**	The inundation band along the Bauan shoreline reflects near-field faults in Batangas Bay/Verde Passage and far-field Manila Trench sources; mapped heights about 1–3 m at the project frontage (Fig. 6-25).	PHIVOLCS
Ground Shaking	**Prone**	Strong shaking expected from nearby offshore faults; effects mitigable through compliance with the National Building Code and NSCP seismic provisions (Fig. 6-22).	PHIVOLCS
Liquefaction	Highly susceptible	Reclaimed coastal wedge underlain by loose Holocene sands/silts and river-mouth alluvium with a shallow water table; site maps as High (Fig. 6-23).	PHIVOLCS
Ground Rupture	Safe/Low	No mapped on-land active fault crosses the port footprint; nearest structures are offshore in Batangas Bay/Verde Passage (Fig. 6-18).	PHIVOLCS
EarthquakeInduced Landslide (EIL)	Safe/Low	The project platform is level to nearly level on coastal plain; mapped landslide concerns are on inland upland outside the footprint (Fig. 6-24).	PHIVOLCS
Volcanic Hazard (Ashfall)	**Prone**	About 23–25 km from Taal Main Crater—outside the 14–17 km danger/evacuation zones—but subject to ashfall depending on plume and winds (Figs. 6-31; 6-32).	PHIVOLCS
Severe Wind	117.1–220 kph (20-YRP); 117.1–220 kph (500-YRP)	PAGASA wind climatology indicates exposure to very strong typhoon winds; adopt NSCP basic wind-speed requirements.	PAGASA

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7.1.3 Pedology

7.1.3.1 Soil

Using BSWM's Soil Series framework (Carating et al., 2014) and the Batangas soil survey literature, the soils mapped in and around the Bauan International Port Inc. project area are Taal sandy loam along the coastal plain and Ibaan loam immediately inland. These are both volcanic-derived series.

Taal Series – falls under soils developed from igneous materials and is commonly classified as Andisols (Typic Hapludands). In the Philippine profile-grouping scheme, these volcanic/igneous upland soils are placed in Profile Group 7 (upland soils developed from igneous bedrock/volcanic deposits). Field keys further describe Taal as well-drained, coarse-textured (fine sand to sandy loam), consistent with its anodic, loose sandy-loam parent materials.

Taal sandy loam (coastal fringe; includes the present port terrace)

Setting and parent material. Recent beach-ridge and shoreface deposits were reworked from Taal volcanic ash and littoral sand. Very low relief (0–3 percent), high groundwater influence near the backshore.

Morphology:

- **Surface (A):** thin to moderate, dark grayish brown to brown sandy loam/loamy sand; singlegrained, loose; rapid infiltration; low to moderate organic matter.
- **Subsurface:** weak or incipient Bw/C horizons; textures remain sandy loam to sand with occasional lenses of shelly sand or reworked ash; structure weak; few pedogenic features due to young age.
- **Drainage/consistency:** excessively to well drained on ridges, somewhat poorly drained in swales; very friable, easily reworked by waves and wind.
- **Taxonomic affinity (USDA/WRB, indicative):** soils with andic influence are patchy; where ash content is high and bulk density is low they trend to Andisols (Hapludands); where quartzose sand dominates they resemble Entisols (Udipsamments/Regosols). On reclaimed pads, natural horizons are truncated and overlain by man-placed fill.

Implications. High permeability and low cohesion favor quick drainage but create **low natural bearing** in loose zones and **high erodibility** unless armored or vegetated. Salt spray and episodic saline intrusion may occur in the back-beach.

Ibaan Series – mapped under Macolod Corridor tuff (volcanic tuff) and grouped with the tuff-derived upland soils; these likewise belong to Profile Group 7. Depending on local relief and water table, Ibaan soils range from moderately well-drained to imperfect/poorly drained in some landscapes.

Ibaan loam (backshore to low uplands)

Setting and parent material. Colluvio-alluvial mantles and weathered tuffaceous to basaltic pyroclastics derived from the Taal–Macolod volcanic sources. Relief ranges from gently undulating to rolling (3–18 percent), locally 18–30 percent on spurs.

Morphology:

- **A horizon:** brown loam; granular to weak sub-angular blocky; moderately rapid infiltration.
- **Bt/Bw horizons:** brown to strong brown clay loam; moderate sub-angular blocky; argillic features (clay films) locally present; increasing firmness with depth.
- **C horizon:** weathered tuff/volcaniclastic material; occasional scoriaceous fragments.
- **Drainage:** generally, well drained; perched wetness in footslope pockets after heavy rain.
- **Taxonomic affinity (USDA/WRB, indicative):** commonly trends to Inceptisols (Eutrudepts/Dystrudepts) where subsoil development is weak, grading to Ultisols (Haplustults/Hapludults) where clay enrichment and acidity are stronger.

Ibaan loam, gravelly phase (foot slopes)

Same profile sequence but with 20–40 percent gravel of tuff and scoria in the A and upper B horizons; slightly lower water-holding capacity and higher infiltration. Occurs on 3–8 percent aprons bordering the coastal flat.

Implications. These loams have better structure and strength than the coastal sands, support vegetation well, and shed runoff downslope toward the coast; the gravelly phase is drier and more erodible on unvegetated slopes.

Filled-up soils (within developed pads and reclaimed margins)

Large portions of the active port and the proposed extension are mantled by **filled-up soils** composed of heterogeneous sand, gravel, rockfill, and compacted sub-base placed during backfilling and site development. Profiles are irregular, horizons are discontinuous, and engineering behavior depends on fill type, compaction, and any underlying native Taal sandy loam or estuarine silts and clays.

In summary, the Project Site lies on a level coastal tract dominated by **Taal sandy loam** bordered landward by **Ibaan loam** and its gravelly phase on gently to moderately sloping volcanic terrain, with extensive **filled-up soils** where reclamation and grading have modified the natural profiles.

Figure 7-32 shows the distribution of soil types and the sampling stations for the TCLP in the project area.

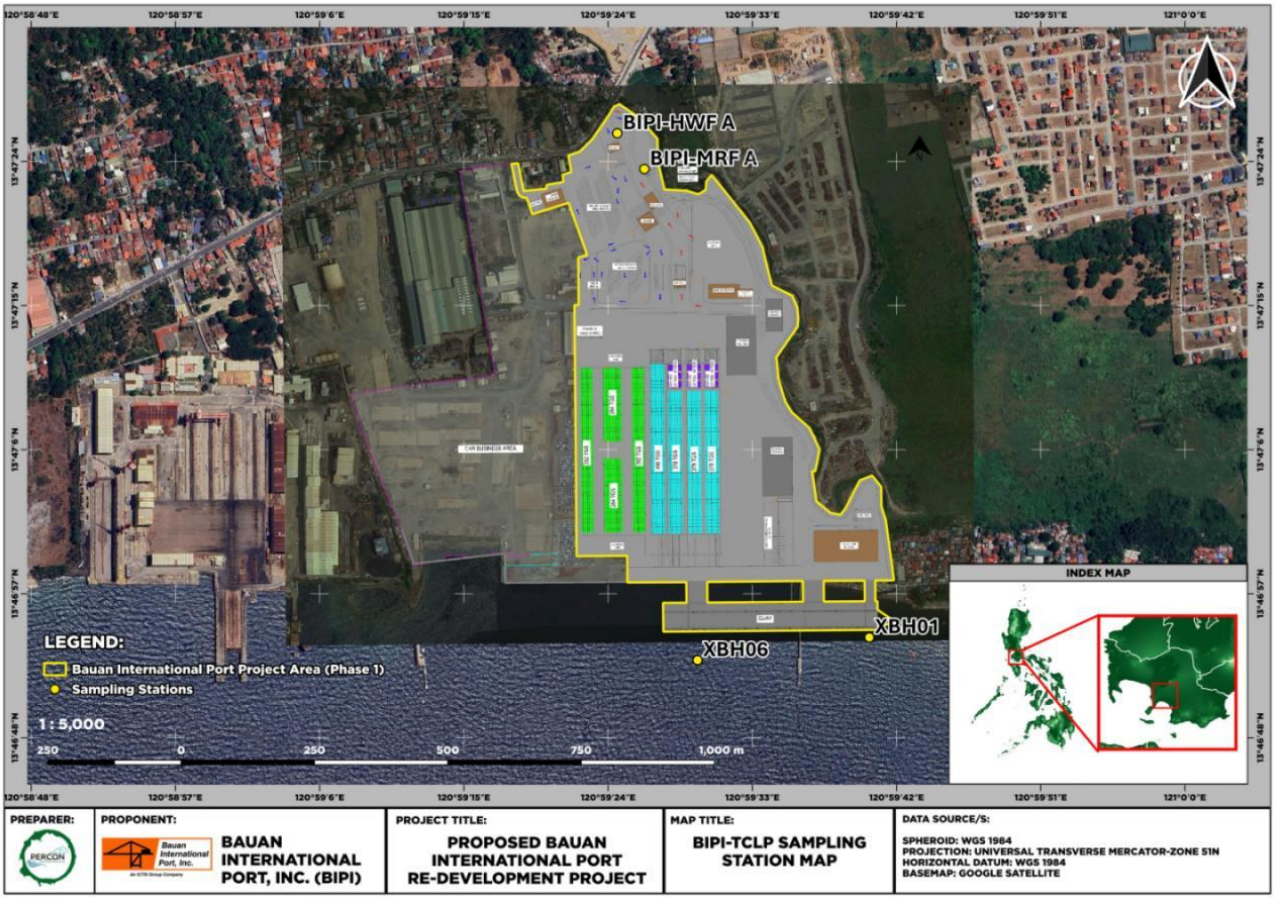

Figure 7-32 Soil and Sampling Station Map of Project Site and Vicinities

7.1.3.2 Soil quality/ fertility

The coastal platform that hosts the port and its proposed extension is underlain chiefly by Taal sandy loam with patches of filled-up soils from reclamation, while the immediately landward ground transitions to Ibaan loam and its gravelly variant on gently to moderately sloping volcanic terrain.

Inherent fertility follows these textures and parent materials. The Taal sandy loam is coarse textured, weakly structured, and typically low in organic matter and cation exchange capacity, so it drains rapidly and is prone to nutrient leaching. Where volcanic ash fractions are present, andic properties can increase waterholding and cation exchange but are often accompanied by moderate to high phosphorus fixation, which limits plant-available phosphorus without appropriate management.

The coastal position exposes unpaved margins to salt spray and, in places with shallow groundwater, to intermittent salinity; together with wind deflation, this tends to depress biological activity and root vigor if soils are left bare.

The Ibaan loam inland has a finer surface texture with a weak granular to sub-angular blocky structure over a loam to clay-loam subsoil, providing better water-holding capacity, stronger aggregation, and a higher exchange complex than the coastal sands. Base status is typically moderate, and acidity can range from slightly to moderately acidic depending on ash content and leaching. The gravelly phase is droughtier and warms quickly, which can be advantageous for establishment but requires more careful moisture management.

Overall, Ibaan loam offers a more favorable rooting environment for landscaped or bio-retention areas, provided slopes are stabilized and topsoil is conserved.

Filled-up soils inside the operational pads are heterogeneous, compacted, and biologically young. Without deliberate amendment they exhibit low organic matter, low biological activity, variable salinity near the coast, and high bulk density that restricts infiltration and rooting.

In this setting, the baseline soil quality is constrained by low organic matter and rapid leaching on the Taal sandy loam, variable compaction and stratification within fill, and episodic salinity and wind exposure along the shore.

The most workable soils for vegetation and green infrastructure lie on the Ibaan loam where topsoil remains intact, but these areas are also the most vulnerable to erosion-induced losses if disturbed.

Geochemical Baseline from TCLP Analysis

To evaluate the potential for hazardous-waste classification and confirm geochemical stability, four representative samples were analyzed by SGS Philippines, Inc. under the supervision of PERCON Environmental Consultancy Services Team.

Table 7-6 Seven (7) Key Characteristics of TCLP Sampling Station and Sediments

Sample ID	Type	Key Setting	TCLP Status
XBH01	Offshore sediment	Subtidal cohesive clayey mud	Non-hazardous
XBH06	Offshore sediment	Subtidal cohesive clayey mud	Non-hazardous
BIPI-MRF A	On-site soil	Material Recovery Facility yard fines	Non-hazardous
BIPI-HWF A	On-site soil	Hazardous Waste Facility yard fines	Non-hazardous

Measured leachate concentrations, basic chemistry, and status relative to DAO 2013-22 TCLP limits are summarized below.

Table 7-7 Summarize Results of TCLP Lab from SGS Philippines, Inc.

Sample ID	Ag (mg/L)	Cd (mg/L)	Cr (mg/L)	Pb (mg/L)	Ba (mg/L)	Hg (mg/L)	As (mg/L)	Se (mg/L)	pH (25°C)	TCLP Status

XBH01 (offshore)	<0.05	<0.01	<0.1	<0.05	0.12	<0.0005	0.0014	<0.01	7.89	Pass
XBH06 (offshore)	<0.05	<0.01	<0.1	<0.05	0.13	<0.0005	0.0023	<0.01	7.94	Pass
BIPI-MRFA (on-site)	<0.05	<0.01	<0.1	<0.05	0.28	0.0028	0.0046	<0.01	7.88	Pass
BIPI-HWFA (on-site)	<0.05	<0.01	<0.1	<0.05	0.07	<0.0005	0.0018	<0.01	7.77	Pass

All leachate concentrations for cadmium, chromium, lead, barium, mercury, arsenic, and selenium were well below TCLP regulatory limits (DAO 2013-22). pH values ranged from 7.77 to 7.94, indicating neutral to slightly basic conditions. The results confirm that both the offshore sediments and onshore soils do not exhibit the Toxicity Characteristic and therefore qualify as non-hazardous materials.

7.1.4 Hydrology/ Hydrogeology

Watersheds of the surrounding project area were delineated using ArcGIS Pro's Spatial Analyst tools to assess hydrologic flow and potential environmental impacts.

- DEM Correction: The Fill tool removed surface depressions to ensure accurate flow modeling.
- Flow Analysis: Flow Direction and Flow Accumulation tools mapped water movement and identified natural drainage paths, including streams and channels.
- Watershed Boundaries: The Watershed tool defined contributing areas to common outlets based on flow data.

This GIS-based approach provided precise watershed boundaries, essential for evaluating surface water dynamics and informing site planning and mitigation strategies. The watershed located near the project site and draining to Batangas Bay is shown in Figure 7-33.

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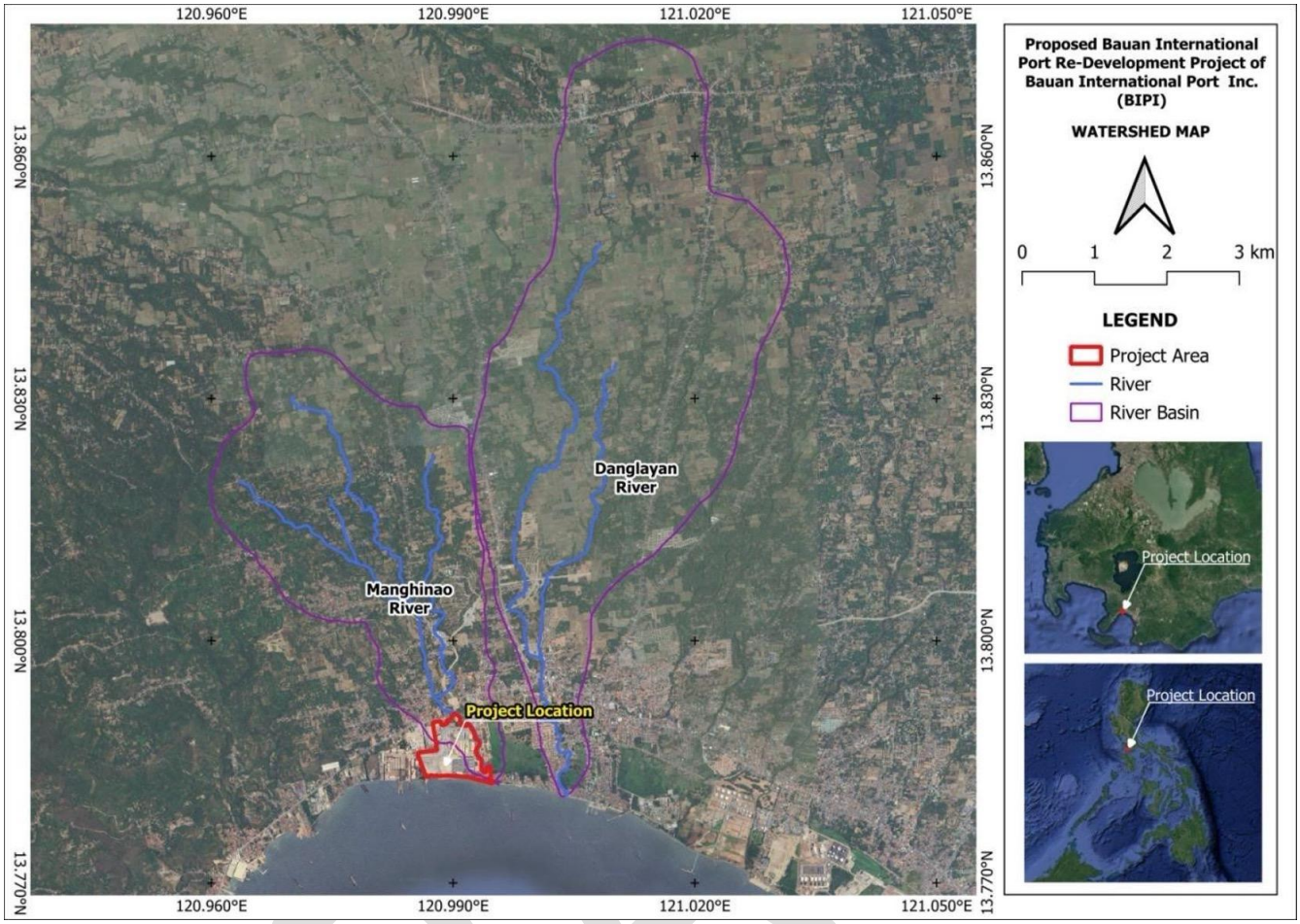

Figure 7-33 Watershed surrounding the BIPI Port

7.1.4.1 Drainage Morphology

The Philippines, situated in the Western Pacific basin, the world's most active typhoon belt experiences an average of 20 typhoons annually. These events often result in flooding, landslides, and storm surges.

Flooding typically occurs during or after intense rainfall, when river channels overflow and inundate floodplains. Low-lying areas and zones with inadequate drainage are particularly vulnerable.

As indicated in Figure 7-34 and based on data from the Mines and Geosciences Bureau (MGB), the project site is within a flood-prone area. However, due to the site's natural topography, the likelihood of flooding is minimal.

The project and its proposed redevelopment are not expected to induce flooding for the following reasons:

- No major natural drainage systems will be obstructed or altered.
- Flooding in the area is primarily triggered by heavy rainfall, independent of project activities.
- Surface runoff from rainfall will naturally drain into nearby creeks without requiring engineered flood control structures such as diversion canals or retention ponds.

The proposed project will not alter existing water body morphology, extract water from natural waterways, or cause flooding or increased stream flow within the port area or adjacent communities.

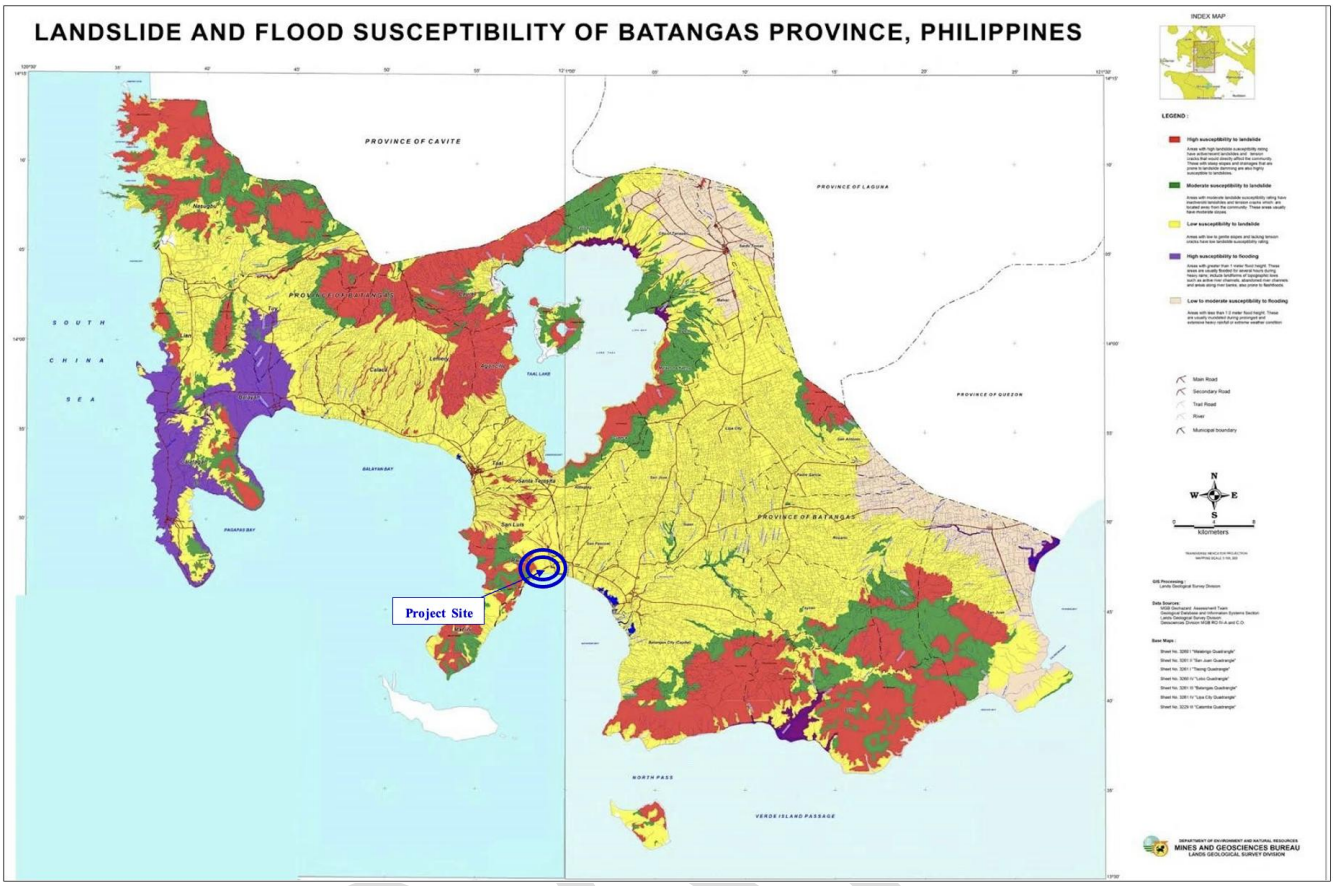

Figure 7-34 MGB Flood Susceptibility Map showing the Project Site

7.1.4.2 Stream, Lake, and Water Depth

The proposed port redevelopment will not extract water from nearby rivers or creeks, nor discharge treated wastewater into them. The existing drainage system will remain unaffected and free-flowing, with no surface water extraction or diversion planned. No changes in stream flow, water depth, or morphology are anticipated.

There are no lakes within or near the project site. The nearest lake, Taal Lake, is approximately 11 km north of the existing BIPI port.

7.1.4.3 Water Resources / Competition in Water Use

The current port operation utilizes the existing deep well to support its operation. In consideration with the proposed port redevelopment project, the existing deep well will be decommissioned and replaced with a new deep well to support the Project's water requirements. The development of the replacement well, including all required studies and permitting, will be undertaken by qualified third-party specialists in accordance with applicable government regulations and requirements.

7.1.5 Oceanography

The Project site is located along the inner coastal margin of Batangas Bay, which forms part of the broader marine system of the Verde Island Passage. As described above, coastal circulation within Batangas Bay is primarily influenced by tidal exchange and localized wind-driven currents, which promote dispersion and dilution of suspended materials with increasing distance from nearshore sources. Sensitive marine ecosystems within the wider bay include the **Bauan Marine Protected Area (Bulacan Reef)**, located approximately **6.25 km southwest of the Project site**. While this marine protected area lies outside the Project footprint and the immediate zone of nearshore disturbance associated with port activities, its presence is considered in the regional environmental context of the baseline assessment. The oceanographic conditions described in this section provide the basis for evaluating potential pathways for sediment dispersion, water

quality changes, and other marine disturbances in the subsequent impact assessment presented in Chapter 8.

7.1.5.1 Circulation Pattern

Tides

The nearest primary tidal station is located within Batangas Port, Batangas City, at geographic coordinates approximately 13°45′16″ North latitude and 121°02′36″ East longitude. It is situated about 15 meters from the edge of the road gutter, across from Sta. Clara Chapel. The observed tidal pattern at the project site is referenced to the Batangas Port Tidal Station, Benchmark 7A (BM 7A). The BIPI port is approximately 6.86 km (aerial distance) northwest of Batangas Port Tidal Station.

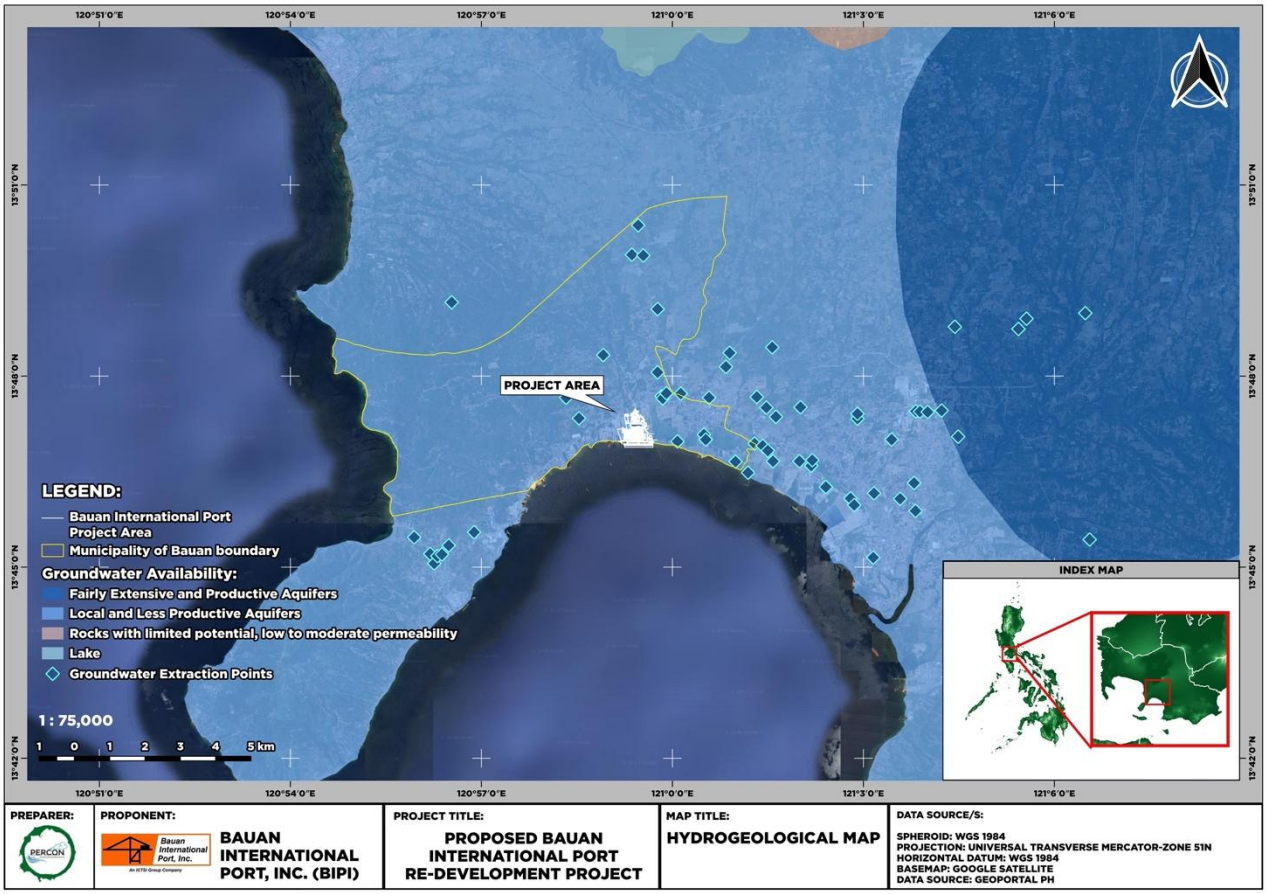

Figure 7-35 Hydrogeological Map showing the project site

Source: Google Earth

Figure 7-36 Nearest Local Tidal Station in Reference to Bauan Port

OBSERVED TIDAL FLUCTUATIONS (BATANGAS BAY VICINITY – AUG 18–22, 2025, PST)

- **Mon Aug 18: High ~1.18 m at ~04:19; Low ~-0.03 m at ~13:56.**
- **Tue Aug 19: High ~1.21 m at ~05:29; Low ~-0.11 m at ~15:12.**
- **Wed Aug 20: High ~1.24 m at ~06:49; Low ~-0.15 m at ~16:07.**
- **Thu Aug 21: High ~1.27 m at ~08:03; Low ~-0.16 m at ~16:51.**
- **Fri Aug 22: High ~1.28 m at ~09:05; Low ~-0.12 m at ~17:26.**

Source: NAMRIA 2025 Tide & Current Tables

Water Current

Figure 7-37 shows the surface water currents in the Philippine waters during northeast and southwest monsoon.

The Verde Island Passage, a narrow and deep channel connecting the South China Sea with the Sibuyan and Tayabas Seas, exhibits strong and variable currents influenced by tidal exchange and wind-driven upwelling. Field data surveys reveal energetic flows, shifting eddies, and intensified currents near constrictions and headlands at the mouth of Batangas Bay.

As a heavily trafficked and regulated maritime corridor, the Verde Island Passage imposes routing constraints that may affect survey vessel operations. Coordination with the Philippine Coast Guard (PCG) and Philippine Ports Authority (PPA) is essential to ensure safe navigation and compliance with designated traffic lanes.

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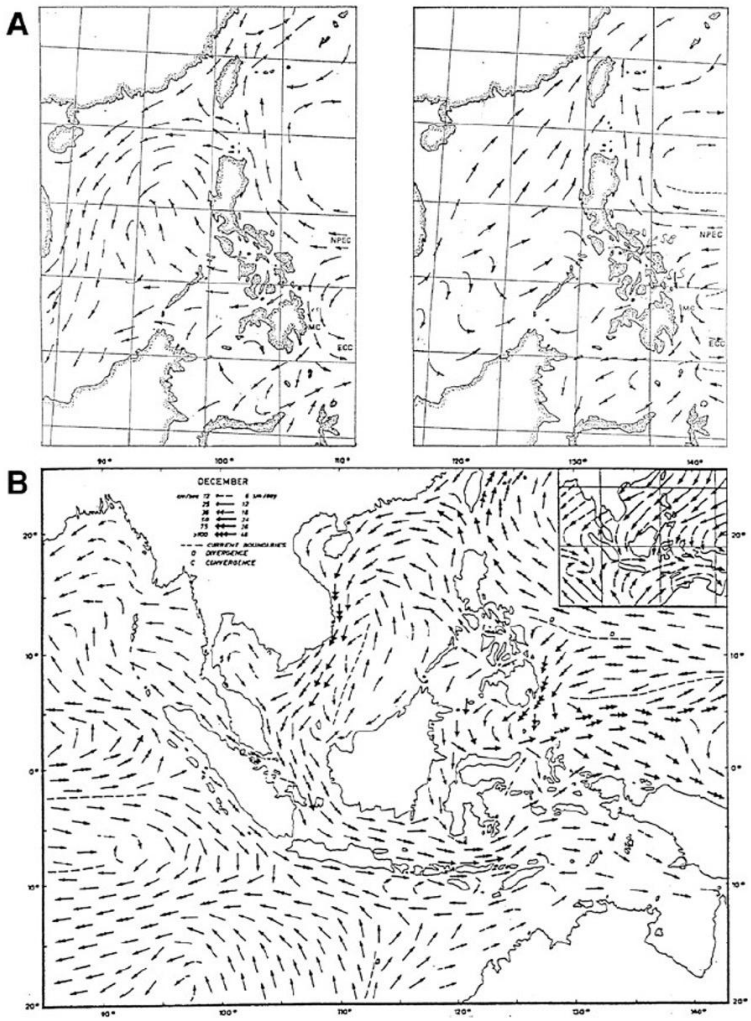

Source: A) Villanoy & Udarbe 1995); B) Wyrtki 1961

Figure 7-37 Surface Current Patterns in the Philippines and Adjacent Waters During NE and SW monsoon; (B) Surface Currents in December in the Pacific and Indian Oceans

7.1.5.2 Bathymetry

Bathymetric conditions within the Project Area were characterized using recent hydrographic survey data, as presented in Figure 7-38 (Bathymetric Map of the Proposed Project Area). The survey covers the existing port basin, berthing areas, and adjacent nearshore marine waters within the defined Area of Influence.

The seabed within the Project Area exhibits a gently sloping bathymetric profile, with shallower depths occurring closer to the shoreline and progressively increasing depths seaward. Nearshore areas within the existing port footprint are characterized by relatively uniform depth contours shaped by historical port development and maintenance dredging activities. Offshore portions of the survey area show smoother gradients with no abrupt depth changes or geomorphological features indicative of reef structures, pinnacles, or submerged coastal formations.

Bathymetric contours indicate that the seabed morphology is consistent with a modified working port environment, influenced by long-term maritime use, sediment deposition from adjacent watersheds, and prior dredging activities. No isolated depressions, channels, or seabed irregularities associated with sensitive benthic habitats were identified within the surveyed area.

The bathymetric dataset provides a reliable baseline for:

- Characterizing existing seabed conditions prior to redevelopment;
- Supporting dredging design and engineering assessments;
- Informing hydrodynamic and sediment transport considerations; and
- Serving as a reference point for evaluating project-related changes to seabed profile during construction and operation.

This baseline bathymetric information forms an integral component of the physical environment assessment and is used as the foundation for subsequent impact evaluation and mitigation planning related to dredging and marine construction activities.

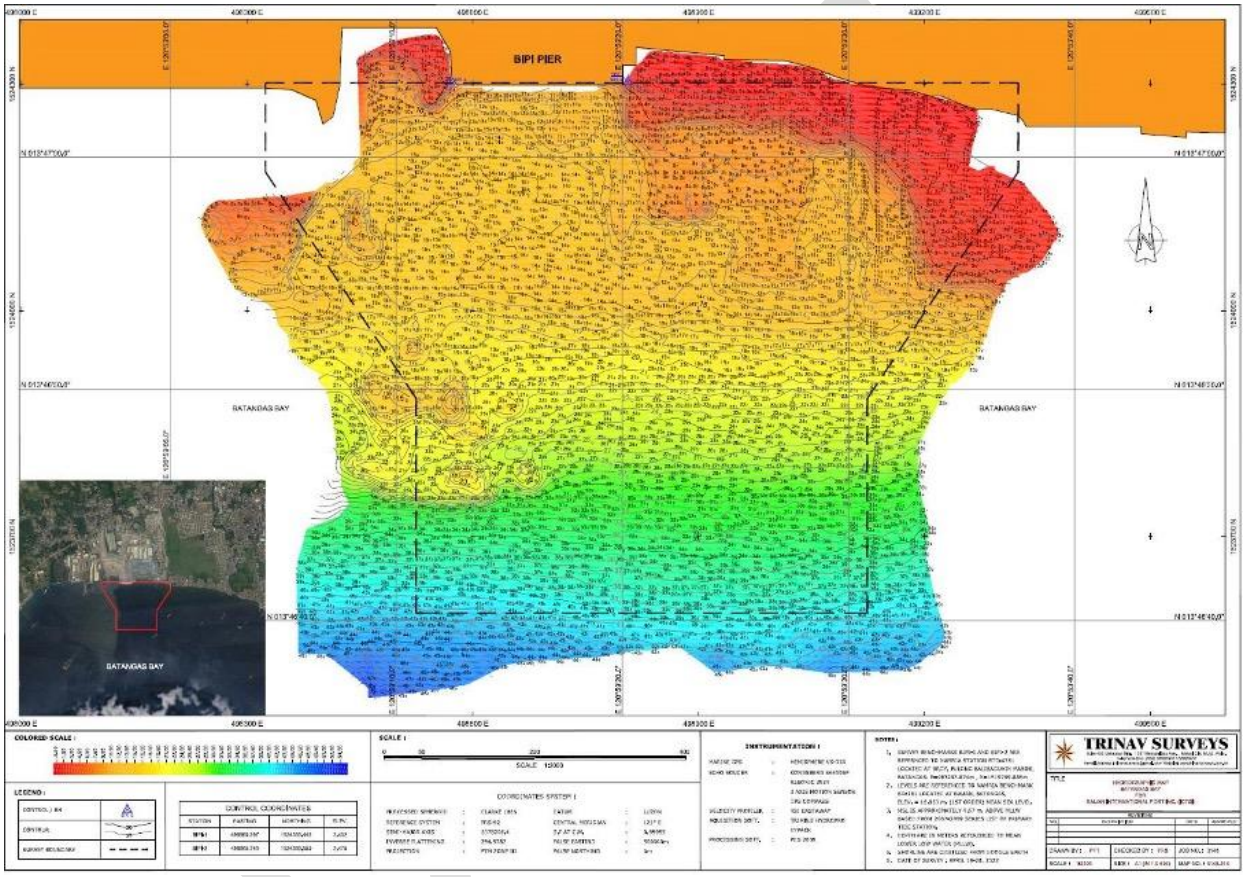

Figure 7-38 Bathymetric Map of the Proposed Project Area

7.1.6 Water Quality

Ambient water quality sampling was conducted last May 24, 2024 in Barangays Santo Domingo and San Andres, Bauan, Batangas. A total of six (6) ambient water quality stations in the study area comprising: one (1) groundwater, three (3) surface freshwater and two (2) coastal marine water stations were established.

Water quality assessment, collection, and handling procedures utilized the procedures prescribed in the *DENR-EMB's Water Quality Monitoring Manual (Volume I)- Manual on Ambient Water Quality Monitoring* issued through Memorandum Circular 2008-08.

Manual collection of grab water samples was done from the identified sampling locations using clean containers

- A wide-mouthed glass for oil and grease
- Bac-T bottles for bacteriological parameters
- 1-litre plastic containers for physico-chemical parameters

The collected samples were stored and chilled using ice packs in a closed container- styrofoam box and brought to a DENR Accredited Laboratory – Ostrea Mineral Laboratories, Inc. located in Mamplasan, Biñan Laguna for analysis.

The method of analysis adopted the Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 23rd Edition.

The temperature and conductivity were measured on-site using a portable EC meter. The results are shown in Appendix 6-A.

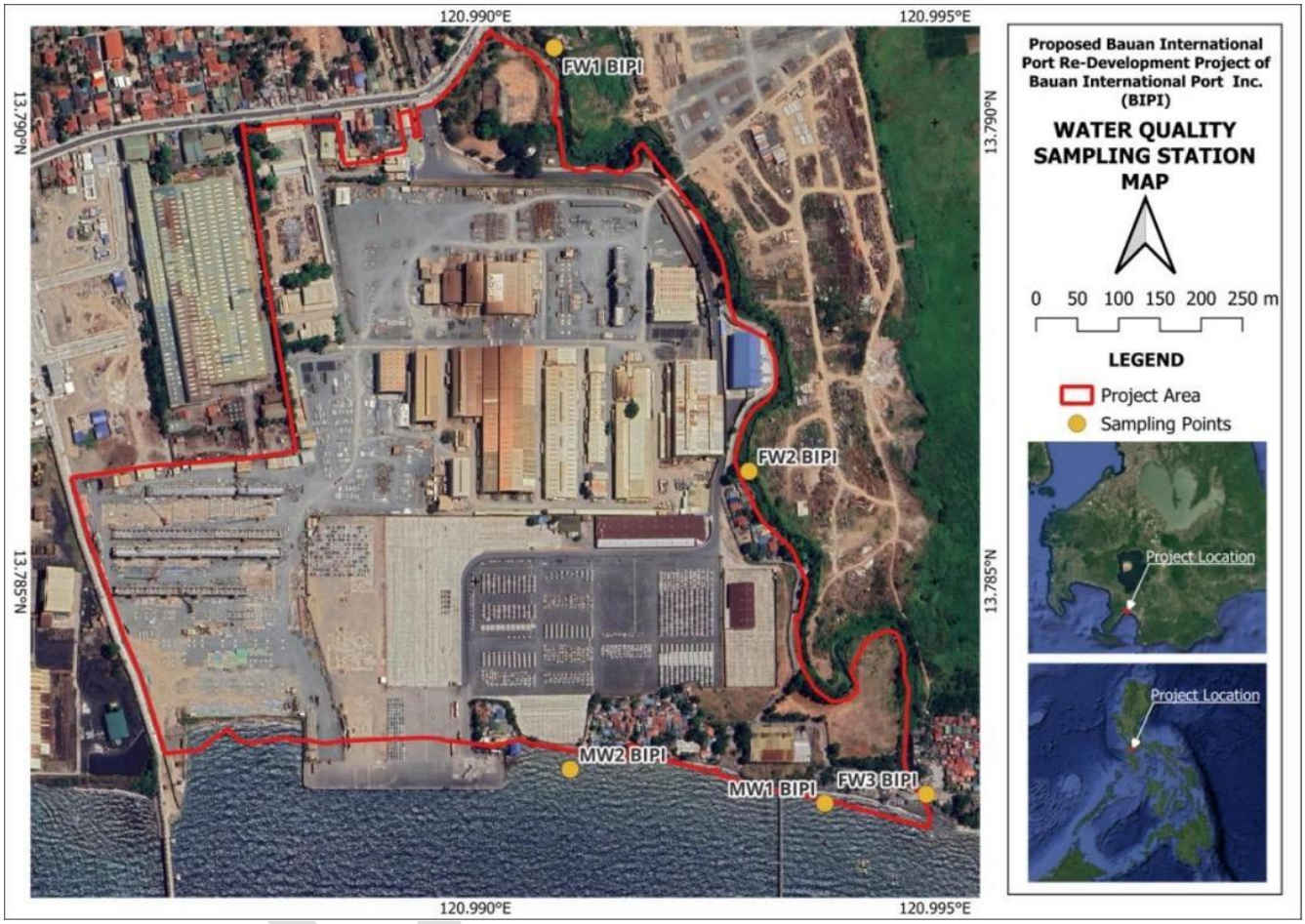

Figure 7-39 Water Quality Sampling Points

7.1.6.1 Groundwater Quality

The table below presents the details of the groundwater sampling stations. Figure 7-40 is the actual groundwater sampling photo.

Table 7-8 Groundwater Quality Sampling Stations taken from Groundwater in Barangay San Roque

Station ID	Coordinates	Location	Site Description/Use	Weather Condition	Season
GW-1 BIPI	3.789862° N 20.990529° E	Barangay San Roque	A hand water pump with a depth of approximately 15 ft, use for drinking and domestic purposes	Sunny	Wet

Figure 7-40 Sampling Station - Ground Water 1

"Groundwater Quality Guidelines" - groundwater sources should adopt Class A WQG (except for BOD and DO) for the source of potable water and other domestic use. Potability of the groundwater samples was characterized using PNSDW 2017.

Table 7-9 Groundwater Analysis Results

Parameter	Analysis Method/Instrument	DAO 2016 - 08 Class A	DAO 2021 -19 Class A*	DOH PNSDW 2017	WB EHS / WHO Guideline	GW-1 BIPI
pH	**Electrometric**	**6.5 – 8.5**	**--**	**6.5-8.5**	**6.5-8.5**	7.9
Temperature, ºC	**In-situ sampling/ Portable**	**26 – 30**	**--**	**--**	--	29.8

Parameter	Analysis Method/Instrument	DAO 2016 - 08 Class A	DAO 2021 -19 Class A*	DOH PNSDW 2017	WB EHS / WHO Guideline	GW-1 BIPI
	Temperature Meter					
Conductivity	**In-situ sampling/Portable Conductivity Meter**	**--**	**--**	**--**		341
BOD, mg/L	**5 – Day BOD Test**	**3**	**--**	**--**	≤ 3 (good quality surface water)	<1
COD,mg/L	**Open Reflux**	**--**	**--**	**--**	--	50
Cl-, mg/L	**Argentometric**	**250**	**--**	**250**	250	17.0
Color, CU	**Visual Comparison**	**50**	**--**	**10**	--	<5
DO, mg/L	**Iodometric**	**5 (min)**	**--**	**--**	>5	6
Oil and Grease, mg/L	**Liquid – Liquid, Partition – Gravimetric**	**1.0**	**--**	**--**	≤ 10 (general surface water)	<1.0
TSS, mg/L	**Gravimetry**	**50**	**--**	**600**	--	<1
Fecal coliforms, MPN/100mL	**Multiple Tube Fermentation Technique**	**--**	**50**	**<1.1 MPN/100mL**	0 (drinking water)	**<1.8**
Total coliforms, MPN/100mL	**Multiple Tube Fermentation Technique**	**--**	**--**	**<1.1 MPN/100mL**	**--**	**<1.8**

*Note: DAO 2021-19 Updated Standard for Selected Water Quality Parameters
MPN/100mL – Most Probable Number per 100 milliliters
TCU – True Color Unit

Bacteriological Quality

The groundwater source was tested positive for both fecal and total coliforms, with exceedance in coliform counts as compared to PNSDW. Under PNSDW, the drinking waters should have less than 1.1MPN/100 ml coliform counts.

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The elevated counts of coliform can be attributed to organics and decaying matter, or in worst case human and animal wastes may be present in the groundwater. Disinfection is necessary prior to usage especially for drinking purposes.

Physical and Chemical Quality: Aesthetic Quality

The pH level of the groundwater water sample is within the allowable range of PNSDW and DENR detection limits. Temperature reading is within the allowable DENR standards for the sample.

Oil and grease concentration of groundwater samples is within the prescribed limit of DAO 2016-08 for Class A water. Biological oxygen demand (BOD) and DO of the groundwater sample conforms with the requirement of Class A waters. Other parameters include TSS which is within the limits.

Comparison with World Bank Group EHS Guidelines
Groundwater quality results were further compared with the World Bank Group General EHS Guidelines (2007), which reference WHO drinking water quality benchmarks where applicable. As shown in Table 7-9, all measured parameters at monitoring point GW-1 are within applicable World Bank/WHO guideline values. Parameters without explicit World Bank numeric limits (e.g., COD, conductivity) were assessed using professional judgment and national standards, and are not indicative of groundwater quality concerns. Overall, the results indicate good baseline groundwater quality consistent with both national regulations and international good practice.

Other Parameters with No Standard Values

No standard values were indicated for conductivity in PNSDW and DAO 2016-08 for Class A water. Conductivity reading indicates the presence of total dissolved solids and minerals in the samples. The measured COD of the groundwater is 50mg/L.

7.1.6.2 Surface Water Quality

The table below presents the details of the fresh water sampling station. Figure 7-41, Figure 7-42, and Figure 7-43 are the actual sampling photos. The sampling area was selected as this is the nearest river to the project site.

Table 7-10 Surface Freshwater Sampling Stations taken from Baliti River (Tabok River)

Station ID	Coordinates	Location	Description/Use	Weather Condition	Season
FW-1 BIPI	13°47’26.94” N 120°59’27.09” E	Barangay San Roque	Baliti River (Baliti River (Tabok River)) Upstream	Sunny	Wet
FW-2 BIPI	13°47’10.33” N 120°59’34.72” E	Barangay San Roque	Baliti River (Tabok River) Upstream	Sunny	Wet
FW-3 BIPI	13°46’57.66” N 120°59’41.67” E	Barangay San Andres	Baliti River (Tabok River) Downstream	Sunny	Wet

Figure 7-41 Sampling Station - Fresh Water 1

Figure 7-42 Sampling Station - Fresh Water 2

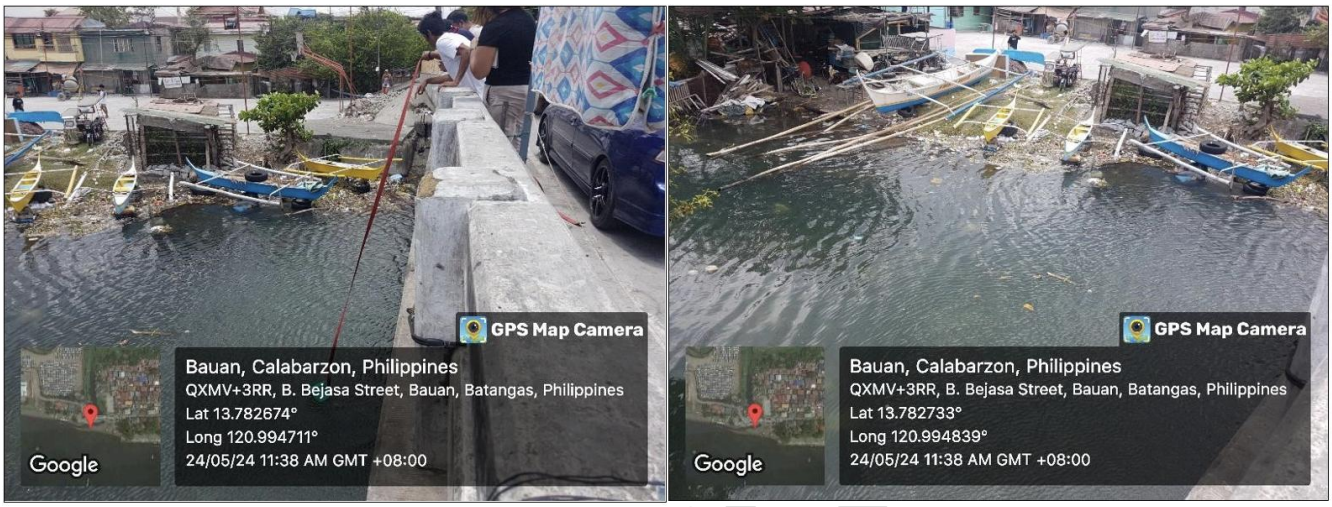

Figure 7-43 Sampling Station - Fresh Water 3

Baliti River (Tabok River) where the surface freshwater was collected had not been classified by DENR, therefore, classification was set using its observed current beneficial usage as Class C which is intended for agricultural, irrigation and livestock purposes. Laboratory results below in Table 7-11 were compared to the guideline values prescribed in DAO 2016-08 for Class C since it is the current beneficial use of surface freshwater.

Table 7-11 Freshwater Quality Analysis Results

Parameter	Analysis Method /Instrument	DAO 2016 -08 Class C	DAO 2021 -19 Class C*	FW1	FW2	FW3
pH	**Electrometric Method**	**6.5 – 9**	**--**	7.8	8	7.8
Temperature, °C	**In-situ sampling/ Portable Temperature Meter**	**25 – 31**	**--**	30.1	30.7	29
DO, mg/L	**Titrimetric**	**5 (min)**	**--**	5	5	**4**
BOD, mg/L	**5 - Day BOD test**	**7**	**--**	**11**	6	**17**
COD,mg/L	**Open Reflux**	**--**	**--**	90	66	52
Cl-, mg/L	**Argentometric**	**350**	**--**	28.8	29.3	**2,930**
Color, CU	**Visual Comparison**	**75**		<5	10	10
Oil and Grease, mg/L	**Gravimetry**	**3**	**--**	<1.0	<1.0	<1.0
TSS, mg/L	**Gravimetry**	**80**	**--**	14	**235**	7
Fecal coliforms, MPN/100mL	**Multiple Tube Fermentation**	**--**	**200**	**54×10^4**	**16×10^5**	**35×10^4**
Total coliforms, MPN/100mL	**Multiple Tube Fermentation**	**--**	**--**	**16×10^5**	**16×10^5**	**92×10^4**

*Note: In accordance with the World Bank Group General EHS Guidelines (2007), wastewater and surface water quality are assessed primarily against applicable national standards.
Note: DAO 2021-19 Updated Standard for Selected Water Quality Parameters
Note: MPN-Most Probable Number
n/a
– Not Applicable

Parameters Pertaining to Conventional and other Pollutants Contributing to Aesthetics and Oxygen Demand for Fresh Waters

Baliti River (Tabok River) stations were tested positive and with exceeding counts of fecal coliforms as compared to Class C water. Elevated coliform contamination of surface freshwater of Baliti River (Tabok River) are mainly caused by human and animal wastes discharged from the households located near the river. Presence of livestock animals were also observed, especially in the upstream of the river.

Elevated BOD levels were measured in stations FW1 and FW3 which is an indication of pollution and contamination which is highly caused by household discharges in the river. As also observed, wastes and garbage can be found in the river. Low DO was observed in station FW3, an indication of bacterial presence and could compete with the consumption of oxygen levels of the river.

Parameters for Toxic and other Deleterious Substances for Fresh Waters (For the Protection of Public Health) and other parameters with no Prescribed values

In general, other parameters including temperature, pH, oil and grease were within their respective standards as stipulated in DAO 2016-08 Class C water. The elevated TSS level in station FW2 indicates that potential sediments or erosion of the river banks increased the suspended solids in the sampling point.

The chloride measured in station FW3 exceeded the limit of Class C water. This is caused by back flow from marine water which mixed up with the downstream freshwater of the river.

7.1.6.3 Marine Water Quality

The table below present the details of the marine water sampling station. Figure 7-44 and and Figure 7-45 are the actual sampling photos.

Table 7-12 Coastal Marine Sampling Stations

Station ID	Coordinates	Location	Description	Weather Condition	Season
MW-1 BIPI	13°46’57.3” N 120°59’37.69” E	Batangas Bay	Marine water sampling station in Barangay San Andres near the existing pier.	Sunny	Dry
MW-2 BIPI	13°46’58.64” N 120°59’27.72” E	Batangas Bay	Marine water sampling station in front of the existing BIPI.	Sunny	Dry

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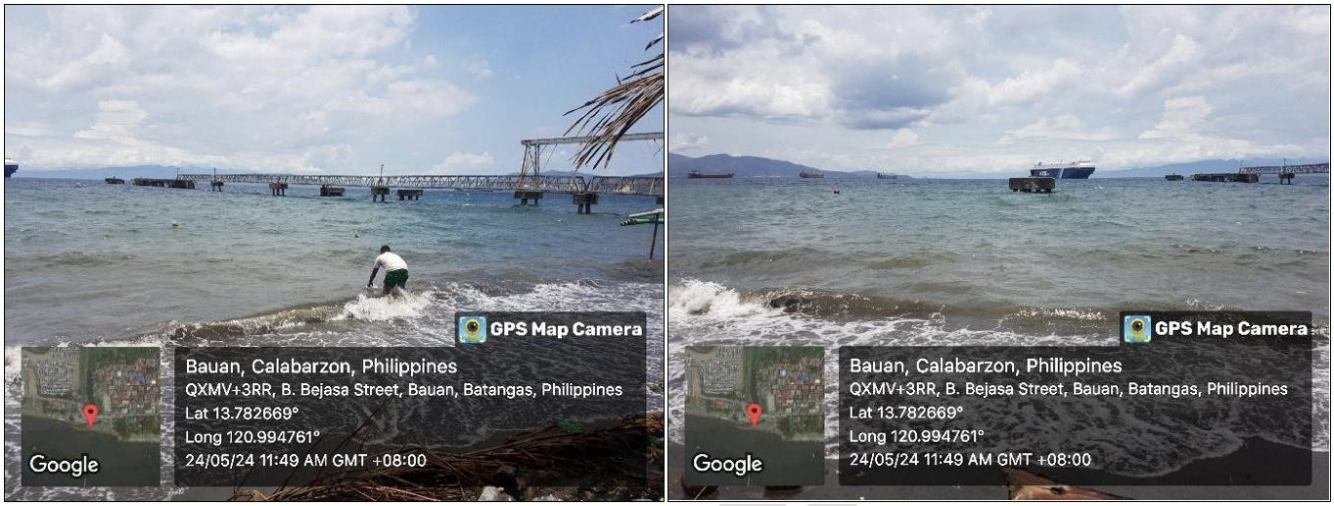

Figure 7-44 Sampling Station - Marine Water 1

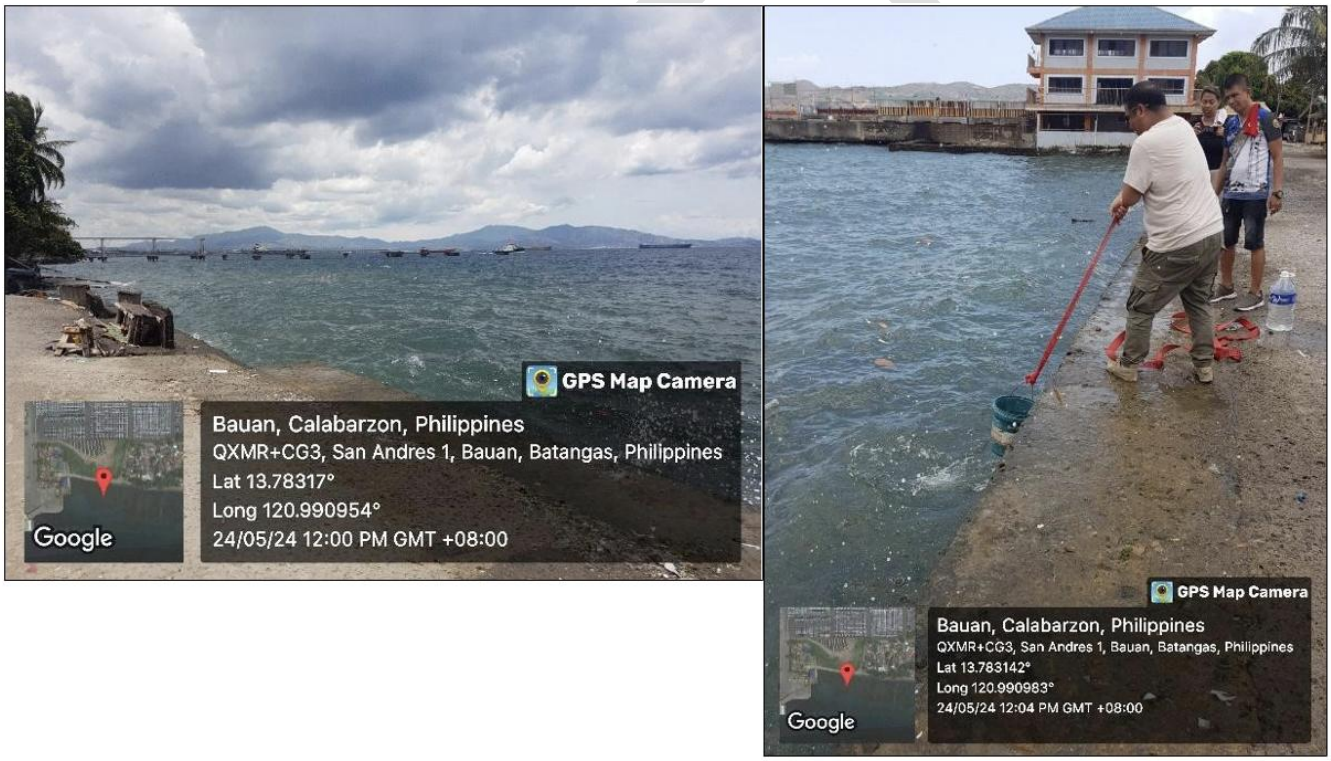

Figure 7-45 Sampling Station - Marine Water 2

Marine water samples were taken from Batangas Bay in which the applicable marine water in the area is classified as SC. The classification was established based on the current beneficial use of water bodies as Class SC.

Table 7-13 Coastal Marine Water Analysis Results

Parameter	Analysis Method/Instrument	DAO 2016 - 08 Class SC	DAO 2021 -19 Class SC*	MW1	MW2
pH	**In-situ sampling/Portable pH Meter**	**6.5 – 8.5**	**--**	8.3	8.3
Temperature, °C	**In-situ sampling/ Portable Temperature Meter**	**25 – 31**	**--**	30.1	31.4
DO, mg/L	**Titrimetric**	**5 (min)**	**--**	6	5
BOD, mg/L	**5 - Day BOD test**	**n/a**	**--**	<1	3
COD,mg/L	**Open Reflux**	**--**	**--**	79	97
Cl-, mg/L	**Argentometric**	**n/a**	**--**	21,406.1	20,794.4
Color, CU	**Visual Comparison**	**75**	**--**	<5	<5
Oil and Grease, mg/L	**Partition - Gravimetric**	**3**	**--**	<1.0	<1.0
TSS, mg/L	**Gravimetry**	**80**	**--**	7	4
Fecal coliforms, MPN/100mL	**Multiple Tube Fermentation**	**--**	**200**	**11×10^2**	**24×10^2**
Total coliforms, MPN/100mL	**Multiple Tube Fermentation**	**--**	**--**	**35×10^2**	**54×10^2**

Note: Marine water quality results were assessed against applicable Philippine ambient marine water quality standards. Consistent with the World Bank Group General EHS Guidelines (2007)

Parameters for Conventional and Other Pollutants Affecting Aesthetics and Exerting Oxygen Demand for Coastal and Marine Water

Results of the laboratory revealed elevated coliform counts of all marine water stations were within the allowable limit for DENR Class SC standard. Discharges from the nearby households are the main cause of exceedances and could reach the marine water or be carried by Baliti River (Tabok River) towards the Bay. Presence of wastes including garbage in both stations could also influence the elevated coliform levels of the sampling stations.

The dissolved oxygen of the two (2) marine sampling stations is above the minimum requirement for Class SC which is 5mg/L.

Parameters for Toxic and Other Deleterious Substances for Coastal and Marine Waters (for the Protection of Public Health) and other parameters with no Criteria

Marine water parameters including temperature, pH, oil and grease and TSS were also within the acceptable limits for Class SC waters.

7.1.7 Climate/ Meteorology

Meteorological and climatological parameters of the Bauan Port were characterized based on data obtained from the nearest weather monitoring station of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) which is the Ambulong Synoptic Station located in Tanauan, Batangas. The project site is situated approximately 34.28 kilometers north (aerial distance) of the said weather station, as shown in Figure 7-46.

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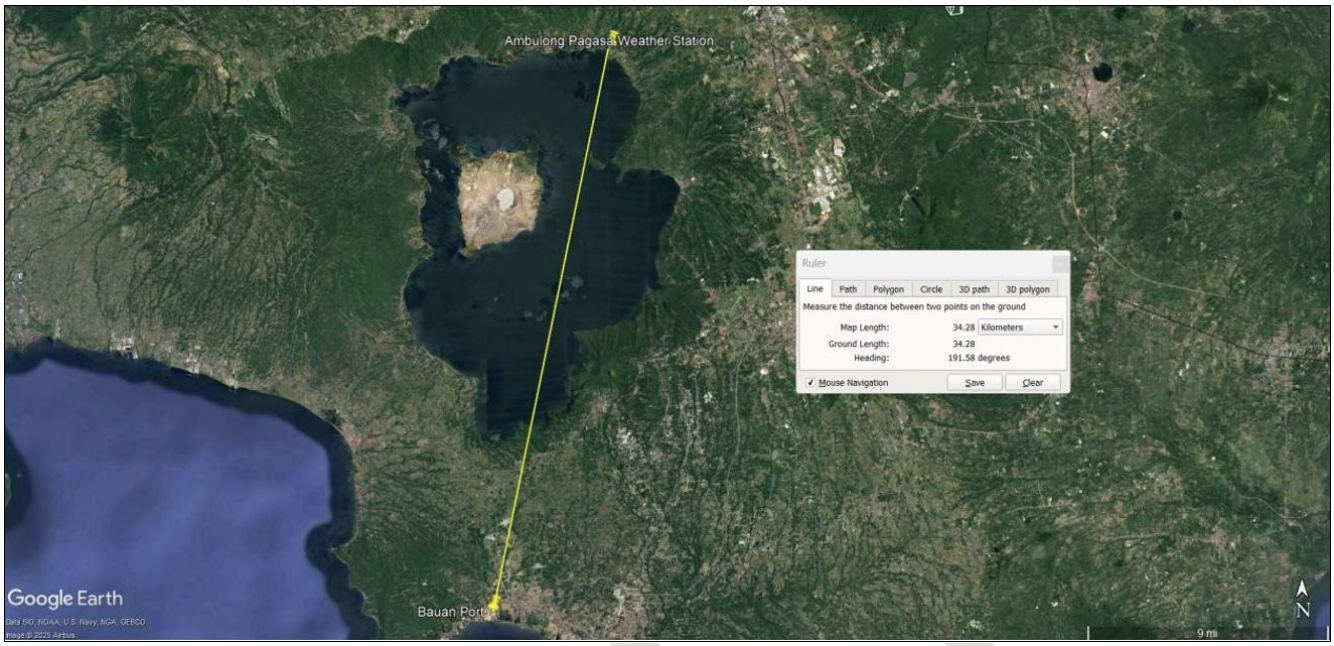

Source: Google Earth

Figure 7-46 PAGASA Synoptic Station nearest to the Project Site

The prevailing weather conditions at BIPI are represented by climatological records from the Ambulong PAGASA station. These data will serve as a reference for related atmospheric parameters, including air temperature, relative humidity, precipitation, wind speed and direction, as well as the frequency and intensity of tropical cyclones.

Climate

The Bauan Port area, including the Municipality of Bauan, is classified under a Type I climate zone according to the Modified Corona's Classification System adopted by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

The project site which experiences a Type I climate was characterized by distinct wet and dry seasons. The dry season spans November to April, with cooler conditions from December to February and hotter, drier weather from March to May. The wet season occurs from May to October, with peak rainfall recorded between June and September.

The Climate Map of the Philippines indicating the project site is shown in Figure 7-47.

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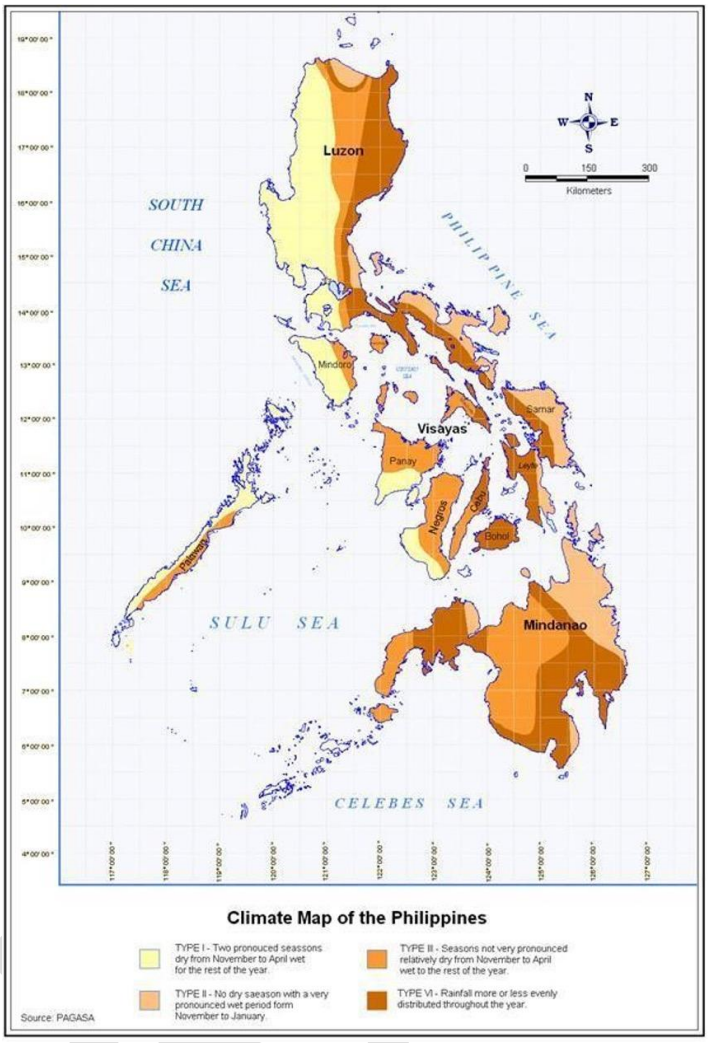

Source: PAGASA

Figure 7-47 Climate Map of the Philippines

Climatological Normal and Extremes

Table 7-14 and Table 7-15 present the climatological and meteorological characteristics of the project site based on PAGASA Climatological Normals and Extremes.

Table 7-14 Climatological Normals - Ambulong, Tanauan Batangas

CLIMATOLOGICAL NORMALS

STATION: **AMBULONG, BATANGAS**
PERIOD: **1991 - 2020**

LATITUDE: **14°05'24.29"N**
LONGITUDE: **121°03'18.88"E**
ELEVATION: **10.6 m**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16a)	(16b)
MONTH	RAINFALL		TEMPERATURE						VAPOR PRESS. (mbs)	RH (%)	MSLP (mbs)	WIND		CLOUD AMT. (okta)	NO. OF DAYS W/	
	AMOUNT (mm)	NO. OF RD	MAX (°C)	MIN (°C)	MEAN (°C)	DRY BULB (°C)	WET BULB (°C)	DEW POINT (°C)				DIR (16pt)	SPD (mps)		TSTM	LTNG
JAN	25.8	5	30.1	22.4	26.3	26.0	23.5	22.5	27.4	81	1012.8	NE	2	5	0	0
FEB	22.1	3	31.1	22.2	26.7	26.5	23.6	22.6	27.4	79	1012.8	NE	2	4	0	0
MAR	21.0	3	32.5	23.0	27.7	27.6	24.5	23.3	28.7	78	1012.0	NE	2	4	1	1
APR	25.0	3	34.3	23.9	29.1	29.0	25.5	24.2	30.2	75	1010.5	NE	1	4	4	3
MAY	129.4	9	33.9	24.6	29.3	29.2	26.1	25.1	31.9	79	1008.9	NE	1	5	14	10
JUN	213.2	13	32.8	24.6	28.7	28.6	26.0	25.2	32.1	82	1008.6	SW	1	5	15	14
JUL	338.3	18	31.5	24.2	27.8	27.7	25.7	24.9	31.7	85	1008.3	SW	1	6	16	13
AUG	305.5	17	31.1	24.3	27.7	27.7	25.7	25.0	31.7	86	1008.0	SW	1	6	11	10
SEP	271.0	16	31.4	24.2	27.8	27.7	25.7	25.0	31.9	86	1008.6	SW	1	6	12	11
OCT	192.6	12	31.6	23.9	27.7	27.6	25.4	24.7	31.2	85	1009.5	NE	1	5	8	10
NOV	139.6	11	31.2	23.8	27.5	27.4	25.0	23.7	30.3	83	1010.5	NE	2	5	2	4
DEC	132.6	9	30.1	23.3	26.7	26.5	24.3	23.5	29.0	84	1011.5	NE	2	5	1	1
ANNUAL	**1,816.1**	**119**	**31.8**	**23.7**	**27.7**	**27.6**	**25.1**	**24.1**	**30.3**	**82**	**1010.2**	**NE**	**1**	**5**	**84**	**77**

Table 7-15 Climatological Extremes - Ambulong, Tanauan Batangas

STATION: **AMBULONG, BATANGAS**
YEAR: **AS OF 2014**

LATITUDE: **14°05'24.29"N**
LONGITUDE: **121°03'18.88"E**
ELEVATION: **11m**

MONTH	TEMPERATURE (°C)				GREATEST DAILY RAINFALL (mm)		STRONGEST WINDS (mps)			SEA LEVEL PRESSURES (mbs)			
	HIGH	DATE	LOW	DATE	AMOUNT	DATE	SPD	DIR	DATE	HIGH	DATE	LOW	DATE
JAN	34.9	01-03-1958	16.0	01-09-1985	118.1	01-01-1960	20	ENE	01-29-1989	1022.1	01-30-1998	1004.1	01-05-1999
			16.0	01-24-2014									
FEB	37.2	02-28-1985	16.1	02-03-1976	92.7	02-21-2013	24	NE	02-06-1982	1022.2	02-01-1962	1003.7	02-08-1985
MAR	38.0	03-30-1984	16.2	03-03-1963	60.6	03-24-1980	22	ENE	03-10-1989	1021.3	03-30-1958	1002.9	03-27-2001
APR	38.3	04-05-1987	17.5	04-05-1963	57.0	04-23-1996	18	SE	04-25-1989	1019.4	04-04-1998	1001.5	04-06-1994
MAY	38.8	05-15-1921	20.0	05-21-1974	499.2	05-21-1976	41	SW	05-17-1989	1015.8	05-02-1998	987.3	05-17-1989
JUNE	38.0	06-14-1983	20.6	06-18-1976	301.5	06-27-1961	40	SW	06-23-1984	1016.2	06-07-1997	987.4	06-29-1964
JULY	36.8	07-15-1999	19.2	07-19-2014	218.5	07-13-2010	75	W	07-15-1983	1015.9	07-22-1959	972.1	07-04-2001
AUG	36.7	08-23-1969	20.5	08-11-1996	283.6	08-24-1990	40	NNE	08-12-1987	1015.3	08-23-1999	995.2	08-12-1987
SEP	35.7	09-14-1984	19.5	09-04-1991	270.8	09-05-1962	54	SSW	09-09-1982	1015.7	09-05-1953	987.7	09-09-1982
OCT	37.3	10-11-1975	18.9	10-31-1969	183.2	10-28-2000	70	S	10-11-1989	1017.3	10-28-1960	977.4	10-10-1989
NOV	36.5	11-02-1956	18.3	11-29-1974	277.2	11-03-1995	45	NE	11-25-1987	1020.0	11-27-2001	978.6	11-03-1995
			18.3	11-22-1975									
DEC	35.3	12-25-1962	16.8	12-16-1960	151.9	12-09-1971	54	NE	12-30-1950	1024.2	12-27-2001	996.2	12-05-1993
ANNUAL	**38.8**	**05-15-1921**	**16.0**	**01-09-1985**	**499.2**	**05-21-1976**	**75**	**W**	**07-15-1983**	**1024.2**	**12-27-2001**	**972.1**	**07-04-2001**
			16.0	**01-24-2014**									
Period of Record	**1919-2014**				**1949-2014**		**1950-2014**			**1949-2014**			

Rainfall

Based on the PAGASA data, the Ambulong weather station recorded an annual rainfall total of 1,816.1 mm. The month of July registers the highest monthly rainfall at 338.3 mm, while March shows the lowest at 21 mm. The most extreme single-day rainfall was 499.2 mm, observed on May 21, 1976.

Temperature

From the same PAGASA data, the weather station recorded an annual mean temperature of 27.7°C. The annual maximum and minimum averages were 31.8°C and 23.7°C, respectively. The highest observed temperature was 34.3°C in April, while the lowest was 22.2°C in February.

The highest temperature recorded at the weather station was 38.8°C on May 15, 1921. The lowest temperature, 16.0°C, was observed on January 9, 1985, and again on January 24, 2014.

Relative Humidity

Relative humidity data from PAGASA's Ambulong station (1991–2020) indicate an annual average of 82%. The lowest monthly humidity level, 75%, occurs in April, while peak values of 82% are recorded in August and September.

Wind Speed and Direction

Prevailing wind patterns at PAGASA's Ambulong station reflect seasonal monsoon systems. The northeast monsoon (—Amihan‖) dominates from October to May, bringing winds from the northeast, while the southwest monsoon (—Habagat‖) prevails from June to September with winds from the southwest. Typical wind speed is 2 m/s with predominant northeast direction from May to October.

The highest wind speed recorded was 75 m/s from the west on July 15, 1983.

Cloudiness

Cloud cover data from PAGASA indicate that the months of July to September exhibit the highest levels, averaging 6 oktas. The annual mean cloud cover is approximately 5 oktas.

Lightning and Thunderstorm

Based from the same PAGASA's Ambulong station, thunderstorms occurred on a maximum of 16 days in July, while lightning was observed on up to 14 days in June. On average, the site experiences 84 thunderstorm days and 77 lightning occurrence days annually.

Tropical Cyclones

The Philippines experiences an average of 20 tropical cyclones annually. The data indicate that the BIPI Port area and Municipality of Bauan may encounter approximately three (3) cyclones every two (2) years (Figure 7-48).

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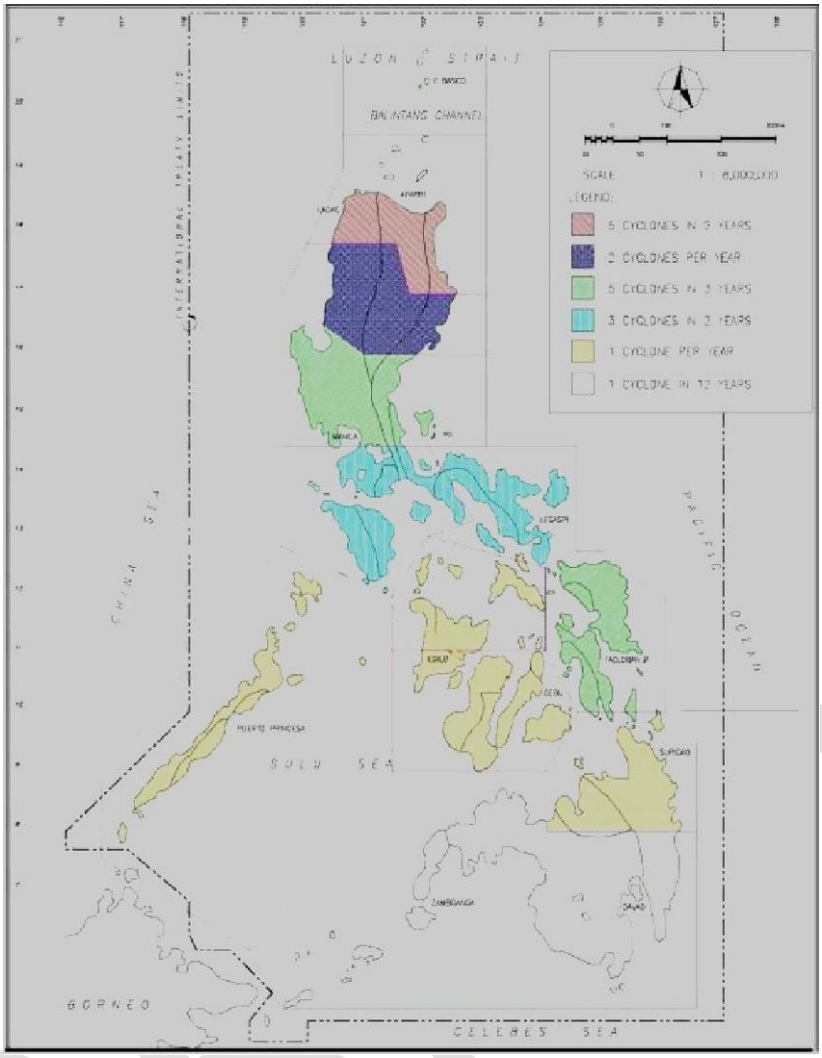

Figure 7-48 Tropical Cyclone Frequency Map

7.1.7.1 Change in the Local Micro-Climate

The proposed expansion of the BIPI port area is not expected to initiate or cause any significant change of microclimate. Existing climatological and meteorological conditions, as indicated by PAGASA data, will remain unaffected. Historical observations show that the current port operations have not impacted local weather patterns; therefore, the planned modifications are likewise not anticipated to result in climatological changes.

Climate Change Projection

Consideration of the PAGASA climate change projections for 2050

PAGASA's climate change scenario for the Philippines outlines projected trends in seasonal temperature increases, changes in rainfall patterns, and the expected frequency of extreme weather events. These projections include specific data for Batangas Province, where the proposed project site is located.

Projected changes in seasonal temperature, rainfall patterns, and the frequency of extreme weather events for the year 2050 based on a medium-range emission scenario are detailed for Region 4-A provinces in Table 7-16, Table 7-18, and Table 7-20, respectively.

Seasonal temperature increase

Climate projections for the period 2036–2065 indicate a rise in average daily ambient temperatures by 1.8°C to 2.2°C.

Table 7-16 Seasonal Temperature Increase (in oC) in 2050 under Medium-Range Emission Scenario in the Provinces in Region 4-A

PROVINCES	OBSERVED BASELINE (1971-2000)				CHANGE IN 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Region 4-A								
Batangas	**24.2**	**26.5**	**25.9**	**25.6**	**1.9**	**2.2**	**1.8**	**1.9**
Cavite	25.7	28.2	27.3	26.9	2.0	2.2	1.8	1.9
Laguna	25.0	27.5	27.5	26.7	1.8	2.1	1.9	1.9
Quezon	25.1	27.2	27.6	26.7	1.8	2.1	2.0	1.8
Rizal	25.4	27.9	27.6	26.8	1.9	2.1	1.8	1.9

In Batangas Province, predicted temperatures are expected to range between 26.1°C and 28.7°C, as shown in Table 7-17.

Table 7-17 Temperature Change Projection in 2050 for Batangas

	Quarter	Temperature increase (°C)	Temperature Projections (°C)
Observed baseline (1971-2000)	DJF	24.2	
	MAM	26.5	
	JJA	25.9	
	SON	25.6	
Change in 2050 (20362065)	DJF	1.9	26.1
	MAM	2.2	28.7
	JJA	1.8	27.7
	SON	1.9	27.5

Seasonal rainfall change

In contrast to the projected temperature rise, PAGASA forecasts variable changes in rainfall for the period 2036–2065. Rainfall may increase by up to 17.2% or decrease by as much as 23.1%, based on climate modeling under a medium-range emission scenario.

Table 7-18 Seasonal Rainfall Change (in %) in 2050 under Medium-Range Emission Scenario in the Provinces in Region 4-A

PROVINCES	OBSERVED BASELINE (1971-2000)				CHANGE IN 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON

Region 4-A								
PROVINCES	**OBSERVED BASELINE (1971-2000)**				**CHANGE IN 2050 (2036-2065)**			
	DJF	**MAM**	**JJA**	**SON**	**DJF**	**MAM**	**JJA**	**SON**
Batangas	**231.0**	**280.4**	**856.5**	**746.4**	**-11.1**	**-23.1**	**17.2**	**6.3**
Cavite	124.9	242.8	985.7	579.0	-19.1	-30.5	24.2	5.9
Laguna	629.2	386.8	845.0	1066.5	0.1	-34.8	6.8	0.4
Quezon	827.7	382.7	670.0	1229.3	6.6	-20.6	6.5	0.9
Rizal	262.4	241.5	1001.3	821.8	-11.5	-39.8	24.8	-0.8

The rainfall changes of the province of Batangas as shown in Table 7-19 shows the rainfall will range from 205.36mm to 1003.82mm for the period of 2036-2065.

Table 7-19 Rainfall changes projection in 2050 for Batangas

	Quarter	**Rainfall, %**	**Rainfall Projections (mm)**
Observed baseline (1971-2000)	DJF	231.0	
	MAM	280.4	
	JJA	856.5	
	SON	746.4	
Change in 2050 (2036 - 2065)	DJF	-11.1	205.36
	MAM	-23.1	215.63
	JJA	17.2	1003.82
	SON	6.3	793.42

Frequency of extreme events

Based on Table 7-20, climate projections for Batangas Province utilize data from PAGASA's nearest station in Ambulong. By 2050, the number of days with temperatures exceeding 35°C is expected to reach 8,016, while dry days are projected at 6,049. Additionally, the number of days with rainfall exceeding 200 mm is estimated at nine (9).

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Table 7-20 Frequency of extreme events in 2050 under medium – range emission scenario in the provinces in Region 4-A

Provinces	Stations	No. of Days w/Tmax > 35°C			No. of Dry Days			No. of Days w/ Rainfall > 200mm		
		(1971-2000)	2020	2050	OBS	2020	2050	OBS	2020	2050
Batangas	Ambulong	928	8010	8016	8226	6081	6049	6	14	9
Cavite	Sangley	630	1697	2733	7352	6635	6565	6	9	9
Quezon	Alabat	53	132	733	6629	7025	7042	20	58	70
	Tayabas	22	791	1434	6771	4717	4668	17	9	12
	Casiguran	575	1720	2768	6893	4520	4887	23	54	57
	Infanta	350	378	1112	5903	4006	4015	22	39	34

7.1.7.2 Contribution in Terms of Greenhouse Gas Emissions

Greenhouse gases (GHGs) are atmospheric gases that trap heat by preventing the escape of infrared radiation from the Earth's surface, thereby contributing to global warming. When present in excessive concentrations, GHGs intensify climate change effects—raising global temperatures, influencing storm and rainfall patterns, and increasing the risk of sea level rise and extreme weather events such as storm surges.

The primary GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and chlorofluorocarbons (CFCs). While these gases play a crucial role in maintaining a habitable climate, elevated levels—especially since the Industrial Revolution—have led to widespread climate disruptions. Among them, CO_2 is the most significant due to its high emission volume and long atmospheric lifespan.

Given the global nature of climate change, the most relevant reference for national GHG emissions is the inventory submitted by the Philippine Climate Change Commission to the UNFCCC in 2004, as presented in

Table 7-21.

Table 7-21 Philippine GHG Emissions in Gg (2000) Based on the latest submission by the Philippine Government to UNFCCC

Sector	CO_2, Gg	CH_4, Gg	N_2O, Gg	*CO_2eEmission, Gg
Energy	62,499.10	304.14	2.52	69,667.24
Industrial Processes	8,604.74	0.24	-	8,609.78
Agriculture	-	1,209.79	37.41	37,002.69
LUFC	(104,040.29)	(46.28)	(0.32)	(105,111.37)
Waste	-	500.67	3.50	11,599.07
Totals	(32,936.45)	1,968.56	43.11	21,767.41

*CH4 GW Potential – 21; N_2O GW Potential-310; * - CO_2 + (CH4*21) + (N_2O*310)

Quantification of potential emissions from the two project sites has been undertaken.

Climate change phenomenon as induced by GHG emissions needs to be reckoned from the global context. Thus, in assessing the local/site specific contribution in terms of greenhouse gases, the Philippine inventory should serve as the starting point/basis for an evaluation of a project. The Philippine GHG inventory based on the 2nd NFCC and on global inventory records are shown below.

Notwithstanding the micro contribution of the project to GHG emissions, the Company will undertake the following initiatives to help mitigate global climate change, while at the same time providing cobenefits to the project:

Greenhouse gases come from all sorts of everyday activities, such as using electricity, heating our homes, and driving around town. The principal forcing greenhouse gases are; 1) Carbon Dioxide (CO_2), 2) Methane (CH_4), 3) Nitrous Oxide (N_2O) and 4) Fluorinated Gases. The principal greenhouse gases that enter the atmosphere because of human activities are emitted into the atmosphere by the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). This is removed from the atmosphere (or ―sequesteredǁ) when absorbed by plants as part of the biological carbon cycle.

7.1.8 Air Quality and Noise

Ambient air quality and noise level monitoring were conducted on August 2, 2025 by Berkman Systems Inc. to establish baseline environmental conditions within the project area. The assessment established four (4) sampling stations and was undertaken in accordance with the provisions of Department Administrative Order (DAO) 2000-81, the Implementing Rules and Regulations (IRR) of Republic Act 8749 or the Philippine Clean Air Act of 1999. Sampling methodologies and analytical procedures adhered to the standards prescribed under the United States Environmental Protection Agency (USEPA) 40 CFR Part 50, specifically Appendices A and M, as well as the EMB Air Pollution Monitoring Manual (1994).

Measured ambient air quality parameters included Total Suspended Particulates (TSP), Particulate Matter less than 10 microns (PM_{10}), Sulfur Oxides (SO_x), and Nitrogen Oxides (NO_x), each evaluated using a one-hour averaging time. Results were compared against the National Ambient Air Quality Guideline Values (NAAQGV) set by the Department of Environment and Natural Resources (DENR).

In addition, the monitoring results were also benchmarked against the World Bank Group Environmental, Health, and Safety (EHS) Guidelines as an international reference for Good International Industry Practice (GIIP). Where differences exist between national standards and the World Bank EHS Guidelines, the more stringent value was used for comparative assessment of ambient environmental quality.

Concurrently, noise level monitoring was conducted over a ten-minute daytime sampling period. Recorded noise levels were assessed against the applicable standards for Class C areas, consistent with the site's proximity to a light industrial zone, and were also benchmarked against the World Bank Group EHS Noise Guidelines for industrial and mixed-use settings.

7.1.8.1 Ambient Air Quality

Results of Ambient Air Sampling, August 2, 2025

Table 7-22 1-Hour Ambient Air Quality Monitoring Results

Station	Location	Time of Sampling (August 2, 2025)	TSP (ug/Ncm)	PM10, ug/Ncm	SO_2, ug/Ncm	NO_2, ug/Ncm
A1	Near Main Gate of Global Marine	1340 H -1440 H	45.3	36.6	<3.6	2.9
A2	Near Main Gate	1000 H – 1100 H	<1.7	<1.7	<3.6	5.1
A3	Near San Roque Covered Court	1500 H – 1600 H	90.6	34.8	<3.6	3.0
A4	BIPI Area Near Tower	1130 H – 1230 H	<1.7	<1.7	8.9	1.3

DENR National Ambient Air Quality Standards for Source Specific Air Pollutants based on 60 minutes averaging time	**300**	**200**	**340**	**260**

Note: For the non-detect values, the detection limit in µg was divided by the total normal volume of air sampled

Based on the results of ambient air quality monitoring conducted at designated sampling stations, the concentrations of particulate matter, specifically PM_{10} and TSP, were found to be within the allowable limits of 200 µg/Ncm and 300 µg/Ncm, respectively, based on a one-hour averaging period. Similarly, gaseous pollutants such as sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) were recorded within the prescribed limits set by the DENR, which are 340 µg/Ncm for SO_2 and 260 µg/Ncm for NO_2, also based on a one-hour averaging time.

For international benchmarking, the measured concentrations were also compared with the World Bank Group EHS Guidelines, which reference World Health Organization (WHO) guideline values for ambient air quality. The observed concentrations of SO_2 and NO_2 were substantially lower than the corresponding short-term guideline values, while PM_{10} concentrations were also well below applicable WHO interim target levels. These results indicate that baseline ambient air quality conditions within the project area are consistent with both national standards and internationally recognized guidelines.

The minimal concentrations of PM_{10} and TSP observed across all stations are attributed primarily to naturally occurring background levels of suspended particulates, as well as localized vehicular activity. For SO_2 and NO_2, the low-level detections are likely associated with emissions from vehicle combustion and the operation of fuel-burning equipment within the vicinity.

Detailed laboratory results and analytical data for the ambient air quality sampling are presented in Annex 6-B.

7.1.8.2 Ambient Noise Quality

Ambient noise standards applicable to the project area are governed by the National Pollution Control Commission (NPCC) Memorandum Circular No. 002, Series of 1980, specifically Section 78 – Ambient (Noise) Quality and Emission Standards for Noise. This regulation prescribes the maximum allowable noise levels in various general areas, with limits differentiated according to land use classification (e.g., residential, commercial, industrial) and time of day (daytime and nighttime periods).

Based on the land use characteristics of the project site, which is situated adjacent to a light industrial zone, the applicable noise classification is identified as Class C.

Table 7-23 Environmental Quality Standards for Noise in General Areas, NPCC 1978

Category	Maximum Allowable Noise (dBA) by Time Periods		
	Daytime	Morning/Evening	Night time
AA	50	45	40
A	55	50	45
B	65	60	55
C	70	65	60
D	75	70	65

Table 7-24 presents the measured ambient noise levels in comparison with the applicable classification under the Philippine Ambient Noise Standards prescribed by the DENR. Based on the land use characteristics of the project site, which is situated adjacent to a light industrial zone, the applicable noise classification is identified as Class C.

Table 7-24 Ambient Noise Level Monitoring Results

Station	Location	Time of Sampling (August 2, 2025)	Noise Level* (dBA)
N1	Near Main Gate of Global Marine	1440H-1450H	49
N2	Near Main Gate	1100H-1110H	54.9
N3	Near San Roque Covered Court	1600H-1610H	49.4
N4	BIPI Area Near Tower	1230H-1240H	48.9
The applicable NPCC standard (for Class C areas - a section which is primarily reserved as a light industrial area) for daytime measurement			70

** Median of seven highest recorded noise levels (NPCC, 1978).*

The measured ambient noise levels at the monitoring stations were significantly lower than the allowable limits prescribed under the Philippine Ambient Noise Standards for Class C areas, which correspond to light industrial zones during the daytime period. For international reference, the recorded values were also well below the World Bank Group EHS recommended daytime noise limit of 70 dBA for industrial and commercial areas.

As detailed in Table 7-25, the recorded noise levels primarily originated from intermittent and low-intensity sources typical of an operational port environment.

These findings indicate that the existing acoustic environment remains within acceptable national and international guideline thresholds and is not currently subject to elevated noise pollution.

Table 7-25 Observed Sources of Noise

Location	Station	Sources of Noise
Near Main Gate of Global Marine	N1	Intermittent passing of vehicles
Near Main Gate	N2	Intermittent passing of vehicles
Near San Roque Covered Court	N3	Intermittent passing of vehicles and conversing people
BIPI Area Near Tower	N4	Chirping birds

Ambient noise monitoring is presented in Annex 6-B.

7.2 Biological Environment (Biodiversity Baseline)

This section presents the baseline characterization of terrestrial, freshwater, and marine biodiversity within the Project's Area of Influence, based on site-specific field surveys, rapid ecological appraisal, habitat mapping, and consultations with local informants. The purpose of the biodiversity baseline is to document existing ecological conditions within the Project footprint and immediate adjacent areas, establish the ecological sensitivity of habitats likely to be directly affected, and provide a defensible reference point for impact assessment and mitigation design.

The biodiversity baseline focuses on species and habitats observed or reasonably expected to occur within the Project area, given prevailing land use, habitat condition, and ecological connectivity. As the Project Site is a heavily engineered, coastal–industrial environment, baseline surveys emphasize habitat condition, species assemblage composition, and functional ecological value, rather than exhaustive inventories of regional biodiversity.

All flora and fauna species recorded within the terrestrial, freshwater, and marine baseline surveys are classified as Least Concern (LC), Not Evaluated (NE), or Not Assessed (NA) under the IUCN Red List. No Critically Endangered (CR) or Endangered (EN) species were recorded during site surveys within the terrestrial or freshwater baseline footprint, and no natural terrestrial habitats (e.g., lowland forest, mangroves, or intact riparian corridors) were identified within the fenced operational area. Species recorded during

baseline assessments are predominantly common, disturbance-tolerant, synanthropic, or invasive taxa typical of modified coastal and urban environments.

Potential presence of globally threatened species (CR/EN) and Critical Habitat triggers, beyond those detectable through field surveys, were assessed separately through desktop screening using the Integrated Biodiversity Assessment Tool (IBAT), complemented by national threatened-species listings and spatial datasets. This approach ensures that wide-ranging, cryptic, migratory, or offshore species that may not be observed during site surveys are nonetheless considered in the overall biodiversity risk assessment.

7.2.1 Terrestrial Ecology

Existing Conditions Terrestrial Flora

Plant cover is a mosaic of ornamental landscaping, ruderal weeds, and shade or boundary trees tolerant of salt spray and disturbance.

Common trees and large ornamentals typically include coconut (Cocos nucifera), Indian almond (*Terminalia catappa*) along seaward edges, acacia/samantree (*Samanea saman*), neem (*Azadirachta indica*), and planted fruit trees such as mango (*Mangifera indica*).

Shrubs and hedges are usually composed of hardy ornamentals like bougainvillea (*Bougainvillea spp.*) and hibiscus (*Hibiscus rosa-sinensis*).

Groundcover is dominated by lawn and verge grasses such as carabao grass (*Axonopus compressus*), Bermuda grass (*Cynodon dactylon*), and paspalum (*Paspalum conjugatum*), with sedges (*Cyperus spp.*). recurring near drains and low pockets.

Typical ruderal or invasive species in disturbed corners include ipil-ipil (Leucaena leucocephala), hagonoy/Siam weed (*Chromolaena odorata*), and lantana (*Lantana camara*).

Within the operational footprint there are no mangrove stands or remnant forest patches; any woody vegetation is planted or spontaneously established in fill and verge soils. Based on habitat conditions and prevailing species, the assemblage is composed of common, nonthreatened taxa widely distributed in lowland-built environments of Luzon.

Should any planted or spontaneous species be screened for legal protection, the applicable reference lists are the Updated National List of Threatened Philippine Plants (DENR Administrative Order 2017-11) and, for any associated fauna, the Updated National List of Threatened Philippine Fauna (DENR Administrative Order 2019-09).

Terrestrial Fauna

Wildlife within the port is characteristic of synanthropic, disturbance-tolerant species that exploit edges, buildings, lighting, and small trees.

The most regularly encountered birds are Eurasian tree sparrow (*Passer montanus*), rock pigeon (*Columba livia*), yellow-vented bulbul (*Pycnonotus goiavier*), common myna (*Acridotheres tristis*), Pacific swallow (*Hirundo tahitica*), and barn swallow during the migratory season (*Hirundo rustica*). Waders such as little egret (*Egretta garzetta*) and night heron (*Nycticorax nycticorax*) may forage along quay edges and drainage outfalls, while pied fantail (*Rhipidura nigritorquis*) and olive-backed sunbird (*Cinnyris jugularis*) occur in landscaped pockets.

Small mammals are limited to commensal rodents (*Rattus spp., Mus musculus*), the Asian house shrew *(Suncus murinus*), and occasional fruit bats such as the lesser short-nosed fruit bat (*Cynopterus brachyotis*) roosting in shade trees.

Reptiles and amphibians are represented by house geckos (Hemidactylus frenatus), sun skinks (*Eutropis spp.*), and the Asian common toad (*Duttaphrynus melanostictus*), with occurrence tied to shelter within structures, riprap, or vegetated verges.

Given the absence of natural lowland forest and the predominance of paved surfaces, the likelihood of legally protected or range-restricted terrestrial vertebrates establishing resident populations within the operational footprint is low.

Any incidental records would be expected to involve wide-ranging or adaptable species. For status screening of any observed wildlife, the current legal references remain DENR Administrative Order 201909 for fauna and DENR Administrative Order 2017-11 for plants.

In summary, the site's terrestrial ecology reflects a heavily engineered, coastal-industrial setting: plant communities are ornamental and ruderal; fauna is synanthropic and edge-tolerant; and natural terrestrial habitats are absent within the core footprint, with ecological linkages occurring primarily along the shoreline and drainage verges.

7.2.1.1 Local species

The operational footprint is a highly modified, built-up port zone where vegetation is confined to landscaping pockets, verges, and drainage setbacks. Rapid appraisal confirmed that terrestrial flora are dominantly ornamental and ruderal species, while fauna is synanthropic and disturbance-tolerant birds, commensal small mammals, house geckos, skinks, and common toads.

No remnant terrestrial communities or mangrove stands occur inside the fenced area. Against the national threatened-species lists for plants and fauna, the likelihood of resident, legally protected terrestrial species within the core footprint is low, and the project is not expected to pose a population-level threat to important local terrestrial species.

During construction, the main pathways of impact are localized vegetation clearance, trimming or removal of individual shade trees that may host incidental nests or roosts, temporary noise and lighting that can displace edge-foraging birds and bats, and increased human activity that may disturb occasional waders along quay edges and drainage outfalls. These effects are site-bounded, short-term, and reversible when standard controls are applied. Where individual trees are removed, the effect is a small loss of microhabitat rather than a loss of any restricted plant population; with replacement planting and timing of works to avoid active nesting, residual impacts are negligible. Dust and accidental spills can temporarily depress insect prey or foul small, vegetated strips, but good housekeeping, spill prevention, and stormwater controls keep risk low.

At the land–sea interface, occasional use of hardened edges by egrets, herons, and transient shorebirds is expected. Their use is opportunistic and tied to foraging at drains and quay edges; with disciplined lighting, noise management near sensitive edges, and rapid spill response, the project is unlikely to measurably affect these wide-ranging species at the local population level. The Verde Island Passage conservation context is primarily marine; within the fenced port's terrestrial footprint there is no evidence of high-value terrestrial habitats whose loss would threaten important local species.

7.2.1.2 Wildlife Access

The Project Site is already a fenced, paved, and brightly lit industrial platform, so baseline permeability for terrestrial wildlife is low. Vegetation occurs as narrow verges and landscaping pockets that function only as short, discontinuous micro-corridors. In this context, the project's incremental works marginally add to existing barriers rather than create new, landscape-scale obstructions.

During construction, temporary fencing, stockpiles, and equipment staging further restrict movement of small mammals, reptiles, and amphibians within verges and along drainage lines, while intermittent noise and lighting deter edge-foraging birds from using quay margins and outfalls. These effects are confined to work zones and subside once staging areas are cleared.

In operations, expanded hardstand, continuous perimeter fencing, and high night-time illumination maintain a low-permeability setting for ground-dwelling fauna. Quay walls and riprap limit land–sea transitions for semi-terrestrial species, and curbs or grated drains can trap or deflect small animals. Birds remain the least constrained due to flight, but some light-sensitive species use edges less frequently under high illuminance.

Feasible measures keep residual hindrance low. Maintaining connected strips of verge vegetation and staggered shade trees preserves short micro-corridors without compromising security. Downward-shielded, task-focused lighting and dimming outside peak activity reduce deterrence while maintaining safety. Wildlife-

friendly drain gratings and simple escape ramps in larger culverts prevent entrapment. Good housekeeping and waste controls avoid attracting commensal pests that displace native edge species.

Where workable along the hardened shoreline, small “softened” pockets in riprap or planting benches above splash zone provide perches and brief refuge for birds without impeding port functions.

Given the highly modified baseline and the dominance of synanthropic species, the project’s contribution to hindrance of wildlife access is minor, localized, and manageable through the measures above, with no expected effect on broader terrestrial connectivity beyond the port footprint.

7.2.1.3 Summary of Terrestrial Species and IUCN Status

The terrestrial flora recorded (Table 32) within the Project footprint is dominated by widely cultivated, ornamental, and disturbance-tolerant species typical of coastal, urban, and industrial environments. Tree cover consists mainly of planted or naturalized species such as coconut (Cocos nucifera), Indian almond (Terminalia catappa), acacia/samantree (Samanea saman), neem (Azadirachta indica), and mango (Mangifera indica), while shrubs, hedges, and groundcover are composed of common ornamentals and turf grasses (Bougainvillea spp., Hibiscus rosa-sinensis, Axonopus compressus, Cynodon dactylon, Paspalum conjugatum), with sedges (Cyperus spp.) in wetter pockets. Invasive ruderal species including Leucaena leucocephala, Chromolaena odorata, and Lantana camara occur in disturbed margins. All species are classified as Least Concern (LC), Not Evaluated (NE), or Not Assessed (NA) under the IUCN Red List, with no endemic, threatened, or legally protected plant species identified.

Table 26. Summary of Terrestrial Flora Species

Species	Common Name	IUCN Status	Notes
Cocos nucifera	Coconut	NE	Widely cultivated
Terminalia catappa	Indian almond / Talisay	LC	Common coastal species
Samanea saman	Acacia / Samantree	LC	Introduced ornamental
Azadirachta indica	Neem	LC	Introduced, medicinal
Mangifera indica	Mango	LC	Cultivated fruit tree
Bougainvillea spp.	Bougainvillea	NE	Ornamental
Hibiscus rosa-sinensis	Hibiscus	NE	Ornamental
Axonopus compressus	Carabao grass	NE	Common turf grass
Cynodon dactylon	Bermuda grass	LC	Disturbance-tolerant
Paspalum conjugatum	Paspalum	LC	Common ruderal
Cyperus spp.	Sedges	NE	Common wetland plants
Leucaena leucocephala	Ipil-ipil	LC	Invasive
Chromolaena odorata	Hagonoy / Siam weed	LC	Invasive
Lantana camara	Lantana	LC	Invasive

The terrestrial fauna recorded (Table 33) within the Project footprint is dominated by common, synanthropic, and disturbance-tolerant bird species typically associated with urbanized and coastal-industrial environments. Avifauna observed includes Eurasian tree sparrow (Passer montanus), rock pigeon (Columba livia), yellow-vented bulbul (Pycnonotus goiavier), common myna (Acridotheres tristis), Pacific swallow (Hirundo tahitica), and migratory barn swallow (Hirundo rustica), along with wide-ranging water-associated species such as little egret (Egretta garzetta) and black-crowned night heron (Nycticorax nycticorax). These species are adaptable generalists that exploit built structures, landscaped areas, and shoreline edges. All recorded avifauna are classified as Least Concern (LC) under the IUCN Red List, with no endemic, threatened, or legally protected terrestrial fauna identified.

Table 27. Summary of Terrestrial Fauna Species

Species	Common Name	IUCN Status	Notes
Passer montanus	Eurasian tree sparrow	LC	Synanthropic
Columba livia	Rock pigeon	LC	Introduced
Pycnonotus goiavier	Yellow-vented bulbul	LC	Common
Acridotheres tristis	Common myna	LC	Invasive
Hirundo tahitica	Pacific swallow	LC	Common
Hirundo rustica	Barn swallow	LC	Migratory
Egretta garzetta	Little egret	LC	Wide-ranging
Nycticorax nycticorax	Black-crowned night heron	LC	Wide-ranging
Rhipidura nigritorquis	Pied fantail	LC	Common
Cinnyris jugularis	Olive-backed sunbird	LC	Common

Other terrestrial fauna recorded within the Project footprint consist of common, disturbance-tolerant mammals, reptiles, and amphibians typically associated with built-up and industrial environments. Mammals are limited to commensal species such as rats (Rattus spp.), house mouse (Mus musculus), Asian house shrew (Suncus murinus), and the lesser short-nosed fruit bat (Cynopterus brachyotis), which utilize buildings and scattered trees for foraging or roosting. Reptiles and amphibians recorded include common house gecko (Hemidactylus frenatus), sun skinks (Eutropis spp.), and Asian common toad (Duttaphrynus melanostictus), all of which are highly adaptable and tolerant of human disturbance. All species are classified as Least Concern (LC) under the IUCN Red List, with no endemic, threatened, or legally protected species identified.

Table 28. Summary of Terrestrial Mammals, Reptiles, and Amphibians

Species	Common Name	IUCN Status	Notes
Mammals			
Rattus spp.	Rats	LC	Commensal
Mus musculus	House mouse	LC	Introduced
Suncus murinus	Asian house shrew	LC	Disturbance-tolerant

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Species	Common Name	IUCN Status	Notes
Cynopterus brachyotis	Lesser short-nosed fruit bat	LC	Common bat species
Reptiles and Amphibians			
Hemidactylus frenatus	Common house gecko	LC	Synanthropic
Eutropis spp.	Sun skinks	LC (genus-level)	Common
Duttaphrynus melanostictus	Asian common toad	LC	Disturbance-tolerant

7.2.2 Freshwater Ecology

7.2.2.1 Scope of Baseline Assessment of Freshwater Ecology

The Baliti River (Tabok River) is a short, low-gradient freshwater system draining the coastal barangays of San Andres Uno/San Andres and San Roque in the Municipality of Bauan, Batangas. Its headwaters originate from the upland areas of Rizal, Durungao, and Inicbulan before converging into a single channel that meanders for approximately 1.5 kilometers, extending from the estuary at Balete (San Andres) Bridge to the San Roque Bridge.

Upstream sections are relatively narrow and shallow, with survey depths recorded at 0.2 meters along the margins, while downstream reaches gradually transition into a tide-influenced estuary where sand and silt bars become exposed near the river mouth. The channel is modest in width and often constricted by sediment deposition, with its morphology strongly shaped by tidal fluctuations and seasonal flow patterns.

Riparian vegetation along the banks provides localized shading and leaf-litter inputs, though canopy influence diminishes in wider estuarine sections. During low discharge periods, tidal backflow reduces freshwater flushing, allowing fine sediments to accumulate and creating highly turbid conditions that suppress benthic productivity. These hydrological and ecological constraints limit the presence of macro-benthic communities and reduce opportunities for capture fishing. Locally, the water body is referred to as the *San Andres River*; however, for consistency, this report uses the formal name Baliti River (Tabok River), with the local designation noted parenthetically when first introduced.

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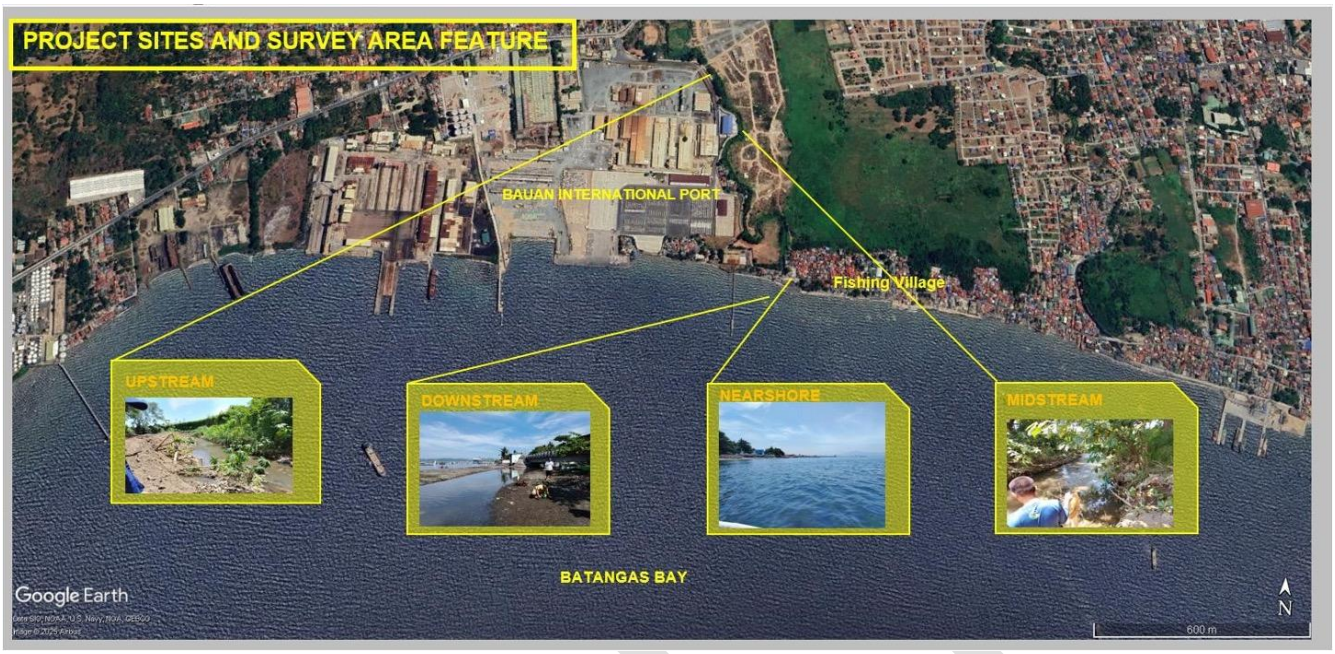


Source: Google Earth

Figure 7-49 Features of Baliti River (Tabok River) and Project Sites

7.2.2.2 Freshwater ecology survey

Freshwater ecology surveys were conducted in the Baliti River (Tabok River) from August 2 to 3, 2025, covering upstream, midstream, and estuarine stations along a stretch of 1.5 kilometers of the river system, from San Roque Bridge to San Andres Bridge. The objective of the aquatic ecology baseline study is to determine the presence and species distribution of important aquatic biota, plankton community structure, macro-invertebrates, and fisheries resources and practices that may be susceptible to anthropogenic pressures associated with the proposed cargo port development and related disturbances. Basic river attributes were also recorded at each sampling station.

Three freshwater stations were established to investigate the plankton community together with the occurrence of fish and macro-invertebrates. Two stations were located in the upstream and midstream sections, while the third was situated in the estuary zone where tidal influence and sediment deposition are most evident. Water depths in the sampling stations ranged from 30 centimeters to 1 meter, measured at shallow margins and deeper channel sections during the survey. The deepest part of the river was observed only near the river mouth, where tidal backflow creates a wider and deeper channel.

This section is locally used by community members as a bathing and swimming area, which was directly observed during the survey. It is important to note that the survey stations were confined only to the vicinity of the proposed cargo port area and do not represent the entire length of the Baliti River (Tabok River). In addition to freshwater stations, a marine habitat assessment was carried out in the coastal waters fronting the Baliti River (Tabok River).

The primary goal is to document the current state of fish biota, plankton, macro-invertebrates, and associated aquatic and marine resources in the project's primary impact areas, such that future monitoring can identify changes attributable to project activities. By generating baseline ecological profiles with consistent survey protocols, susceptible endpoints and critical habitats can be characterized in their present condition, and potential stressor pathways can be anticipated. Ultimately, this baseline will serve as the foundation for developing appropriate mitigation and management measures to reduce long-term impacts on aquatic ecosystems.

The Baliti River (Tabok River) itself is a narrow, low-gradient system where only limited portions of the channel carry continuous flow. Upstream and midstream stretches are shallow, generally ranging from 30 centimeters to 1 meter, with substrates consisting of fine silt, sand, and scattered pebbles. Much of the channel is

constricted by sediment accretions and exposed sandbars, some colonized by grass and shrubs, while tidal backflow in the estuarine reach further slows freshwater discharge and enhances turbidity. The deepest section of the river occurs at the estuary, but even here suspended sediments reduce light penetration and may suppress benthic productivity. Riparian vegetation is sparse, dominated by shrubs and grasses with very few trees, providing minimal shading or leaf-litter input.

Field observations confirmed that portions of the riverbanks are prone to erosion, and that household waste and urban waste have contributed to deteriorating water quality. Such inputs increase organic loading and turbidity, which in turn affect the abundance and diversity of plankton and benthic macroinvertebrates. The river is not used for fish culture or clam culture, and fisheries practices are minimal. Fishing during the survey was not possible due to very low depths and limited aquatic fauna. These combined conditions underscore the ecological vulnerability of the Baliti River (Tabok River) and adjacent coastal waters, highlighting the need for a sound baseline against which to gauge potential project impacts.

There is no mangrove species found along the river and its estuary. The estuary is constricted by a wide sandbar at the mouth, and sand accretions and deposits elsewhere have rendered portions of the river shallow. There are no mangroves and significant vegetation in the estuary banks. A few houses have been erected along the river mouth, contributing to localized domestic waste inputs. No fishing activity was observed in the river mouth during the survey; the only use of this section is the docking of boats along the accreted sand. These combined conditions underscore the ecological vulnerability of the Baliti River (Tabok River) and adjacent coastal waters, highlighting the need for a sound baseline against which to gauge potential project impacts.

7.2.2.3 Sampling Methodology

Fish Biota

Documentation of freshwater and estuarine fish species was carried out through a transect walk along the river, focusing on shallow pools and clear sections where fish swimming in the channel could be observed. No actual fishing was undertaken in the river itself, as there are no records of fishing activities and the channel is consistently shallow, to the extent that it may be considered more of a creek than a river. Experimental fishing was likewise not conducted because of the absence of commonly used fishing gear suited for river conditions. Transect swims for fish identification were not feasible due to the very limited depth, and observations were restricted only to pools where visibility allowed. Additional information on fish species present in the river system was obtained through key informant interviews with Barangay officials and survey guides. Two stations were formally assessed for freshwater fish biota, and coordinate is shown in Table 7-29, while the locations of the observation stations are shown in **Error! Reference source not found.**.

No fishing operations were sighted during the survey, consistent with community reports that there is no fishing activity along the river. Fish species documentation was limited to two sampling stations selected from several random observation sites.

Table 7-29 Coordinates of Fish Biota Observation Stations Investigated in Baliti River (Tabok River); 02-03 August 2025

WP Code	LATITUDE	LONGITUDE	Depth (m)	Location
RvrFishTW1	N 13.7828569°	E 120.9948096°	0.60	River mouth near estuary
RvrFishTW2	N 13.7871039°	E 120.685446°	0.10	midstream of Baliti River (Tabok River) about 500m downstream to San Andres bridge

Marco-invertebrates

Sampling of macro-invertebrates in the river was conducted at three stations through gleaning, involving the manual collection of specimens along shallow margins, sandbars, and exposed substrates. The method targeted benthic organisms such as snails, small crabs, bivalves, and other macro-invertebrates typically found in accessible areas of the river. The coordinates of the sampling stations are provided in Table 7-30.

Table 7-30 Coordinates of Macro-Invertebrates Observation Stations; 02-03 August 2025

WP Code	LATITUDE	LONGITUDE	Remarks
MAC1	N 13.7895963°	E 120.9920220°	Located about 800m from the estuary sandbar. Only *Stenomelania funiculus* (river Thiarid) were sighted, identified, and returned to its source
MAC2	N 13.7874330°	E 120.9933704°	Located 500m upstream from San Andres bridge. Various macro-invertebrates such as *Varuna litterata* (Perigrine crab), *Nerith spp.*, and *Stenomelania funiculus* (river Thiarid) were sighted. All were identified and returned to its source
MAC3	N 13.7825460°	E 120.9949378°	Located at the river mouth near the estuary sandbar.

Source: Google Earth

Figure 7-50 Location of Freshwater Macro-Invertebrates Survey Stations in Baliti River (Tabok River)

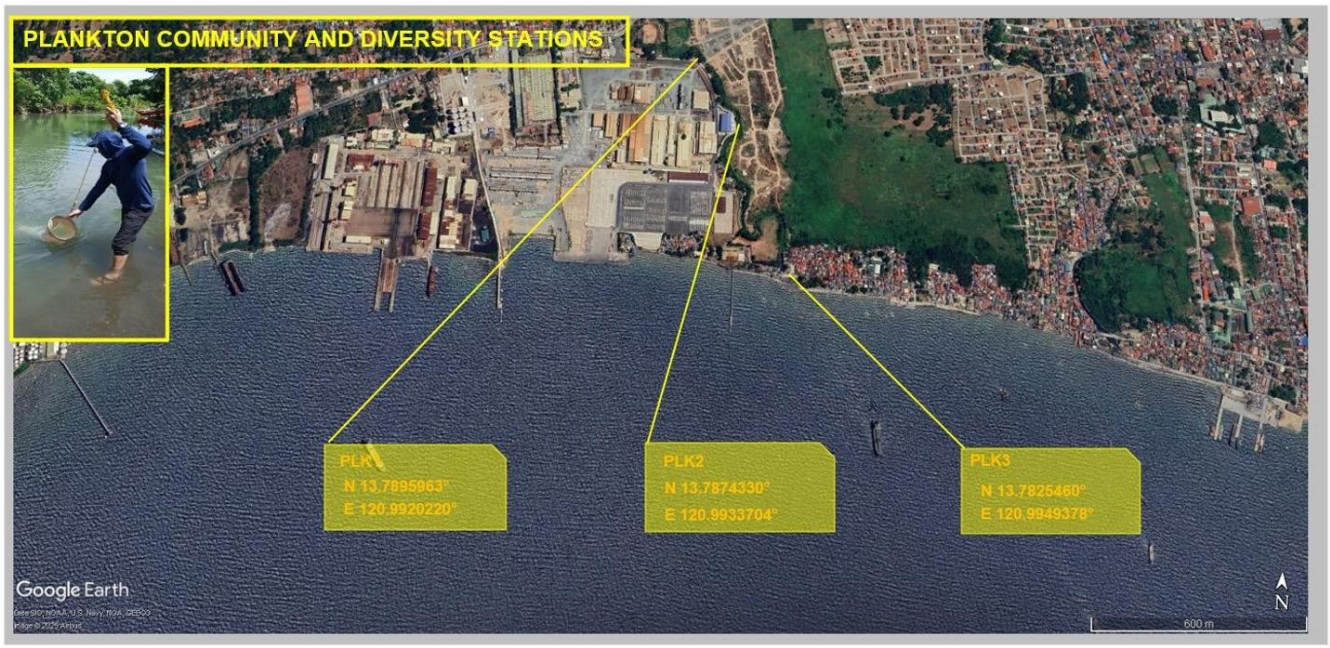
Plankton Community

Plankton community structure was assessed from water samples collected in the same upstream, midstream, and downstream stations used for macro-invertebrate investigations which are listed in Table 7-31 and shown in a map in Figure 7-51. Composition, abundance, and density of phytoplankton communities were determined using standard methodologies, including the Shannon– Wiener Diversity and Evenness Indices and other bio-assessment metrics. Quantitative and qualitative analyses were based on composite samples prepared by filtering ten 1-liter water samples per station. Phytoplankton samples were preserved with Lugol's solution, while zooplankton samples were fixed with 10% buffered formalin, before being brought to the BFAR–National Fisheries Laboratory Division (NFLD) for counting and identification. Enumeration was performed using a Sedgwick–Rafter plate: phytoplankton were identified to the lowest possible taxonomic level (usually genera) under a compound light microscope, while zooplankton was identified to major groups using a dissecting microscope and available references. Densities of phytoplankton and zooplankton are expressed as the number of cells or organisms per liter.

Table 7-31 Coordinates of Plankton Community Sampling Stations in Baliti River (Tabok River)

WP Code	LATITUDE	LONGITUDE	Remarks

PLK1	13.7895963°	120.9920220°	Located 800m upstream from San Andres bridge.
PLK2	13.7874330°	120.9933704°	Located about 500m from the estuary sandbar.
PLK3	13.7825460°	120.9949378°	Located at the river mouth near the estuary sandbar.



Source: Google Earth

Figure 7-51 Location of Sampling Stations for Plankton Community Diversity

7.2.2.4 Result of Baseline Freshwater Ecology

Freshwater Aquatic Biota

Fish biota was documented in River Fish Biota Stations 1 and 2, as shown in **Error! Reference source not found.**. Observations were carried out through transect walks along shallow sections of the river and supplemented by interviews with local key informants. The only fish species directly observed during the survey was Blackchin tilapia (*Sarotherodon melanotheron*), a highly invasive species, concentrated mostly in the downstream portion where the river is deepest. No fish were observed in the midstream section, where the river is extremely shallow.

Local respondents reported that snakehead (*Channa striata*), mullets (*Mugilidae*), and therapon (*Theraponidae*) had occasionally been observed in the downstream portion, but these were not recorded during the survey. Barangay officials also confirmed that there is no record of regular fishing in the Baliti River (Tabok River), as its shallow condition does not provide viable habitat for fishing operations. Most fishers in the community conduct their fishing activities in the nearshore marine area, while the river itself is primarily used as a docking and sheltering area for their boats.

The scarcity of fish specimens signifies a poor fisheries profile in the Baliti River (Tabok River). It is presumed that the consistently limited depth of the river restricts the range of fish species and limits their capacity to reproduce effectively, leaving the fish community dominated by invasive tilapia.

The presence of Blackchin tilapia as the only observed fish species may also serve as an indicator of the river's ecological condition. This invasive species is known to thrive in disturbed, shallow, and low quality habitats where native species are unable to compete. Its dominance in the Baliti River (Tabok River) suggests a degraded aquatic environment with limited ecological resilience, underscoring the vulnerability of the river to further environmental stressors.

Macro-invertebrates

Macro-invertebrates are widely recognized as indicators of ecosystem health because they vary in their tolerance to pollution. Group 1 (sensitive) organisms cannot survive in polluted conditions, and their presence indicates good water quality. Group 2 (facultative) organisms can tolerate a broader range of conditions compared to sensitive species. Group 3 (tolerant) organisms thrive even in polluted environments, often dominating under poor water quality but also occurring in fair or good conditions. In this survey, most of the macro-invertebrates recorded fell into Groups 1 and 2.

Benthic macrobenthos utilize different habitats within the river system. They may be found on mud, sand, pebbles, or stones, where they graze on diatoms and filamentous algae. Some species in tidally influenced areas are able to withstand periods of air exposure. Certain species are nocturnal, burrowing into sediment during the day to avoid predators. Neritids typically attach to firm substrates such as submerged branches, bivalves burrow into sand and mud, while other gastropods occupy the upper layer of the riverbed. Many species occur in the main channel of slow-flowing streams, in inundated riverbanks with sandy embankments and accretions, or in shallow pools, while others are adapted to more stagnant habitats such as small pools and marshes.

Macro-invertebrates were collected at the same stations as plankton samples, using core sampling techniques and supplemented by direct observations along the riverbanks and estuary. Identification of species with food or trade value was aided by specimen collection with the assistance of two local fishers. However, it was noted that there are no fisherfolk engaged in gleaning or shell collection in the river, as no economically important species were observed that would make gathering worthwhile. This absence of valuable macro-invertebrate resources is consistent with the poor fisheries profile already noted for the Baliti River (Tabok River), where limited depth and habitat conditions restrict both fish and invertebrate populations.

A total of 30 macro-invertebrate specimens representing four species were collected from the sampling stations. All specimens were gastropods, dominated by thiarid species. No macroinvertebrate of high commercial or trade value was observed.

The list of macro-invertebrates is presented in Table 7-32, with selected species shown in Figure 7-52.

Table 7-29 Macro-invertebrates Catalogued in Baliti River (Tabok River)

Table 7-32 Macro-invertebrates Catalogued in Baliti River (Tabok River)

Species Name	Common Name	Habitat	Group
Neritina sp	Freshwater nerith	Sandy-muddy riverside	Gastropod
Stenomelania funiculus	River thiarid	Sandy riverbeds	Gastropod

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Figure 7-52 Photographs of the macro-invertebrate survey in the Baliti River (Tabok River): upper- collection in-situ; lower left – the dominant thiarid species Stenomelania funiculus; and lower right – nerith.

Thiarids are ovoviviparous, while nerites are herbivorous gastropods that primarily graze on microalgae. The Thiaridae family typically inhabits freshwater systems and intertidal flats, with many species regarded as invasive due to their prolific reproduction. Both thiarids and nerites play important ecological roles as primary herbivores, bioturbators, and as prey for certain aquatic predators. Their shells are generally simple in appearance, often dark brown to black.

In terms of conservation status, both groups are categorized as “Least Concern” under the IUCN Red List, meaning no immediate conservation measures are required. Ecologically, they are highly adaptable and resilient, occurring in rivers, tidal areas, and lakes, as well as in various human modified habitats such as pools and canals. However, the dominance of thiarids in particular is often associated with disturbed or altered ecosystems, as these species tend to thrive under stressed or degraded environmental conditions.

River Fisheries

No fishing operations were observed in the Baliti River (Tabok River), and Barangay officials reported that the river is not used for fisheries due to its consistently shallow condition, which in many portions resembles a creek rather than a river. Most fish observed in the area were Blackchin tilapia (*Sarotherodon melanotheron*), a highly invasive species that thrives in disturbed and low-quality freshwater habitats. Information on aquatic species present was obtained primarily through transect walks along shallow sections of the river and through community reports, rather than from direct fishing operations

Mangroves

No mangroves were recorded in any portion of the river during the freshwater ecology baseline assessment. Instead, the riverbanks are lined with banana trees, papaya trees, cassava plants, shrubs, and kans grass,

while at the river mouth, Talisay trees were observed. The estuary, being constricted, is bordered mainly by sandy embankments with no vegetation Figure 7-53

Figure 7-53 Shrubs vegetation located at the upstream area of the river with ongoing filing of soil for flood(right) and downstream area.

Plankton

Planktons are free-drifting organisms generally concentrated in the upper layers of the water column and form a fundamental base of aquatic food webs. They are broadly categorized into phytoplankton, the microscopic plant-like organisms that carry out photosynthesis, and zooplankton, the small animal plankton that graze on phytoplankton and in turn serve as prey for higher trophic levels. The abundance of phytoplankton is often closely linked to nutrient availability, making them an important indicator of water quality and ecological conditions. Planktons are not usually abundant in fast-moving lotic environments; therefore, sampling stations were established in areas with relatively slower current. Ecological changes in a river system often result in shifts in both plankton communities and benthic fauna. In the Baliti River (Tabok River), plankton diversity was observed to be low to moderate, reflecting the limited depth and generally shallow conditions of the river system.

Plankton community sampling in the Baliti River (Tabok River) was undertaken at three sampling stations located in the upstream, midstream, and downstream sections of the river.

Phytoplanktons

A summary of the phytoplankton genera identified in three stations sampled along Baliti River (Tabok River) is presented in Table 7-33. Station FW1 is located upstream, FW2 midstream, and FW3 downstream.

Table 7-33 Phytoplankton Composition, Abundance (cells/m3), Diversity and Distribution in the Baliti River (Tabok River)

TAXA	STATION			Grand Total	Relative Abundance (%)
	FW1 (Upstream)	FW2 (Midstream)	FW3 (Downstream)		
Diatoms					
Chaetoceros sp.	13	–	–	13	3.23
Coscinodiscus sp.	5	1	–	6	1.49

Pleurosigma sp.	4	–	1	5	1.24
Thalassionema sp.	195	4	–	199	49.50
Thalassiosira sp.	6	–	5	11	2.73
Subtotal Diatoms	**223**	**5**	**6**	**234**	**78.19**
Silicoflagellates					
Dictyocha spp.	2	–	–	2	0.50

TAXA	STATION			Grand Total	Relative Abundance (%)
	FW1 (Upstream)	FW2 (Midstream)	FW3 (Downstream)		
Subtotal Silicoflag.	**2**	–	–	**2**	**0.50**
Total Cell Density (N)	**225**	**5**	**6**	**236**	**100**
Richness (S)	6	2	2	6	–
Diversity (H′)	0.58	0.50	0.45	–	–
Evenness (J′)	0.33	0.72	0.65	–	–

A total of 236 phytoplankton cells were recorded across the three sampling stations in Baliti River (Tabok River). The community was overwhelmingly dominated by diatoms, which accounted for 78.19% of the total density, with *Thalassionema spp.* contributing almost half of the total count (49.5%). Other diatoms such as *Chaetoceros*, *Coscinodiscus*, *Pleurosigma*, and *Thalassiosira* were present in relatively small numbers. Silicoflagellates (*Dictyocha spp.*) contributed only 0.5% of the total cell density and were found exclusively in the upstream station (FW1).

In terms of station-wise distribution, FW1 (upstream) had the highest taxa richness (6 species), while both FW2 (midstream) and FW3 (downstream) had only 2 taxa each. The Shannon–Wiener Diversity Index (H′) values were low, ranging from 0.45 (FW3) to 0.58 (FW1), reflecting low species diversity and uneven distribution across taxa. Evenness values also varied considerably, with FW2 (0.72) indicating a relatively balanced but species-poor assemblage, while FW1 (0.33) reflected dominance by a few taxa.

Overall, the plankton community structure of Baliti River (Tabok River) indicates a low-diversity, diatom-dominated system, which may be attributed to the limited depth, relatively fast-flowing lotic environment, and reduced nutrient availability in the river. The results suggest a stressed aquatic condition, where only a few highly adaptable diatom taxa are able to thrive.

7.2.2.5 Important Local Species and Habitat

Summary of Endemicity and Conservation Status

The freshwater and estuarine fauna reported for Baliti River (Tabok River) are not classified as threatened or endangered species. No endemic species were recorded during the survey. The absence of freshwater prawns, mudfishes, and catfishes, which are usually present in similar systems, highlights the low ecological productivity of the river. The plankton assessment showed that the community was composed entirely of diatoms, while zooplankton, fish larvae, and higher trophic forms were absent. This finding indicates that the river ecosystem is already stressed and simplified.

Although none of the identified organisms are of immediate conservation concern, the very low abundance and diversity suggest that the system is vulnerable. The weak plankton population provides only limited primary productivity and offers little food web support for higher organisms such as fishes and benthic invertebrates.

Presence of Pollution Indicator Species

The plankton community was dominated by Thalassionema species along with a few other diatoms. No zooplankton taxa were found and no fish larvae were observed. The absence of higher plankton forms suggests a low carrying capacity of the river.

Plankton blooms, which are often used as indicators of nutrient overloading, were not detected in Baliti River (Tabok River) during the survey. Harmful algal bloom species such as dinoflagellates were not present. However, the low diversity and reliance on only a few diatom species show that the system is fragile and could easily shift to eutrophic conditions if additional stresses such as nutrient discharges or hydrocarbon inputs are introduced.

Although algal bloom thresholds were not reached, the condition of the plankton community shows that the system is highly vulnerable and may be destabilized if nutrient or chemical loading continues to rise.

Epibenthic Fauna

Macroinvertebrates and benthic organisms, which usually serve as bioindicators of water quality, were scarce and highly limited in diversity. The lack of bivalves, gastropods, and sessile filter feeders suggests that the river is under stress, possibly due to sedimentation and poor water quality. This also reduces the capacity of the river to filter and clean itself naturally.

7.2.2.6 Abundance, Frequency and Distribution of Species

Abundance of Ecologically and Economically Important Species

The diatom community observed in Baliti River (Tabok River) reflects low abundance, richness, and diversity. Shannon–Wiener index values were below two, which is typical of stressed aquatic ecosystems. Taxa richness was very limited across all stations. This means that the planktonic food base is weak and insufficient to support higher trophic levels such as fish and crustaceans.

The absence of zooplankton and fish larvae further shows that the recruitment potential of higher organisms is very poor. Fish stocks in the river are likely to remain low and unable to sustain fisheries. Since the river connects to coastal estuarine habitats, the reduced productivity in freshwater input may also lower productivity downstream.

7.2.2.7 Summary of Freshwater Species and IUCN Status

Freshwater and estuarine species recorded within the Baliti River (Tabok River) system and its immediate estuary are limited to common, disturbance-tolerant, and opportunistic taxa typically associated with shallow, sediment-laden, and modified aquatic environments. Fish records are dominated by blackchin tilapia (Sarotherodon melanotheron), an invasive species, with additional species (e.g., Channa striata, mullets, and terapons) reported only through key informant interviews and not directly observed during the survey. Macro-invertebrates consist primarily of pollution-tolerant gastropods (Stenomelania funiculus, Neritina spp.) and the estuarine crab Varuna litterata. Phytoplankton communities are composed entirely of common diatom genera, reflecting low diversity and stressed freshwater conditions. All freshwater and estuarine taxa are classified as Least Concern (LC) or Not Assessed (NA) under the IUCN Red List, with no endemic, threatened, or protected species identified.

Species / Taxon	Common Name	IUCN Status	Notes
Freshwater & Estuarine Fish			
Sarotherodon melanotheron	Blackchin tilapia	LC	Invasive; dominant species observed
Channa striata	Snakehead	LC	Reported only (not observed)
Mugilidae spp.	Mullets	NA (family-level)	Opportunistic; reported

Theraponidae spp.	Terapon	NA (family-level)	Opportunistic; reported
Freshwater Macro-invertebrates			
Stenomelania funiculus	River thiarid	LC	Pollution-tolerant
Neritina spp.	Freshwater nerith	LC	Common
Varuna litterata	Peregrine crab	LC	Estuarine species
Phytoplankton			
Thalassionema spp.	Diatom	NA	Common
Chaetoceros spp.	Diatom	NA	Common
Coscinodiscus spp.	Diatom	NA	Common
Pleurosigma spp.	Diatom	NA	Common
Thalassiosira spp.	Diatom	NA	Common
Dictyocha spp.	Silicoflagellate	NA	Common

7.2.3 Marine Water Ecology

7.2.3.1 Scope of Baseline Assessment for Marine Ecology

Barangay San Andres, the identified impact area of the proposed project, is a coastal barangay of Bauan, Batangas, situated along Batangas Bay. The marine portion of the barangay lies adjacent to the small Baliti River (Tabok River), which discharges into the bay and influences the sediment and nutrient dynamics of the nearshore zone.

The marine ecological assessment in this coastal impact area was undertaken to establish a baseline dataset of critical benthic habitats and associated resources. The purpose is to develop a comprehensive environmental profile of the nearshore environment where port development and subsequent operations are expected to exert both direct and indirect pressures.

A broad survey was undertaken last August 2, 2025 (wet season) to identify critical marine habitats such as seagrass beds, coral reefs, and associated plankton communities. To validate the presence of these habitats in deeper sections, four spot dives were conducted within a range of 200 meters to 1 kilometer away from the proposed cargo port site. These dives allowed direct inspection of benthic conditions and provided supplemental information on water column characteristics relevant to plankton and other aquatic life. The assessment aims to account for and describe aquatic and marine communities in the nearshore and offshore of impacted areas that could potentially be disrupted or impaired by project operations, or subjected to stresses arising from anthropogenic environmental impacts attributable to cargo port development.

Key habitats of concern in the area include tidal flats, shallow sandy bottoms, and potential seagrass and reef-associated zones. These ecosystems perform essential ecological functions such as sediment stabilization, nutrient cycling, and providing nursery habitats for juvenile fish and invertebrates. In addition, they are closely tied to small-scale fisheries and coastal livelihood activities, including hook-and-line fishing, net operations, and shellfish gleaning, which form part of the socioeconomic fabric of the San Andres coastal community.

Baseline information on benthic communities, fisheries resources, and local resource-use practices is vital in this zone, as these represent sensitive ecological endpoints that could be adversely affected by port-related activities such as backfilling, dredging, shoreline alteration, and increased turbidity and sedimentation during both construction and operation phases.

Ultimately, the baseline profile will serve as the primary reference in identifying potential environmental impacts of the proposed project on the nearshore marine environment and in guiding the development of effective mitigation and management measures to minimize such impacts over the long term. By generating comparable datasets using standardized methods and consistent protocols, future monitoring efforts will be able to measure changes in environmental conditions relative to the present baseline.

The survey employed established coastal resource assessment methodologies as prescribed by English et al. (1997), and adapted to site-specific conditions following rapid appraisal techniques developed under the Coastal Resource Management Project (CRMP) and the Fisheries Improved for Sustainable Harvest (FISH) Project. The results represent a snapshot of the current ecological state and marine resources at the time of sampling. These do not imply that the habitats and resources are inherently vulnerable to project activities but rather highlight potential pathways for negative outcomes if stressors remain unmanaged.

Given the open-access nature of Philippine coastal environments, the baseline already reflects diverse and cumulative pressures that influence resource conditions in the area. Additional project related stressors may accelerate ecological decline, altering the baseline condition in a relatively short timeframe.

For this assessment, a total of two (2) manta tow segments, four (4) underwater spot dives using SCUBA, two (2) plankton community sampling stations, two (2) actual fishing operation documentations, and one (1) macro-invertebrate observation were conducted. These were further supplemented by systematic snorkeling surveys to locate viable coral patches and other benthic features within the impact area. In addition, key informant interviews with local fisherfolk and community stakeholders were carried out to gather contextual information on fisheries practices, historical ecological changes, and socio-economic dependence on coastal resources.

7.2.3.2 Methodology

Manta tows for investigation of presence of seagrass beds and littoral corals

Manta tows were conducted in the coastal impact area to provide a broad reconnaissance survey of benthic habitats. The objective of the assessment was to obtain rapid visual information on the potential presence and distribution of seagrass beds and littoral coral assemblages across sandy flats and shallow reef patches. This method allowed wide-area coverage of the nearshore coastal shelf, providing baseline data on critical benthic habitats that may be affected by port development activities. Two sets of manta tow surveys were implemented, each consisting of six contiguous tow segments.

Table 7-34 Manta Tow Stations for Determination of the Presence of Seagrass and Corals in the Nearshore Shelf of Brgy. San Rafael III, Bauan, Batangas; 02-03 August, 2025

Station	Latitude	Longitude
Start-T01	13.7812142°	120.9994551°
T01-T02	13.7812142°	120.9986081°
T02-T03	13.7810887°	120.9977175°
T03-T04	13.7808676°	120.9968096°
T04-T05	13.7807978°	120.9958914°
T05-T06	13.7808358°	120.99499°
T06-End	13.7808485°	120.9940298°
Start02-T01a	13.7802227°	120.9937092°
T01a-T02a	13.7804846°	120.9946902°
T02a-T03a	13.7804846°	120.9956524°
T03a-T04a	13.780613°	120.9966913°
T04a-T05a	13.7805332°	120.9976223°
T05a-T06a	13.7804069°	120.9986727°
T06a-End	13.7802944°	120.9997106°

Spot dives in nearshore and offshore of Barangay San Andres

A total of three random spot dives were undertaken directly in front of the Baliti River (Tabok River) estuary to validate benthic conditions in nearshore areas not adequately covered by manta tow surveys. The purpose of the dives was to confirm whether corals or seagrass beds were present in the deeper portions of the coastal shelf that could not be fully observed at the surface level.

Table 7-35 Coordinates of spot dives during the baseline assessment; 02-03 August, 2025

WP Code	Latitude	Longitude	Remarks
SPD01	13.7783073°	120.9952057°	Approximately 450m from the shoreline
SPD02	13.7798179°	120.9936938°	Approximately 310m from the shoreline
SPD03	13.780066°	120.9960648°	Approximately 240m from the shoreline
SPD04	13.7783831°	120.9988229°	Almost 650mm southeast of the estuary; approximately 400m from shoreline.

Offshore and nearshore Fisheries

Fisheries appraisal was conducted through Key Informant (KI) interviews with experienced fishers and community leaders to gather information on fishing gears, target species, bycatch, catch composition, productivity, and seasonal trends of nearshore and offshore fishing activities, strictly within the municipal waters of Bauan, Batangas. Actual observation of fish catch was also undertaken as a representative form of experimental fishing to validate the reported catch composition and gear performance. Underwater fish visual census was not undertaken due to the absence of a coral reef ecosystem in the coastal impact area, making interview and catch observation the most suitable methods for this appraisal.

Figure 7-54 Conduct of fisheries appraisal through key informant interview and experimental fishing

Table 7-36 Coordinates of actual fishing during the baseline assessment; 02-03 August, 2025

WP Code	Latitude	Longitude	Remarks
AFM01	13.7801147°	120.9920006°	Hook and line, non-motorized boat observed, almost 300m from the shoreline
AFM02	13.7663169°	120.9906751°	Gill net, almost 1.4 kilometers from the shoreline

Information gathering on occurrence of Megafauna

Key Informant Interviews (KII) for marine megafauna occurrence can generate important information on potential impacts of the project on unique marine fauna. For the baseline survey, the information gathering focused only on commonly encountered megafauna– marine turtles, dugong and dolphins. Key respondents were requested to divulge personal observations of the presence of any of the five marine turtle species known to be present in the Philippines, i.e., the green turtle (Chelonia mydas), hawksbill turtle (*Eretmochelys imbricata*), olive ridley turtle (Lepidochelys olivacea), loggerhead turtle (Caretta caretta) and leatherback turtle (Dermochelys coriacea).

Figure 7-55 Information gathering on occurrence of Megafauna

Plankton

Plankton community structure in the marine waters of the coastal impact area was assessed through three sampling stations established in the nearshore zone, located in the same sites where spot dives were undertaken. At each station, ten 1-liter water samples were collected and composited to represent the plankton population. Phytoplankton samples were preserved in Lugol's iodine solution, while zooplankton, if present, would be preserved in 10% buffered formalin. Laboratory analyses involved both qualitative and quantitative assessment, with enumeration conducted using a Sedgwick–Rafter counting chamber. Phytoplankton were identified to the lowest possible taxonomic level, generally up to genus, using a compound light microscope and standard taxonomic keys.

Table 7-37 Coordinates of sampling station for plankton on nearshore during the baseline assessment; 02-03 August, 2025

WP Code	Latitude	Longitude	Remarks
MW01	N 13.7783073°	E 120.9952057°	Approximately 450m from the shoreline
MW02	N 13.7798179°	E 120.9936938°	Approximately 310m from the shoreline
MW03	N 13.780066°	E 120.9960648°	Approximately 240m from the shoreline

7.2.4 Results of Marine Ecology Baseline

Manta Tow Results – Nearshore of Brgy. San Andres

Two sets of manta tows, each consisting of six tow segments, were completed along approximately 1.9 kilometers of nearshore pathways fronting the estuary of Brgy. San Andres. The survey did not record the presence of seagrass meadows or shallow-water coral assemblages within the transects. This absence is consistent with the prevailing environmental conditions, as the nearshore shelf directly in front of the estuary is subjected to continuous sediment input, which restricts coral recruitment and seagrass establishment. Benthic observations throughout the two segments indicated that the substrate is dominated by coarse to fine sand. Given these sedimentary conditions, the area exhibits low potential for supporting critical benthic communities, as fine and shifting sands provide little substrate stability for seagrass colonization or coral settlement.

Table 7-38 Manta tow transects conducted in the coastal impact area fronting the estuary in Bauan, Batangas. Two sets of tows were completed, each composed of six segments, providing approximately 1.2 kilometers of survey coverage; 02 August 2025

Site Name:	Coastal waters of the project site, fronting the estuary (Coastal Impact Area)
Date / Time:	02 August 2025 / 09:00 AM (Tow Start)
Tow Speed:	.0 km/h (average)
Visibility:	±8–10 m
Weather:	Sunny and Fair
Wave:	Rolling crests of approx. ±10 cm
Current:	None
Tide:	Slightly rising (reference: Batangas Tidal Station, WXTIDE32)
Water Temp:	Approx. ±29–30 °C

Wind Speed:		Beaufort Scale #2						
Cloud Type(s):		Cumulus Clouds						
Observers:		Mark Joseph G. Culaste and Saturnino P. Miano Jr.						
Station	**Location**	**LHC**	**SC**	**DC**	**DCA**	**R**	**S**	**Remarks**
Start-T01	N 13.7812142° E 120.9994551°	0	0	0	0	0	100	Coarse sand to fine sand
T01-T02	N 13.7812142° E 120.9986081°	0	0	0	0	0	100	Coarse sand to fine sand
T02-T03	N 13.7810887° E 120.9977175°	0	0	0	0	0	100	Coarse sand to fine sand
T03-T04	N 13.7808676° E 120.9968096°	0	0	0	0	0	100	Coarse sand to fine sand
T04-T05	N 13.7807978° E 120.9958914°	0	0	0	0	0	100	Coarse sand to fine sand
T05-T06	N 13.7808358° E 120.99499°	0	0	0	0	0	100	Coarse sand to fine sand
T06-End	N 13.7808485° E 120.9940298°	0	0	0	0	0	100	Coarse sand to fine sand
Average benthic Composition		0	0	0	0	0	100	Coarse sand to fine sand
Station	**Location**	**LHC**	**SC**	**DC**	**DCA**	**R**	**S**	**Remarks**
Start02-T01a	N 13.7802227° E 120.9937092°	0	0	0	0	0	100	Coarse sand to fine sand
T01a-T02a	N 13.7804846° E 120.9946902°	0	0	0	0	0	100	Coarse sand to fine sand
T02a-T03a	N 13.7804846° E 120.9956524°	0	0	0	0	0	100	Coarse sand to fine sand
T03a-T04a	N 13.780613° E 120.9966913°	0	0	0	0	0	100	Coarse sand to fine sand
T04a-T05a	N 13.7805332° E 120.9976223°	0	0	0	0	0	100	Coarse sand to fine sand
T05a-T06a	N 13.7804069° E 120.9986727°	0	0	0	0	0	100	Coarse sand to fine sand
T06a-End	N 13.7802944° E 120.9997106°	0	0	0	0	0	100	Coarse sand to fine sand
Average benthic Composition		0	0	0	0	0	100	Coarse sand to fine sand

Live hard coral (LHC) - coverage of stony or hard corals on the bottom or part of the bottom **Live soft coral - (SC)** - coverage of soft corals attached to the bottom
Dead coral (DC) - recently dead coral still attached and recognizable at the bottom in original upright position, color usually white with no living tissue
Dead coral with algae (DCA) - corallites still visible, skeletal structure can still be seen but algae dominate the structure (often appears greenish to brownish)
Coral rubble/rock (CR) - loose broken fragments of stony corals, consolidated hard bottom or large blocks of hard reef materials not attached or easily moved around **Sand/silt (S)**

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7.2.5 Summary of Marine Water Species and IUCN Status

Marine species recorded in the nearshore coastal waters fronting Barangay San Andres consist primarily of planktonic taxa and mobile, wide-ranging species typical of sandy, sediment-influenced coastal environments. The marine baseline surveys did not identify seagrass beds, coral reefs, or reef-associated fauna within the surveyed nearshore zone, consistent with continuous sediment input from the Baliti River (Tabok River). Marine phytoplankton communities are dominated by common diatom and silicoflagellate genera (*Thalassionema*, *Chaetoceros*, *Coscinodiscus*, *Pleurosigma*, *Thalassiosira*, *Dictyocha*), none of which are subject to IUCN conservation listing. No marine megafauna of conservation concern were confirmed during surveys or interviews. Overall, marine species recorded are classified as Not Assessed (NA) or Least Concern (LC), and no Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) species were identified within the marine Project Area of Influence.

Species / Taxon	Common Name	IUCN Status	Notes
Marine Phytoplankton			
Thalassionema spp.	Diatom	NA	Dominant genus
Chaetoceros spp.	Diatom	NA	Common
Coscinodiscus spp.	Diatom	NA	Common
Pleurosigma spp.	Diatom	NA	Common
Thalassiosira spp.	Diatom	NA	Common
Dictyocha spp.	Silicoflagellate	NA	Low abundance

7.2.6 Critical Habitat Assessment (CHA)

7.2.6.1 Data Sources and Screening Approach

The Project is located within Batangas Bay, part of the broader Verde Island Passage, a region recognized nationally and internationally for its high marine biodiversity. While this regional context elevates overall ecological sensitivity at the bay scale, the Project footprint itself is situated within a long-established, highly modified coastal-industrial port environment, characterized by:

- Engineered shorelines;
- Reclaimed land;
- Dredged and maintained navigation channels; and
- Sustained vessel traffic and port operations.

The biodiversity baseline for the Project was established using a tiered assessment approach combining:

- Primary baseline surveys undertaken within and adjacent to the Project footprint, focusing on marine habitats, benthic conditions, and ecological receptors relevant to port construction and operations;
- Secondary sources include published ecological literature on Batangas bay and the Verde Island passage, World Database on Protected Areas (WDPA, and; Integrated Biodiversity Assessment Tool (IBAT).
- Integrated Biodiversity Assessment Tool (IBAT) screening to identify internationally recognized biodiversity features, including:
    - Key Biodiversity Areas (KBAs);
    - Protected Areas (PAs); and

- IUCN Red List–assessed species; and

To ensure an appropriate spatial scale, IBAT screening was conducted using graduated buffers around the Project location:

- 10 km radius to identify features potentially interacting directly with Project activities; and
- 50 km radius to identify regionally important biodiversity features and mobile species for which wider spatial context is required, consistent with IFC Performance Standard 6 (PS6) and AIIB ESS1 guidance.

Protected Areas and Key Biodiversity Areas

IBAT and World Database on Protected Areas (WDPA) screening identified several legally protected and internationally recognized areas within the broader 50 km regional context of the Project, including:

- Taal Volcano Protected Landscape, designated as a National Protected Landscape (IUCN Category V);
- Mount Makiling Forest Reserve, designated as a National Forest Reserve; and
- Mount Makiling ASEAN Heritage Park, recognized as a Regional ASEAN Heritage Site.

Taal Volcano Protected Landscape is a multiple-use protected landscape centered on an active volcanic system and associated lacustrine environment (Taal Lake). Its designation primarily reflects geological, scenic, and hazard-related values, rather than the presence of intact terrestrial or marine ecosystems relevant to the Project Area. The protected landscape is inland and separated from the Project Area by Batangas Bay, with no direct hydrological, ecological, or habitat connectivity between the Project footprint and the volcanic or lacustrine systems of Taal. Biodiversity values associated with Taal Volcano Protected Landscape—such as lake-endemic freshwater species—are spatially confined to Taal Lake and are not ecologically linked to coastal or marine port environments.

Mount Makiling is located approximately 30–35 km north of the Project Area and comprises a forested, mountainous terrestrial ecosystem characterized by primary and secondary forest, high endemism, and freshwater headwater systems. These ecological characteristics are spatially and functionally distinct from the Project Area, which is located in a coastal, industrial port setting.

No part of the Project footprint, Area of Influence, or associated marine works overlaps with Mount Makiling Forest Reserve or the Mount Makiling ASEAN Heritage Park, nor do Project activities intersect ecological corridors or hydrological systems linking the Project Area to Mount Makiling.

IUCN Red List Species Screening

Screening Methodology

IBAT species outputs within the 50 km screening radius yielded approximately 4,500 IUCN Red List–assessed taxa, reflecting the high regional biodiversity of the Verde Island Passage and adjacent marine systems.

To support a defensible Critical Habitat Assessment, the dataset was programmatically filtered using the following criteria:

- Red List Category: Critically Endangered (CR) and Endangered (EN) only;
- Biome: Marine species only[2];

[2] Detailed Critical Habitat assessment was limited to the marine biome, as Project impact pathways are confined to coastal and nearshore marine environments. Freshwater and terrestrial habitats within the Project Area are highly modified and limited to reclaimed land, industrial infrastructure, and short estuarine/riverine systems with no hydrological or ecological connectivity to habitats supporting CR/EN species. Freshwater and terrestrial CR/EN species identified through IBAT are associated with upland forest streams, lacustrine systems (e.g., Taal Lake), or forested habitats that are absent from the Project Area and its Area of Influence; these species were therefore screened out as not applicable, consistent with IFC PS6 good practice.

- Range Attributes: Restricted-range species and/or species with limited habitat specialization; and
- Ecological Relevance: Species with habitat requirements potentially intersecting with port or nearshore environments.

Short-Listed Species of Conservation Concern

This filtering process reduced the long-list to a short-list of species requiring detailed ecological evaluation, consistent with good international industry practice for Critical Habitat screening.

The screening identified one marine species meeting the above criteria:

1. **Reticulated Swellshark *(Cephaloscyllium fasciatum)***
   IUCN Status: **Critically Endangered (CR)**
   Population Trend: **Decreasing**

- According to the IUCN Red List:
- Habitat Type: **Marine deep benthic**
- Depth Range: **Approximately 200–450 meters**
- Geomorphological Setting: **Insular slopes and continental slope environments**
- Substrate: **Hard and soft substrates at bathyal depths**
- Reproductive Strategy: **Oviparous; eggs deposited on deep benthic substrates**
- Primary Threats: **Fisheries-related mortality, not coastal habitat modification**

The species is demersal and restricted to deep-water environments well beyond the depth, substrate, and geomorphological conditions present in nearshore port settings.

Assessment of Project-Species Interaction

The Project Area comprises:

- shallow coastal waters;
- engineered and dredged seabed;
- reclaimed land;
- high vessel traffic; and
- long-established port infrastructure.

Maximum operational and construction depths are orders of magnitude shallower than the minimum depth requirements of C. fasciatum. As a result:

- No suitable feeding habitat, breeding habitat, or shelter for the species exists within the Project footprint or its zone of influence;
- The Project Area does not provide bathyal depth, continental slope morphology, or deep benthic substrates required by the species; and
- Project activities do not overlap with the ecological niche occupied by the species at any life stage.

While Cephaloscyllium fasciatum is known to occur within Philippine waters at a national scale, available ecological data indicate that the species is restricted to deep benthic habitats on insular and continental slopes at depths of approximately 200–450 m.[3] The shallow, highly modified nearshore and port environments within the Project Area do not provide suitable habitat, nor do they support breeding, feeding, or shelter functions for

[3] Source: IUCN SSC Shark Specialist Group (2020). *Cephaloscyllium fasciatum*. The IUCN Red List of Threatened Species 2020: e.T162207827A162870102. https://www.iucnredlist.org/species/162207827/162870102

this species. Accordingly, the Project Area does not form part of the species' habitat, functional range, or ecological dependency network.

7.2.6.2 Critical Habitat Assessment

This CHA has been undertaken in accordance with the AIIB ESF, specifically the requirements on Critical Habitats, which prohibit project activities in critical habitat areas unless all conditions under Paragraph 31 of ESS 1 are demonstrably met.

Under the AIIB ESF, project activities in areas of critical habitat may proceed only if it is demonstrated that:

- There are no predicted measurable adverse impacts on the critical habitat that could compromise its ability to function;
- There is no predicted reduction in the population of any recognized Endangered (EN) or Critically Endangered (CR) species;
- The Project will not involve significant conversion or degradation of critical habitats; and
- Any impacts are mitigated.

This CHA evaluates the Project against these requirements using site-specific baseline data, IBAT biodiversity screening, and species-level ecological analysis.

Spatial Screening

The CHA applied a tiered screening approach:

- 10 km radius: to assess direct overlap with Critical Habitats, Protected Areas (PAs), and Key Biodiversity Areas (KBAs); (Figure 6-55)
- 50 km radius: to identify regional biodiversity context and species of conservation concern that may occur at a broader scale. (Figure 6-56)

Spatial screening was conducted using:

- IBAT outputs for Protected Areas, Key Biodiversity Areas, and IUCN Red List species;
- Baseline ecological survey results presented in Chapter 6.

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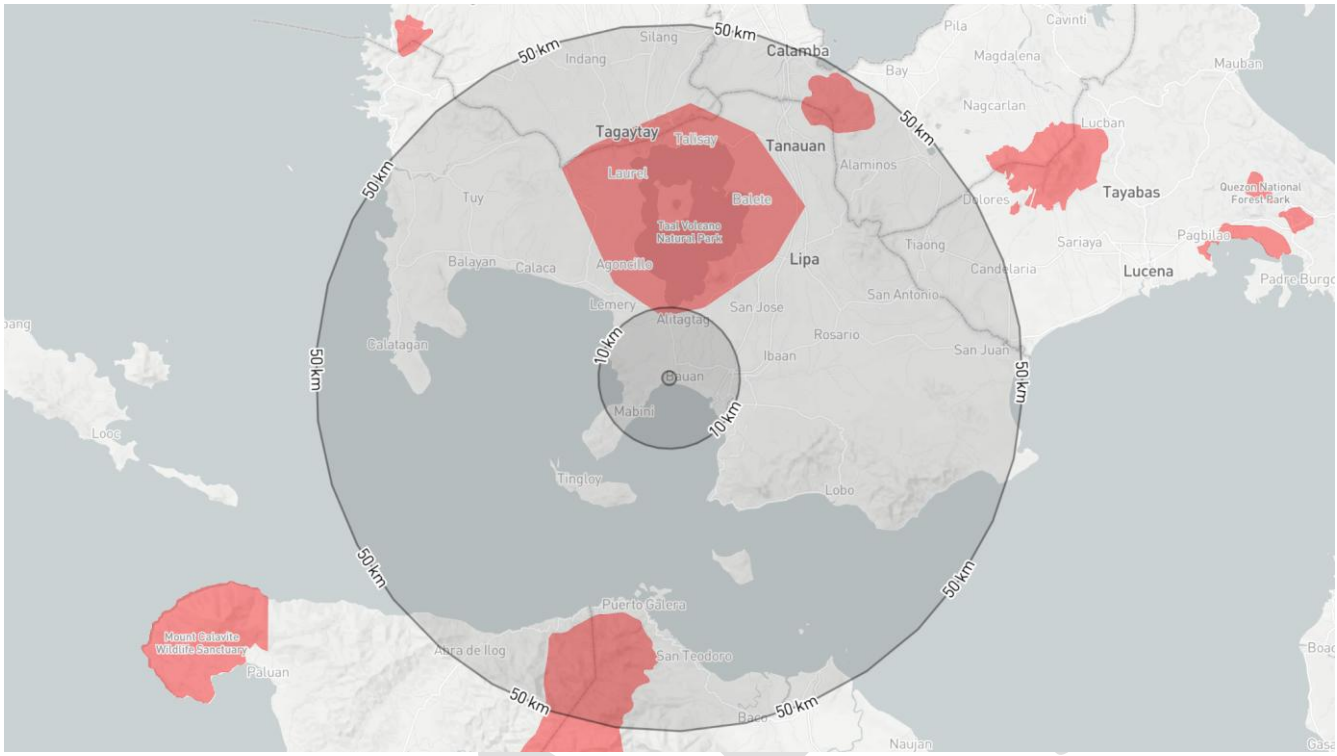

Figure 7-56 Biodiversity Area in relative to the Project Location (10km and 50km buffers)

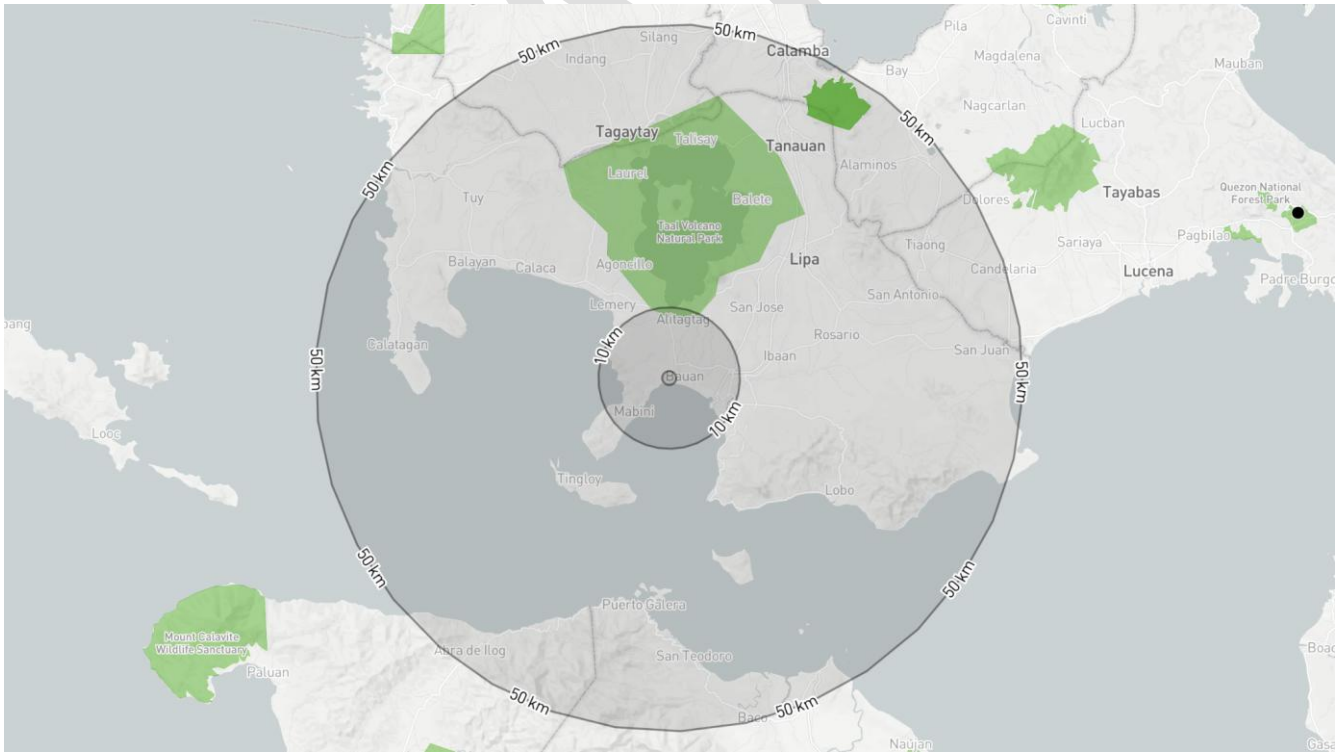

Figure 7-57 World Database of Protected Areas relative to the Project Location (10km and 50km buffers)

Species Screening

From the full IBAT species lists (including >4,500 records within the 50 km radius), species were filtered using the following criteria:

- IUCN Red List Category: Critically Endangered (CR) or Endangered (EN);

- Biome relevance:
  - Marine species for marine works assessment;
  - Freshwater and terrestrial species screened for land-based and hydrological linkage;
- Habitat suitability:
  - Depth, substrate, and ecological requirements;
- Functional dependency:
  - Breeding, feeding, shelter, or migration dependency on the Project Area.

Species failing to meet habitat suitability or ecological dependency criteria were screened out as not applicable to Critical Habitat determination, consistent with AIIB ESS 1 and IFC PS6 guidance.

Species of Conservation Concern Identified Through IBAT Screening

IBAT screening within the 50 km regional context identified a limited number of Critically Endangered (CR) and Endangered (EN) species occurring at a national or regional scale. A focused screening was undertaken to determine whether any of these species are ecologically linked to the Project Area or could trigger Critical Habitat criteria under AIIB ESS 1 and IFC PS6.

Although several CR and EN species are present within the wider regional or national context, none are ecologically dependent on the Project Area. This determination is supported by the following:

- The Project footprint comprises shallow, engineered coastal waters, reclaimed land, and port infrastructure;
- No deep-water benthic habitats, freshwater systems, or terrestrial natural habitats occur within or adjacent to the Project Area;
- Species identified through IBAT screening rely on habitat types (deep marine slopes, forest streams, lakes, forests) that are absent from the Project Area and Area of Influence;
- There are no ecological pathways (e.g., hydrological connectivity, habitat corridors, depth overlap) linking these species to Project activities.

Accordingly, while these species are acknowledged in the biodiversity baseline, they do not trigger Critical Habitat criteria and are not expected to experience direct, indirect, or cumulative impacts from the Project.

Table 7-39 Critical Habitat Assessment Matrix

Species	IUCN Status	Primary Habitat	Key Ecological Requirements	Suitable Habitat in Project Area	Potential Project Interaction	Critical Habitat Trigger
***Cephaloscyllium fasciatum* (Reticulated Swellshark)**	**CR**	**Marine deep benthic (200–450 m)**	**Bathyal depths, continental/insular slopes**	**None (Project waters <30 m)**	**No overlap with dredging, port operations, or nearshore works**	**Not Triggered**
Drepanosticta makilingia	CR	Freshwater forest streams	Clean, shaded upland streams	None	No hydrological or habitat linkage	Not Triggered
Drepanosticta trimaculata	CR	Freshwater forest streams	Riparian forest dependency	None	No ecological pathway	Not Triggered

Coeliccia brachysticta	EN	Freshwater / riparian	Forested stream systems	None	No interaction	Not Triggered
Sardinella tawilis	EN	Lacustrine (Taal Lake endemic)	Pelagic freshwater lake habitat	None	No hydrological connection	Not Triggered
Cacatua haematuropygia	CR	Terrestrial forest / mangrove	Forest and mangrove nesting	None	No habitat presence	Not Triggered
Gallicolumba platenae	CR	Terrestrial forest floor	Primary lowland forest	None	No habitat presence	Not Triggered
Penelopides mindorensis	EN	Terrestrial forest	Canopy-dependent frugivore	None	No habitat presence	Not Triggered

Conclusion - Critical Habitat Assessment

No project components are located within designated Critical Habitat, Key Biodiversity Areas, or legally protected areas, nor are they functionally linked to habitats supporting endangered or critically endangered species. The Project footprint is confined to an existing, long-established port environment characterized by engineered shorelines, reclaimed land, and modified nearshore waters.

Screening of Critically Endangered and Endangered species identified through IBAT confirms that:

- The Project Area does not provide suitable habitat, breeding sites, feeding grounds, or shelter for any CR or EN species;
- No populations of CR or EN species are supported within the Project Area or its immediate Area of Influence; and
- No ecological processes or dependency networks essential to CR or EN species occur within or adjacent to the Project footprint.

Accordingly, the Project meets all conditions under Paragraph 31 of the AIIB ESF, in that:

- No measurable adverse impacts on critical habitat functions are predicted;
- No reduction in populations of any endangered or critically endangered species is anticipated;
- The Project does not involve the conversion or degradation of critical habitats; and
- Potential indirect impacts are addressed through standard, industry-accepted mitigation measures for dredging, marine works, and water quality management.

On this basis, no Critical Habitat is present within or affected by the Project, and no further Critical Habitat mitigation or offset measures are required under the AIIB ESF.

7.3 Socio-Economic and Cultural Environment

7.3.1 Demographics and Settlement Patterns

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Demography

Bauan is situated in the southern part of Batangas Province along the coastal area at the southwestern tip of Luzon Island, Philippines. It is bounded in the southeast by Batangas Bay and in the southwest by Balayan Bay.

The town of Bauan is regarded as one of the most strategically situated towns in the archipelago for its impressive accessibility through modern road network and distinct coastlines. The town lies 120 kms. South of Manila, the Philippine capital and 7 kms. west of Batangas City, the provincial capital. Bauan is located at 13.8° North latitude and 121° East longitude.

Furthermore, it is one of the first-class municipalities in the Southern Tagalog Region, and a highly industrialized town in Batangas, one of the five provinces within a major growth area in the Philippines known as Calabarzon.

Demographic Profile

The municipality is composed of 40 barangays, each contributing to Bauan's identity and development.

1. Alagao
2. Aplaya
3. As-Is
4. Bagong Silang
5. Baguilawa
6. Balayong
7. Barangay I (Poblacion)
8. Barangay II (Poblacion)
9. Barangay III (Poblacion)
10. Barangay IV (Poblacion)
11. Bolo
12. Colvo
13. Cupang
14. Durungao
15. Guibay
16. Inicbulan
17. Locloc
18. Magalang-Galang
19. Malindig
20. Manalupang
21. Manghinao Proper
22. Manghinao Uno
23. New Danglayan
24. Orense
25. Pitugo
26. Rizal
27. Sampaguita
28. San Agustin
29. San Andres Proper
30. San Andres Uno
31. San Diego
32. San Miguel
33. San Pablo
34. San Pedro
35. San Roque
36. San Teodoro
37. San Vicente
38. Santa Maria
39. Santo Domingo

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40. Sinala

Land Area

The Municipality of Bauan, Batangas covers a total land area of 66.67686 square kilometers, including 0.07686 square kilometers of reclaimed areas. Of this, 20.41672 square kilometers (about 30.6%) are classified as urban, with Balayong being the largest urban barangay at 3.58903 sq. km, and Barangay IV (Poblacion) the smallest at 0.49188 sq. km. The remaining 46.18328 square kilometers (approximately 69.3%) are rural, dominated by larger barangays such as Alagao (3.37651 sq. km) and San Pablo (3.18465 sq. km), while Sto. Domingo is the smallest at just 0.24270 sq. km. This distribution shows that while Bauan has a concentrated urban core serving as its commercial and administrative center, the majority of its territory remains rural, supporting agriculture, fisheries, and open spaces.

Table 7-40 Land Area

Barangay	Area (sq. m.)
URBAN	
1. Aplaya	0.55627
2. As-is	2.89949
3. Balayong	3.58903
4. Barangay I, II, III (Poblacion)	0.97635
5. Barangay IV (Poblacion)	0.49188
6. Bolo	1.72559
7. Gulibay	2.20972
8. Manghinao Proper	2.00802
9. Manghinao I	1.95519
10. San Miguel	0.83936
11. San Roque	1.77882
12. Sta. Maria	1.38700
Subtotal	20.41672
RURAL	
13. Alagao	
14. Bagong Silang	1.23923
15. Baguilawa	1.62463
16. Colvo	1.15007
17. Cupang	3.05867

18. Durungao	2.99471
19. Inicbulan	3.01615
20. Locloc	3.12465
21. Magalang-galang	1.19324
22. Malindig	1.95578
23. Manalupang	2.19260
24. New Danglayan	0.53674
25. Orense	0.78533
26. Pitugo	1.79858
27. Rizal	2.04170
28. Sampaguita	1.44423
29. San Agustin	1.88059
30. San Andres I	0.40624
31. San Andres Proper	0.51935
32. San Diego	1.92760
33. San Pablo	3.18465
Barangay	Area (sq. m.)
34. San Pedro	1.49835
35. San Teodoro	1.80454
36. San Vicente	1.16878
37. Sto. Domingo	0.24270
38. Sinal	2.01769
Subtotal	46.18328
Grand Total	66.60000
Reclaimed Areas	0.07686
Total Area	66.67686

Population

Population Size

Based on the 2020 Census, the Municipality of Bauan, Batangas has a total population of 90,819 spread across 40 barangays. The most populous barangay is Manghinao Uno, accounting for 11.98% of the total population with 10,877 residents, followed by Aplaya with 8.63% (7,837 residents) and San Roque with 7.01% (6,365 residents). Other barangays with significant populations include Santa Maria (5.26%), Bolo (4.70%), As-is (4.45%), and Inicbulan (4.24%). In contrast, the least populated barangays are Magalang-Galang (0.40%, 361 residents), Malindig (0.43%, 394 residents), and San Diego (0.56%, 509 residents). This distribution shows that while certain barangays serve as densely populated residential and commercial

centers, a number of smaller barangays remain sparsely populated, reflecting the municipality's mix of urbanized zones and rural communities.

Table 7-41 Population of Municipality of Bauan as of 2020

Barangay	Population Percentage (2020)	Population (2020)
1. Alagao	2.76%	2,505
2. Aplaya	8.63%	7,837
3. As-is	4.45%	4,040
4. Bagong Silang	0.52%	474
5. Baguilawa	1.72%	1,563
6. Balayong	2.57%	2,335
7. Barangay 1	1.50%	1,363
8. Barangay II	3.29%	2,984
9. Barangay III	0.58%	528
10. Barangay IV	2.88%	2,619
11. Bolo	4.70%	4,270
12. Colvo	0.53%	485
13. Cupang	2.30%	2,093
14. Durungao	1.91%	1,731
15. Gulibay	1.84%	1,673
16. Inicbulan	4.24%	3,854
17. Locloc	1.57%	1,423
18. Magalang-Galang	0.40%	361
19. Malindig	0.43%	394
20. Manghinao Proper	1.53%	1,387
21. Manghinao Uno	11.98%	10,877
22. Manghinao Proper	3.02%	2,740
23. New Danglayan	1.63%	1,477
24. Orense	0.94%	858
25. Pitugo	0.99%	903
26. Rizal	0.89%	806
Barangay	**Population Percentage (2020)**	**Population (2020)**
27. Sampaguita	0.64%	584
28. San Agustin	1.21%	1,101
29. San Andres Proper	2.75%	2,502
30. San Andres Uno	**0.67%**	**606**
31. San Diego	0.56%	509
32. San Miguel	1.70%	1,541
33. San Pablo	0.94%	853
34. San Pedro	2.37%	2,152
35. San Roque	**7.01%**	**6,365**
36. San Teodoro	2.07%	1,879

37. San Vicente	0.83%	751
38. Santa Maria	5.26%	4,781
39. Santo Domingo	2.98%	2,702
40. Sinala	3.21%	2,913
Bauan Total		**90,819**

Population Growth

The population of the Municipality of Bauan, Batangas for the year 2015 is 91,297. The largest increase of population occurred between census years 1980 and 1990, with a total increase of 15,698 people. The biggest growth rate was recorded in the same period, with a growth rate of 3.13%. The decrease in population during the 1918 and 1970 census years was due to the separation of municipalities of Mabini in 1918 and San Pascual in 1960 from the mother municipality of Bauan. It is noticeable that the smallest increase was in 1960, where the increase was only 969 persons creating a growth rate of 0.20%.

Population Distribution

Of the municipality's forty (40) barangays, Manghinao Proper had the biggest population in 2015 with 10,789 persons, followed by four (4) barangays, Aplaya (8.038), San Roque (6,634), Bolo (5,311), and Sta. Maria (5,129). The total population of these five (5) barangays is 39.32% of Bauan's population in 2015. All these barangays are also urban barangays.

Barangay Magalang-galang on the other hand, had the smallest population size with 340 persons. Four (4) other barangays with the smallest population are Malindig (358), Bagong Silang 457, San Diego (521) and Sampaguita (522).

Urbanization Level by Urban-Rural Barangay

The tempo of urbanization for the period 1990 to 2000 shows a mildly increasing trend. By 2015, it is noted that the tempo of urbanization was five times that of 1990. This is due to the increase in inmigration from other provinces brought on by the increased industrial activity in the municipality. This is supported by the fact that the barangays hosting said industries have now been classified as urban. This tempo of urbanization is maintained at present. It is still an increasing trend.

Population Density

With a total land area of 66.67686 sq. km. The gross population density is about 1,369 persons per sq. km. The total areas of fourteen (14) urban barangays are **20.41672** sq. km. and urban population density is about **2,696** persons per sq. km. The remaining areas of the municipality classified as rural have total areas of **46.18328** sq. km. and rural population density is about **785** persons per sq. km.

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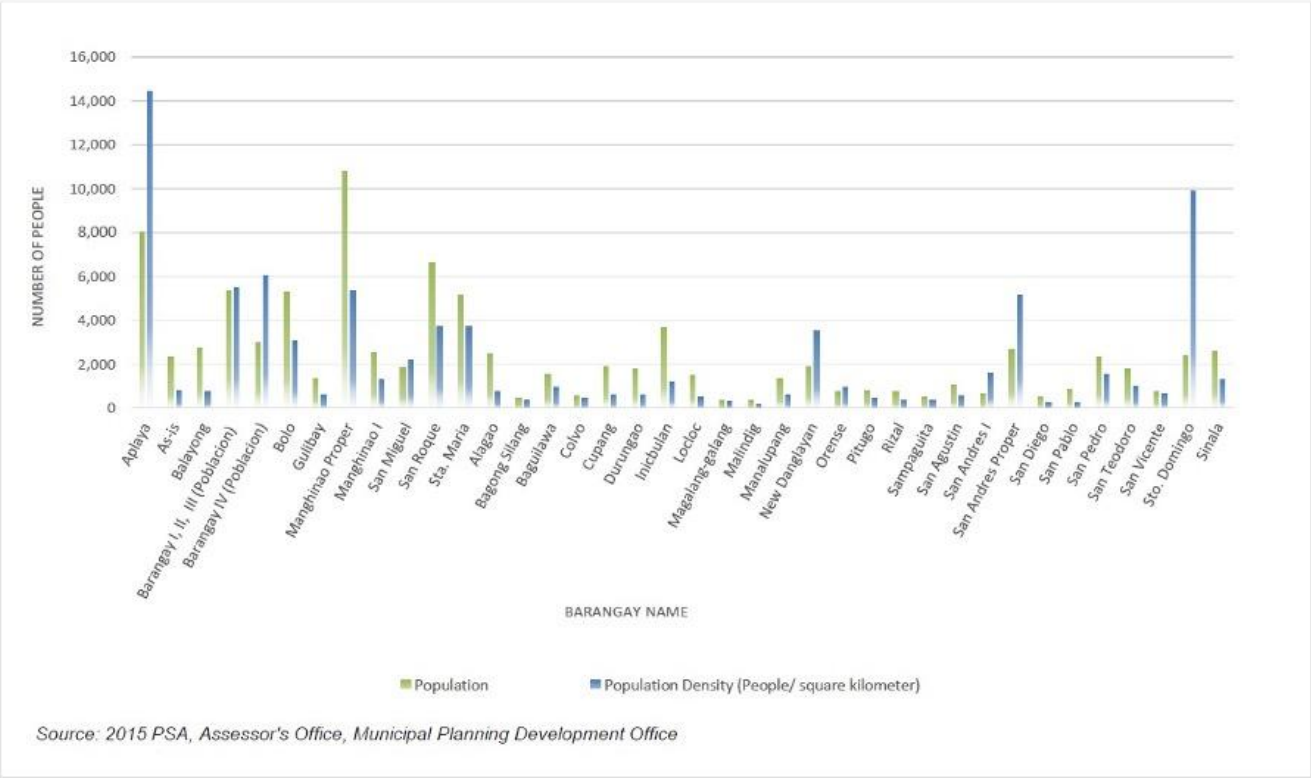

Figure 7-58 Population Density by Barangay, 2015

Age Dependency, Household Structure, and Sex Distribution

Age Dependency Ratio

The demographic structure of the Municipality of Bauan is characterized by a relatively low dependency burden and a predominantly working-age population. The total dependency ratio is estimated at 33.45%, comprising a young dependency ratio of 27.65% and an old-age dependency ratio of 5.80%. This indicates that the municipality has a comparatively high proportion of economically productive individuals, with approximately 51 dependents for every 100 persons of working age.

Table 7-42 Total Population Distribution by Age Group and Sex CY 2015 vs CY 2010

Age group	2015			2010		
	Male	Female	Total	Male	Female	Total
Under 1	974	837	1,811	859	825	1,685
1-4	3,841	3,498	7,339	3,312	3,118	6,429
5-9	4,255	4,056	8,311	4,000	3,812	7,812
10-14	3,969	3,816	7,785	3,995	3,844	7,839
15-19	4,273	4,089	8,362	3,919	3,921	7,840
20-24	4,338	4,101	8,439	3,995	3,737	7,732
25-29	4,212	3,891	8,103	3,663	3,478	7,141
30 - 34	3,768	3,528	7,296	3,277	3,132	6,408
35 - 39	3,331	3,239	6,590	2,784	2,813	5,598
40 - 44	2,900	2,796	5,696	2,690	2,601	5,292
45 - 49	2,727	2,621	5,348	2,211	2,264	4,475

50 - 54	2,153	2,319	4,472	1,931	1,863	3,794
55 - 59	1,893	1,861	3,754	1,384	1,409	2,792
60 - 64	1,296	1,423	2,719	1,001	1,246	2,246
65 - 69	841	1,207	2,048	608	837	1,446
70 - 74	488	800	1,288	467	746	1,214
75 - 79	341	634	975	289	554	843
80 and over	248	733	981	207	556	763
Total	**45,848**	**45,449**	**91,297**	**40,593**	**40,758**	**81,351**

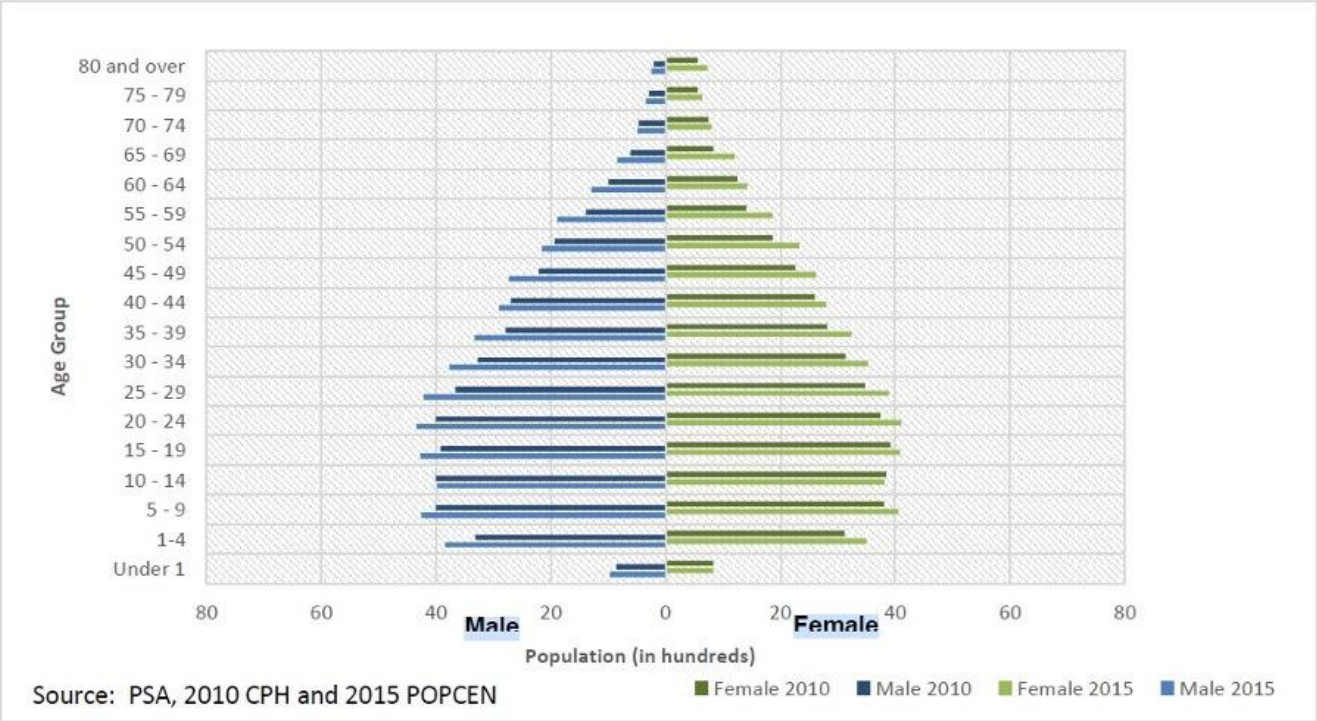

Figure 7-59 Population Distribution by Age Group and Sex CY 2015 vs. CY 2010

Number of Households by Age Group, Sex of the Household Head, Household Size

Household distribution by age group and sex of household head reflects a concentration within the middle working-age cohorts. The largest proportion of households is headed by individuals aged 40–49 years, accounting for 5,021 households (24.26% of the total), of which 4,436 households (21.43%) are male-headed and 585 households (2.83%) are female-headed. Household size patterns further indicate that households with four (4) members represent the most common household size, totaling 4,500 households (21.75%). Of these, male-headed households account for 3,875 (18.73%), while female-headed households account for 625 (3.02%). Notably, among older age cohorts (60–69 years), female-headed households with smaller household sizes (two members) are more prevalent relative to other female age groups.

Overall, the municipality has a total of 20,694 households, with male-headed households comprising 16,516 (79.81%) and female-headed households comprising 4,178 (20.19%). The average household size is estimated at 4.5 persons per household. These figures indicate a predominance of male household headship within the municipality.

Population Sex Distribution

Bauan exhibits a generally balanced sex composition across age groups, including within the working-age population. This demographic profile provides context for understanding labor availability as well as baseline

demand for social services. The age and sex composition of the population informs existing service requirements, particularly in health, transport, and childcare, where household caregiving roles are a key consideration. In addition, temporary population changes associated with project-related in-migration during construction may influence local demographic patterns, underscoring the relevance of sex- and age-disaggregated data for subsequent impact assessment and monitoring.

Settlements Map

The existing project site, including the proposed re-development area, is located within the political boundaries of the Municipality of Bauan.

In terms of land use classification, the proposed site falls within the light intensity industrial zone as defined in the municipality's current Land Use and Zoning Classification.

The 2011-2020 Municipality of Bauan Comprehensive Land Use Plan is shown in Figure 7-60.

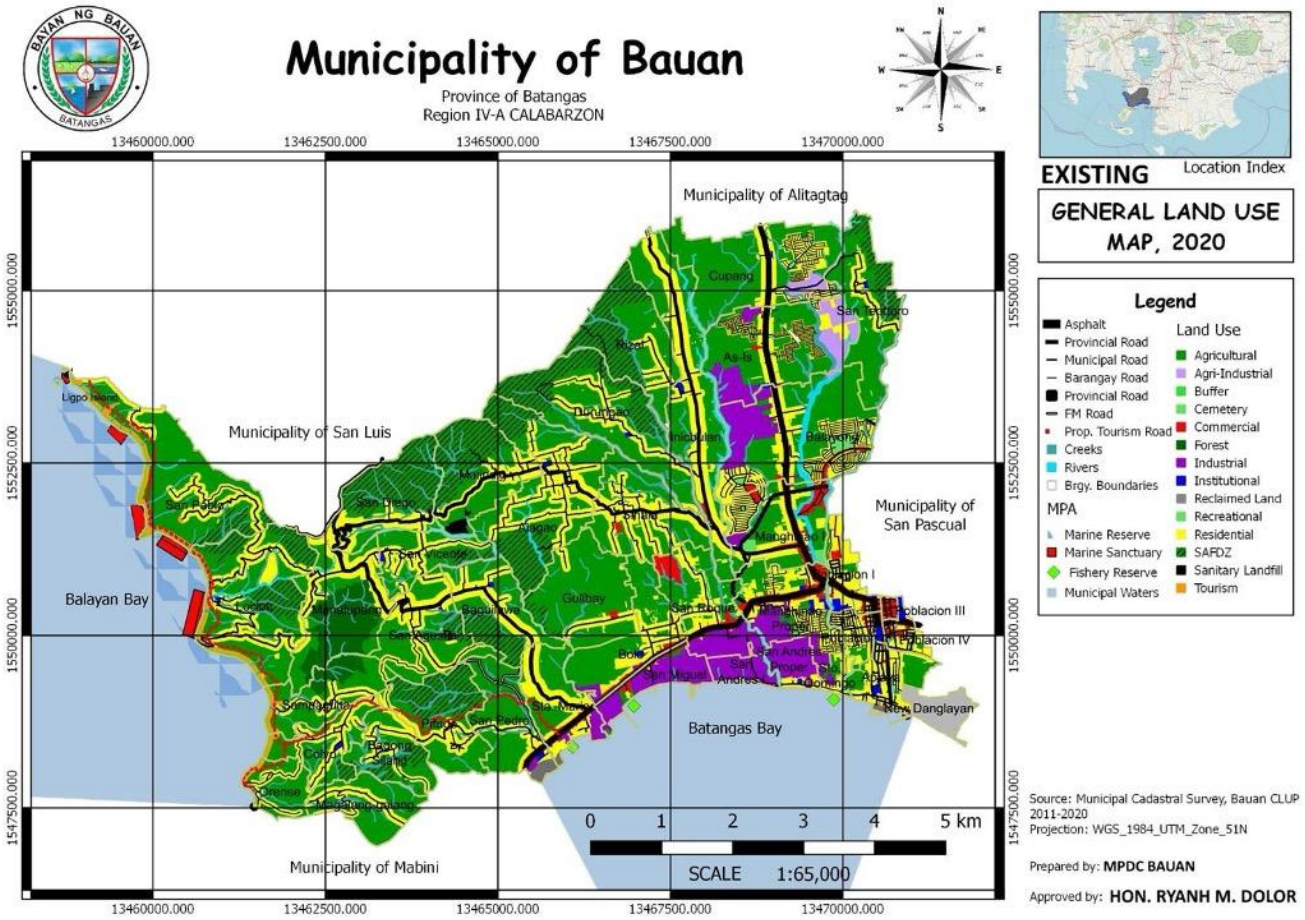

Figure 7-60 Existing Land use Map of Municipality of Bauan; 2011-2020

7.3.2 Land Tenure and Displacement Context

7.3.2.1 Properties

The Project will be implemented within the existing property of BIPI and adjacent areas, with a total land area of approximately 29.76 hectares. Baseline assessments conducted identified portions of the Project Area that are currently occupied, including areas with informal settlers and other potentially affected persons within properties owned or managed by BIPI. As such, the proposed redevelopment area overlaps with existing residential occupancy. This information establishes the existing land tenure and settlement conditions within

the Project Area and serves as the reference point for subsequent resettlement planning and implementation. Detailed information on affected persons, land tenure status, and resettlement arrangements is provided in the Resettlement plan.

7.3.2.2 Land Ownership

Land ownership within the Project footprint is mixed. Portions of the area form part of the BIPI project footprint and are under BIPI authority for port development and operations. Within the same footprint are privately owned parcels held by 25 titled landowners, comprising 15 parcels in the marine area and 10 parcels in the Ilaya area. In addition, certain areas within the Project footprint have been occupied for many years by informal settler households. The management of land acquisition, compensation, and resettlement associated with these existing land tenure conditions is addressed separately in a standalone Resettlement Plan.

7.3.2.3 Right of Way

No Right-of-Way is expected to encounter any changes or conflicts, as the project will be carried out within the existing property owned by BIPI. Since the enhancement is limited to this designated area, there will be no need for a new right of way, effectively reducing the likelihood of conflicts or issues related to land access or ownership.

7.3.3 Labor Influx

7.3.3.1 Labor Influx and in-migration

Labor influx is anticipated if BIPI engages additional workers from outside the host barangays and province. To manage potential demographic changes, BIPI and its third-party contractors will prioritize the hiring of qualified local workers where feasible. Nevertheless, the scale of the proposed redevelopment indicates that a portion of the workforce may be sourced from outside the local area.

During the construction phase, approximately 2,035 workers are expected to be employed for port infrastructure redevelopment activities. This workforce is anticipated to consist largely of construction and technical personnel, which may result in a temporary increase in the local population during peak construction periods. Such in-migration may influence demand for basic services, including water supply, sanitation, healthcare, and other community facilities, and may affect local population composition.

Following construction, the operational phase of the Project is expected to require an estimated 471 employees to support routine port operations, including cargo handling, logistics, administration, and maintenance. This expansion of the workforce is expected to contribute to local employment levels and economic activity within the municipality.

Further assessment of gender-differentiated implications associated with labor influx is provided in the Gender Analysis Chapter.

7.3.4 Socio-Cultural Characteristics

7.3.4.1 Demographic Data on Indigenous People (If Any) and Existing Culture/Lifestyle That May Be Significantly Affected

There are no indigenous communities within the project site, and the project is not expected to significantly impact the culture or lifestyle of the local population. However, the re-development project is anticipated to bring increased revenue to the host LGU through tax payment from the proponent. This additional revenue may enable the implementation of more projects aimed at improving the residents' quality of life.

While the cultural or lifestyle changes may not be substantial, there could be positive shifts resulting from the improved living conditions within the host city. This could be further enhanced by the Social Development Plans (SDP) that the proponent will establish, which aim to benefit the local community.

7.3.5 Threat to Deliver of Basic Services/ Resource Competition

Availability of public services in terms of:

Water Supply

Waterworks Systems and Management Bodies

All barangays in the municipality have waterworks systems. Urban barangays including all barangays with urban influence are under the management of Aqua Data, Inc.; a private entity, while the waterworks cooperatives in 21 barangays are being managed by each waterworks cooperative and/or barangay council in the barangays. Table 7-43 shows the latest water rates being charged by the Aquadata, Inc. within their coverage areas.

Table 7-43 Water Rates, 2020

Classification	Size of Water Pipe Connected	Minimum Rate – 10 cu.m. below (pesos)	11-20 cu.m. (pesos per cu.m.)	21-30 cu.m. (pesos per cu.m.)	31-40 cu. m (pesos per cu. m)	40 cu. m. and up (pesos per cu. m.)
Residential						
	½”	150	18	19.5	21.95	25.8
	¾”	276	18	19.5	21.95	25.8
	1”	532	18	19.5	21.95	25.8
	1 ½”	961	18	19.5	21.95	25.8
	2”	1,260.00	22	24	28.4	30.8
	3”	3,520.00	26	28.8	32.4	36.34
Commercial / Industrial						
	½”	360	36	37.5	40.6	43.1
	¾”	580	36	37.5	40.6	43.1
	1”	1,060.00	36	37.5	40.6	43.1
	1 ½”	1,930.00	36	37.5	40.6	43.1
	2”	3,320.00	45	49	55	59
	3”	6,540.00	55	60	65	69

The 16 barangays under the direct management of Aqua Data, Inc. coverage are: Poblacion I-IV, Aplaya, part of Bolo, Cupang, Manghinao Proper, Manghinao I, New Danglayan, San Andres I, San Andres Proper, San Miguel, San Roque, part of Sta. Maria and Sto. Domingo. The barangays have total population of 58,112 or about 63.65% of the municipality’s total population.

Barangays, whose waterworks systems are managed by the barangay water cooperatives and/or barangay

council total to 25 barangays. These barangays are: Alagao, As-Is, Bagong Silang, Balayong, Baguilawa, parts of Bolo, Colvo, Gulibay, Inicbulan, Locloc, Magalang-galang, Malindig, Manalupang, Orense, Pitugo, Rizal, Sampaguita, San Agustin, San Diego, parts of Sta. Maria, San Pablo, San Pedro, San Teodoro, Sinala, and San Vicente. Total population in these barangays is 38,177 or 37.47% of the total municipality's population. By the end of the planning period in 2030, population in these barangays will be 46,791. Maintenance of barangay waterworks system is the concern of waterworks cooperatives organized for the purpose and/or of each barangay council.

Nevertheless, the municipality of Bauan still has allotment for the improvement and/or rehabilitation of Barangay Waterworks System as part of public service delivery.

The list of barangays and population served by waterworks system management bodies is shown in Table 7-44.

Table 7-44 Barangays served by Waterworks System Management Bodies

Name of Barangays Covered	Population Served	Type of Waterworks System Management
1. Poblacion I	1,501	BWS/Aqua Data, Inc.
2. Poblacion II	3,081	BWS/Aqua Data, Inc.
3. Poblacion III	560	BWS/Aqua Data, Inc.
4. Poblacion IV	2,447	BWS/Aqua Data, Inc.
5. Aplaya	7,652	BWS/Aqua Data, Inc.
6. Baguilawa (Sitio Mahayhay)	1,421	BWS/Aqua Data, Inc.
7. Parts of Bolo	4,239	BWS/Aqua Data, Inc.
8. Cupang	1,819	BWS/Aqua Data, Inc.
9. Manghinao Proper	8,024	BWS/Aqua Data, Inc.
10. Manghinao I	2,393	BWS/Aqua Data, Inc.
11. New Danglayan	1,768	BWS/Aqua Data, Inc.
12. San Andres Proper	2,640	BWS/Aqua Data, Inc.
13. San Andres I	588	BWS/Aqua Data, Inc.
14. San Miguel	1,841	BWS/Aqua Data, Inc.
15. San Roque	6,149	BWS/Aqua Data, Inc.
16. Sta.Maria	4,793	BWS/Aqua Data, Inc.
17. Sto. Domingo	2,299	BWS/Aqua Data, Inc.
18. Alagao	1,848	Brgy. Waterworks Coop./Brgy. Council
19. As-is	2,253	Brgy. Waterworks Coop./Brgy. Council
20. Bagong Silang	413	Brgy. Waterworks Coop./Brgy. Council

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21. Balayong	2,512	Brgy. Waterworks Coop./Brgy. Council
22. Colvo	498	Brgy. Waterworks Coop./Brgy. Council
23. Durungao	1,496	Brgy. Waterworks Coop./Brgy. Council
24. Gulibay	1,428	Brgy. Waterworks Coop./Brgy. Council
25. Inicbulan	3,026	Brgy. Waterworks Coop./Brgy. Council
26. Locloc	1,615	Brgy. Waterworks Coop./Brgy. Council
27. Magalang-galang	347	Brgy. Waterworks Coop./Brgy. Council
28. Malindig	393	Brgy. Waterworks Coop./Brgy. Council
29. Manalupang	1,072	Brgy. Waterworks Coop./Brgy. Council
30. Orense	716	Brgy. Waterworks Coop./Brgy. Council
31. Pitugo	647	Brgy. Waterworks Coop./Brgy. Council
32. Rizal	703	Brgy. Waterworks Coop./Brgy. Council
33. Sampaguita	539	Brgy. Waterworks Coop./Brgy. Council
34. San Agustin	937	Brgy. Waterworks Coop./Brgy. Council
35. San Diego	521	Brgy. Waterworks Coop./Brgy. Council
36. San Pablo	819	Brgy. Waterworks Coop./Brgy. Council
37. San Pedro	2,093	Brgy. Waterworks Coop./Brgy. Council
38. San Teodoro	1,637	Brgy. Waterworks Coop./Brgy. Council
39. San Vicente	617	Brgy. Waterworks Coop./Brgy. Council
40. Sinala	2,518	Brgy. Waterworks Coop./Brgy. Council

Number of Households served by Type of Water System

Thirty-eight (38) barangays have Level III or house-to-house connections within the municipality. Level III system services about 96% of the total residential households while the remaining percentages of households are of the Level I system. Commercial establishments are connected with the Level III system.

Location of water sources/waterworks system servicing the areas covered by the Aquadata, Inc. are: Poblacion I-IV, Aplaya, New Danglayan, Sto. Domingo, San Andres I, San Andres Proper, Manghinao Proper, Manghinao I, San Roque, Bolo, San Miguel, Sta. Maria, and Cupang.

Sources of water/waterworks system in the different barangays managed by cooperatives and barangay councils are in barangays Alagao, As-Is, Bagong Silang, Baguilawa, Balayong, Colvo, Durungao, Gulibay, Inicbulan, Locloc, Magalang-galang, Malindig, Manalupang, Orense, Pitugo, Rizal, San Agustin, San Andres I, San Pablo, San Pedro, San Diego, San Teodoro, San Vicente, and Sinala.

There is also an existing artesian well in Barangay Aplaya called **Gripo de Tarcena,** or otherwise known as

Old Faithful. This water source has been around since 1915, serving as a secondary source of fresh water for the municipality of Bauan. This is primarily used by the residents of Barangay Aplaya, but also by other citizens needing large amounts of water. It produces 332 cubic meters of water per day. This water source is used by residents with existing water lines at home but prefers tap water for drinking as opposed to filtered, mineral, or purified water, or during long **blackouts** when submersible pumps aren't working. This has also been a cost cutting way for residents in need of large amounts of water.

Large subdivisions have their own waterworks system that supplies water to their homeowners. These subdivisions are: Boomtown (both in Manghinao Proper and Cupang), Grand Villa, AMAIA, LynVille, and Catalina Lakes. These subdivisions have clearances from National Water Resource Board (NWRB) and report the volume of extraction annually.

Existing industrial establishments operate their own water supply system too. However, the sources are the same as the existing ones.

Table 7-45 Level I Water Supply System by Type and Number of Population Served, 2022

Barangay	Year Constructed	No. of Household	Shallow Well			Deep Well			Improved Spring			Hazard Susceptibility							
			No.	HH Served		No.	HH Served		No.	HH Served									
				No.	%		No.	%		No.	%	Fl	Tc	Eq	Vo	Ln	Ts	Su	Others
San Andres	n/a	151	100	151	100	0	0	0%	0	0	0%	H	L	L	L	L	H	L	

Table 7-46 Level III Local Waterworks System by Type of Consumer and Average Water Consumption

Name of Barangays Served	Type of Consumer							
	Domestic		Commercial		Industrial		Others	
	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption	No. of Connections	Ave. Water Consumption
Poblacion I	263	14	38	25	0	0	3	14
Poblacion II	405		27	25	0	0	2	14
Poblacion III	105	14	78	25	0	0	5	14
Poblacion IV	309	14	39	25	0	0	4	14
Aplaya	882	14	10	25	0	0	2	14

New Danglayan	138	14	0	0	0	0	1	14
Sto. Domingo	143	14	1	25	0	0	1	14
San Andres I	0	0	0	0	0	0	0	0
San Andres Proper	73	14	1	25	0	0	1	14
Manghinao Proper	937	14	31	25	0	0	2	14
Manghinao I	329	14	12	25	0	0	2	14
San Roque	643	14	9	25	0	0	2	14
Bolo	17	14	1	25	0	0	0	0
San Miguel	134	14	0	25	0	0	2	14
Sta. Maria	545	14	7	25	0	0	1	14
Cupang	225	14	4	25	0	0	2	14
TOTAL	**5,148**		**258**				**30**	
Alagao	499	23	0	0	0	0	0	0
As-is	1,531	22	0	0	0	0	0	0
Bagong Silang	108	14	0	0	0	0	0	0
Baguilawa	253	12	0	0	0	0	0	0
Balayong	686	14	0	0	0	0	0	0
Colvo	120	14	0	0	0	0	0	0
Durungao	413	14	0	0	0	0	0	0
Gulibay	320	14	0	0	0	0	0	0
Inicbulan	914	12	0	0	0	0	0	0
Locloc	372	14	0	0	0	0	0	0
Magalang galang	80	23	0	0	0	0	0	0
Malindig	100	14	0	0	0	0	0	0
Manalupang	287	10	0	0	0	0	0	0
Orense	175	14	0	0	0	0	0	0

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Pitugo	185	12	0	0	0	0	0	0
Rizal	206	14	0	0	0	0	0	0
San Agustin	219	14	0	0	0	0	0	0
San Pablo	12	14	0	0	0	0	0	0
San Pedro	320	18	0	0	0	0	0	0
San Diego	160	14	0	0	0	0	0	0
San Teodoro	475	14	0	0	0	0	0	0
San Vicente	120	14	0	0	0	0	0	0
Sinala	550	20	0	0	0	0	0	0
TOTAL	**8,105**							
GRAND	**13,253**		**258**				**30**	

Table 7-47 Water Distribution Line

Pipeline ID	Ownership	Diameter (mm)	Type of Pipe Material	Year Established	Physical Condition	Hazard Susceptibility (H/M/L)							
						Fl	Tc	Eq	Vo	Ln	Ts	Su	Others
n/a	PRIVATE	315	HDPE	2015	FAIR	L	L	L	L	H	L	L	
n/a	PRIVATE	225	HDPE	2015	FAIR	L	L	L	L	H	L	L	
n/a	PRIVATE	160	HDPE	2015	FAIR	L	L	L	L	H	L	L	
n/a	PRIVATE	110	HDPE	2015	FAIR	L	L	L	L	H	L	L	
n/a	PRIVATE	63	HDPE	2015	FAIR	L	L	L	L	H	L	L	
n/a	PRIVATE	50	G.I.	2015	FAIR	L	L	L	L	H	L	L	

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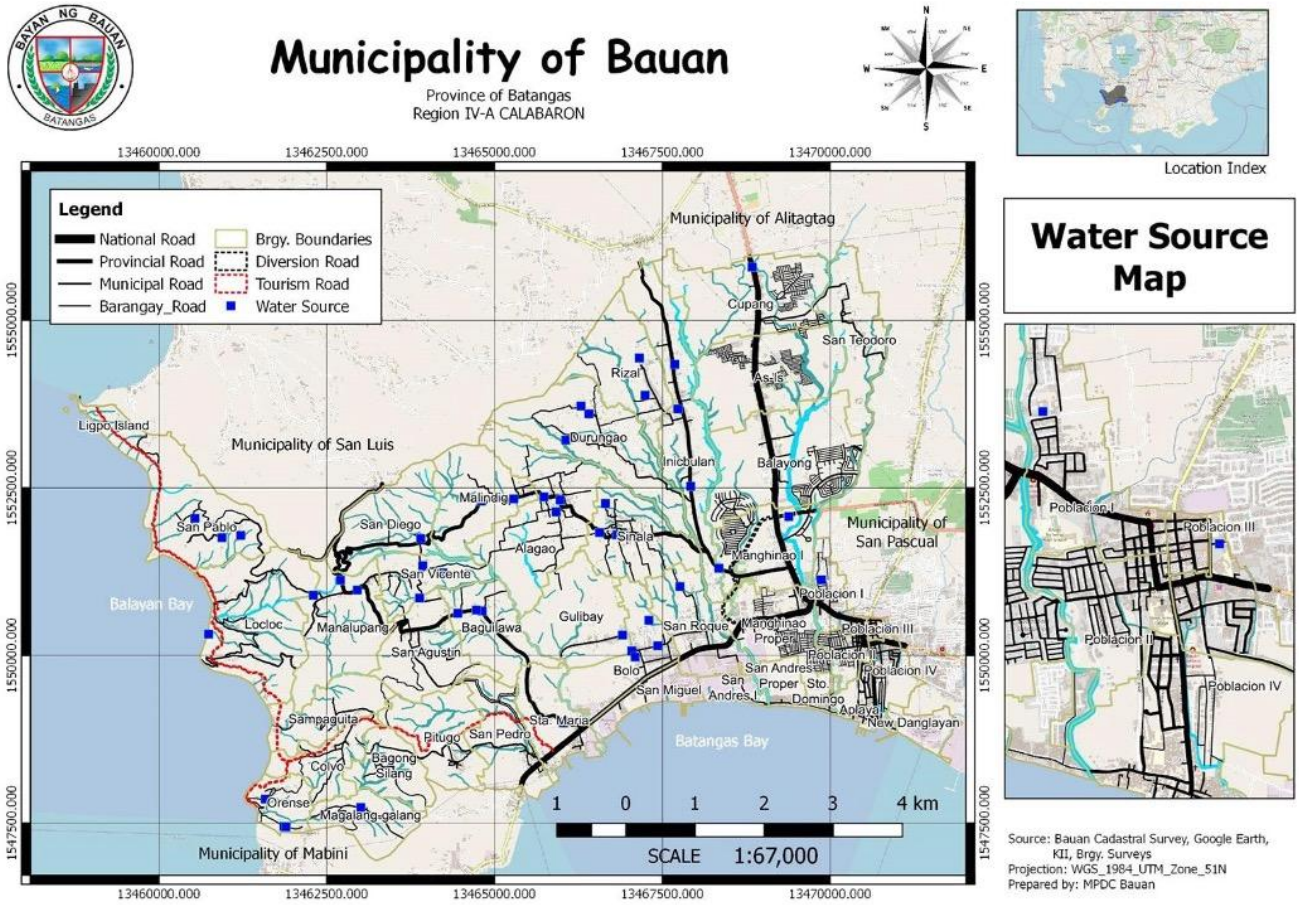

Figure 7-61 Water Source Map of Municipality of Bauan

Mitigation of Competition for Water Resources

The current domestic water is being sourced from the existing deep well and local concessionaire while drinking water is being procured from local refilling stations. With the planned redevelopment, the existing deep well will be replaced with a new deep well, and water demand will continue to be supplemented by the local concessionaire, as needed. All activities will be undertaken in accordance with applicable regulatory requirements to ensure sustainable groundwater use.

With the current operation, BIPI's water consumption is approximately 1,370 liters per day in terms of domestic use and 274 liters/day for drinking. With the planned re-development, the estimated water consumption per day during the construction phase is about 1,000L/day for domestic use and 120L/day for drinking. While during the operations phase the estimated water consumption is about 1200L/day for domestic and 220 L/day for drinking.

Power Supply

The power generation in Bauan is part of the over-all system of the Luzon grid. All of the 40 barangays in the municipality are fully energized.

A power service in the municipality has been provided by First Bay Power Corporation (FBPC) since 2006. The management of Bauan Electric Light Systems (BELS) facilities, which used to provide power services in earlier years, was taken over by FBPC in that year. Electric distribution and street lighting is the responsibility of FBPC. It purchases electricity from National Power Corporation (NPC). The company had a substation adjacent to Bauan Technical Integrated High School and at Balayong, Bauan.

Household Served and Un-served by electricity

As of 2020, FBPC is servicing 22,276 households and establishments. CH 6. Table 7-48 shows the households served by FBPC for the previous years, 2018, 2019, and 2020.

Table 7-48 Households Served with Electricity for the Past Three Years

Barangay	Total HH (2018*)	2018				Total HH (2019*)	2019				Total HH (2020*)	2020			
		Served		Unserved			Served		Unserved			Served		Unserved	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
A. Urban	**13,020**		**100%**	**0**	**0**	**13,434**		**100%**	**0**	**0**	**13,762**		**100%**	**0**	**0**
1.Aplaya	1,853	1,853	100%	0	0%	1,857	1,857	100%	0	0%	1,833	1,833	100%	0	0%
2.As-is	752	752	100%	0	0%	950	950	100%	0	0%	1,139	1,139	100%	0	0%
3.Balayong	612	612	100%	0	0%	620	620	100%	0	0%	631	631	100%	0	0%
4.Barangay I (Pob)	407	407	100%	0	0%	423	423	100%	0	0%	440	440	100%	0	0%
5. Barangay II (Pob)	795	795	100%	0	0%	827	827	100%	0	0%	859	859	100%	0	0%
6.Barangay III (Pob)	158	158	100%	0	0%	164	164	100%	0	0%	171	171	100%	0	0%
7.Barangay IV (Pob)	964	964	100%	0	0%	1,001	1,001	100%	0	0%	1,041	1,041	100%	0	0%
8.Bolo	1,014	1,014	100%	0	0%	1,024	1,024	100%	0	0%	1,033	1,033	100%	0	0%
9.Gulibay	312	312	100%	0	0%	322	322	100%	0	0%	326	326	100%	0	0%
10.Manghinao Proper	2,674	2,674	100%	0	0%	2,723	2,723	100%	0	0%	2,760	2,760	100%	0	0%
11.Manghinao I	618	618	100%	0	0%	632	632	100%	0	0%	625	625	100%	0	0%
12.San Miguel	322	322	100%	0	0%	320	320	100%	0	0%	319	319	100%	0	0%
13.San Roque	1,463	1,463	100%	0	0%	1,472	1,472	100%	0	0%	1,481	1,481	100%	0	0%
14.Sta. Maria	1,076	1,076	100%	0	0%	1,099	1,099	100%	0	0%	1,104	1,104	100%	0	0%
B. Rural	**8,131**		**100%**	**0**	**0**	**8,299**		**100%**	**0**	**0**	**8,514**		**100%**	**0**	**0**
15.Alagao	514	514	100%	0	0%	520	520	100%	0	0%	526	526	100%	0	0%
16.Bagong Silang	100	100	100%	0	0%	102	102	100%	0	0%	106	106	100%	0	0%
17.Baguilawa	325	325	100%	0	0%	330	330	100%	0	0%	337	337	100%	0	0%
18.Colvo	128	128	100%	0	0%	129	129	100%	0	0%	130	130	100%	0	0%
19.Cupang	469	469	100%	0	0%	520	520	100%	0	0%	594	594	100%	0	0%
20.Durungao	403	403	100%	0	0%	416	416	100%	0	0%	425	425	100%	0	0%
21.Inicbulan	824	824	100%	0	0%	839	839	100%	0	0%	860	860	100%	0	0%
22.Locloc	380	380	100%	0	0%	378	378	100%	0	0%	388	388	100%	0	0%
23.Magalang-galang	77	77	100%	0	0%	77	77	100%	0	0%	78	78	100%	0	0%
24.Malindig	102	102	100%	0	0%	105	105	100%	0	0%	105	105	100%	0	0%
25.Manalupang	273	273	100%	0	0%	276	276	100%	0	0%	287	287	100%	0	0%
26.New Danglayan	387	387	100%	0	0%	390	390	100%	0	0%	390	390	100%	0	0%
27.Orense	177	177	100%	0	0%	180	180	100%	0	0%	186	186	100%	0	0%
28.Pitugo	238	238	100%	0	0%	243	243	100%	0	0%	242	242	100%	0	0%
29.Rizal	171	171	100%	0	0%	173	173	100%	0	0%	178	178	100%	0	0%
30.Sampaguita	139	139	100%	0	0%	142	142	100%	0	0%	145	145	100%	0	0%
31.San Agustin	242	242	100%	0	0%	245	245	100%	0	0%	251	251	100%	0	0%
32.San Andres Proper	550	550	100%	0	0%	554	554	100%	0	0%	557	557	100%	0	0%
33.San Andres I	111	111	100%	0	0%	110	110	100%	0	0%	113	113	100%	0	0%
34.San Diego	129	129	100%	0	0%	132	132	100%	0	0%	133	133	100%	0	0%
35.San Pabo	100	100	100%	0	0%	100	100	100%	0	0%	102	102	100%	0	0%
36.San Pedro	519	519	100%	0	0%	527	527	100%	0	0%	526	526	100%	0	0%
37.San Teodoro	412	412	100%	0	0%	421	421	100%	0	0%	431	431	100%	0	0%
38.San Vicente	179	179	100%	0	0%	182	182	100%	0	0%	184	184	100%	0	0%
39.Sto. Domingo	522	522	100%	0	0%	531	531	100%	0	0%	542	542	100%	0	0%
40.Sinala	660	660	100%	0	0%	677	677	100%	0	0%	698	698	100%	0	0%
Total	**21,151**		**100%**	**0**	**0%**	**21,733**		**100%**	**0**	**0%**	**22,276**		**100%**	**0**	**0%**

Source: First Bay Power Corp.
Note: % = (No. of Household served/total no. of households) x 100
**Projection based on POPCEN 2015*

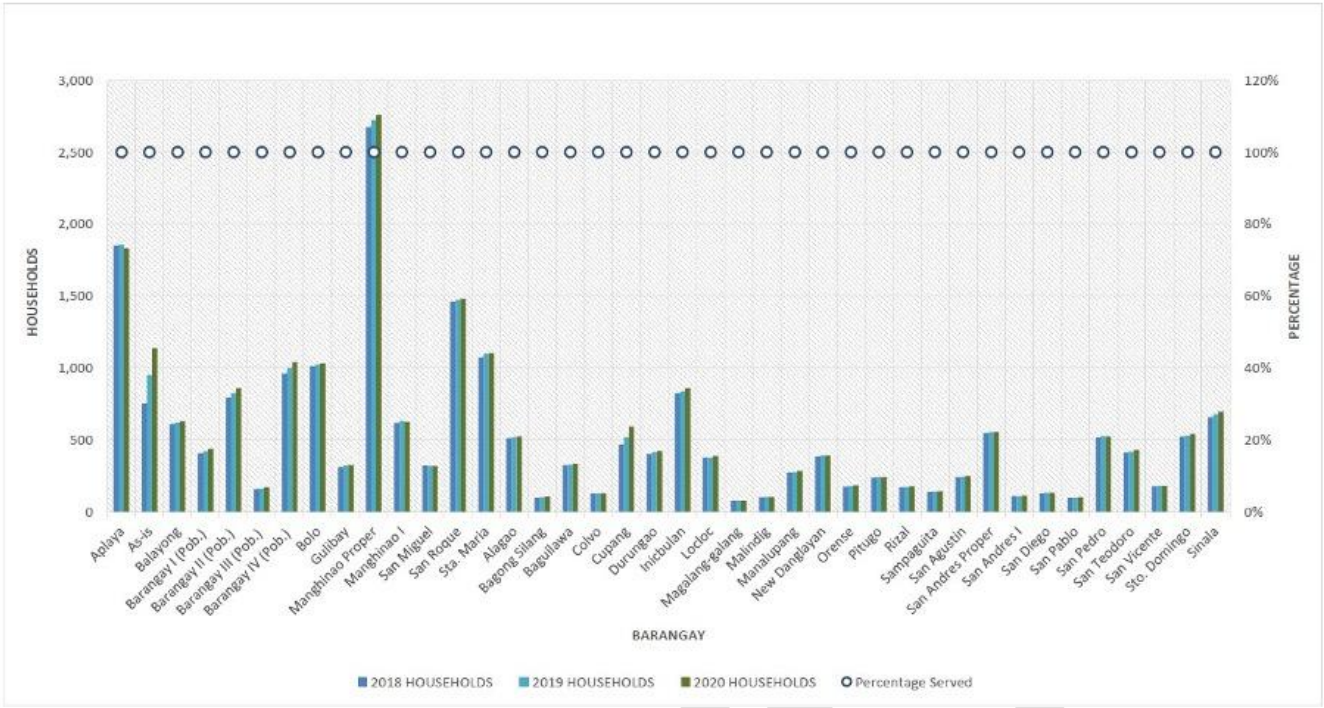

Figure 7-62 Households Served with Electricity for the Past Three Years

Number of Connections by Type of Users and Average Consumption

FBPC has total connections of 267,866 consisting of domestic, industrial, commercial, and public buildings as types of connections. Table 7-49 shows the number of connections by type of users and average consumption per month.

Table 7-49 Number of Connections by Type of Users and Average Consumption (KWH/Mo.)

Type of Consumers	2018			2019			2020		
	No. of Connections	KW	%	No. of Connections	KW	%	No. of Connections	KW	%
Residential	20,965	2,563,915	47.1	21,466	33,986,769	62.2	21,907	33,066,631	66
Commercial	2,014	1,314,337	24.1	2,075	17,362,531	31.8	2,073	13,998,420	28
Industrial									
Institutional									
Other: Public Buildings / Facilities; Street Lights	277,185	1,567,307	28.8	270,334	3,308,169	6.05	243,886	3,018,040	6.03
Total	300,164	5,445,559		293,875	54,657,469		267,866	50,083,091	

Source: First Bay Power Corp. (FBPC)
Note: % = (KW per type of consumer/Total KW) x 100

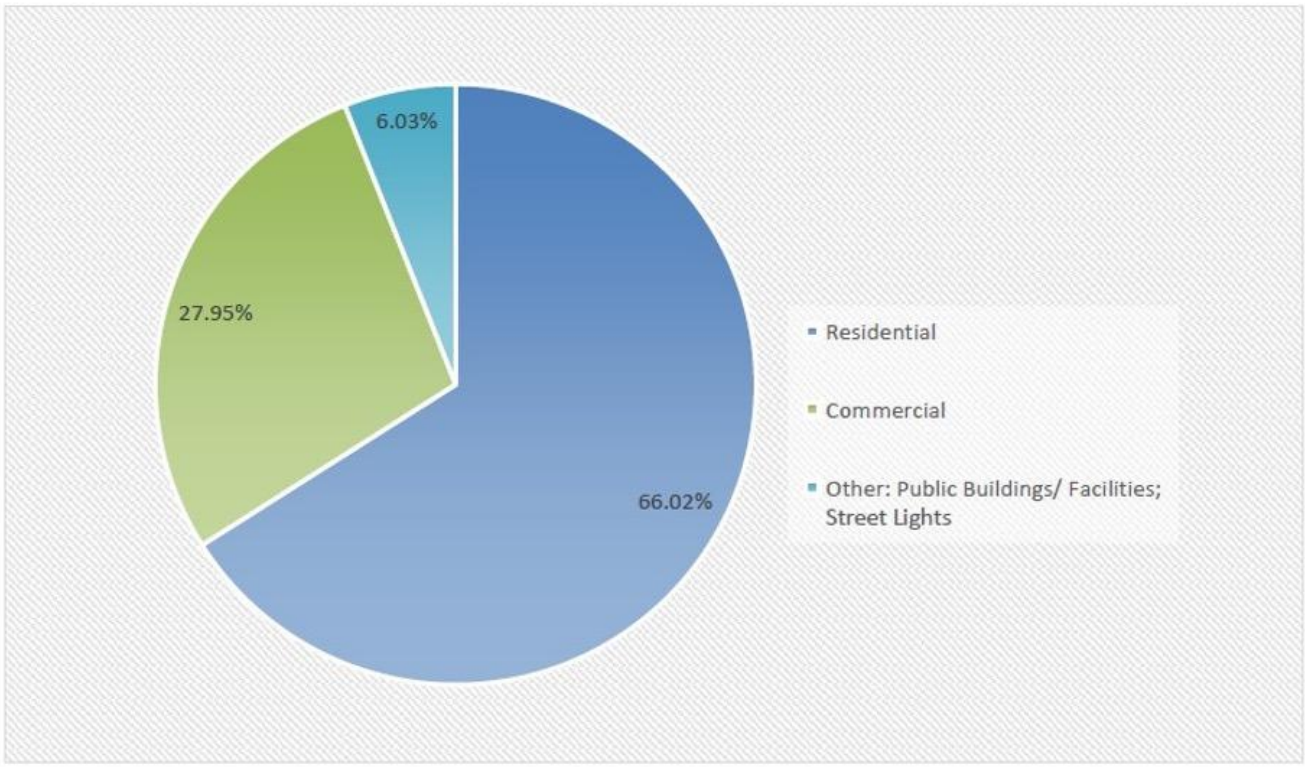

Figure 7-63 Power Consumption (kW) by Type of Consumers, Year 2020

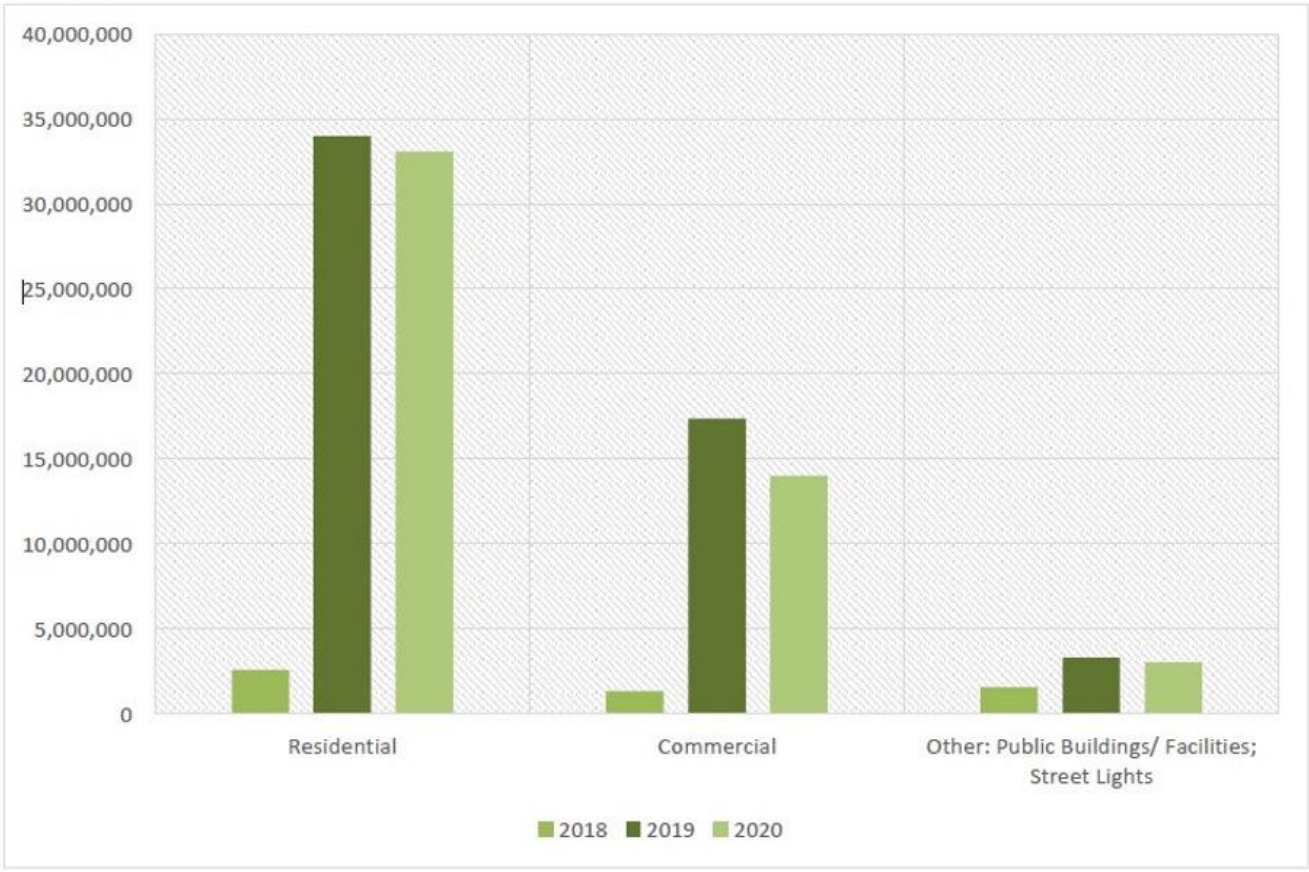

Figure 7-64 Power Consumption (kW) by Type of Consumers for the Past Three Years

In terms of power supply, BIPI will continue sourcing electricity for land-based equipment and the office camp through its service provider, FIRSTBAY Power.

Communications Services Facilities

Bauan has no deficiency when it comes to communication services. It currently has a number of cell sites and 4 internet and telephone service providers all of which are enough to service the forty (40) barangays of the municipality. It still also has postal services located within the CPD of the municipality.

Table 7-50 Communication Services Facilities, Year 2019

Type	Year constructed	Area	Barangay	Ownership		Hazard Susceptibility (H/M/L)							
						Fl	Tc	Eq	Vo	Ln	Ts	Su	Others
				Public	Private								
Postal Services	n/a		Poblacion II and III	1	1	M	L	L	L	L	M	M	
Internet Providers	n/a		40 Barangays		4	L	L	L	L	L	L	L	
Telephone Service Provider	n/a		40 Barangays		4	L	L	L	L	L	L	L	
Cell sites Network	n/a		40 Barangays		30	L	L	L	L	L	L	L	

Telecommunication

The cell sites operated by the telecommunication service providers also provide facilities for accessing the global communications highway. Through these facilities, access to internet connections made possible. On-line communications made possible through these facilities. The people of the municipality are using the internet communication networks such as e-mails, facebook, twitter, Skype, instagram, online communications like zoom, google and microsoft teams that are useful nowadays due to pandemic, cameras and other services provided by these facilities through computers. Computers connected to landline phones and even mobile cellular phones with internet connections make use of these facilities for information and communications. These facilities provide local, national and even international connections of people, goods and services for the population of the municipality.

The municipality serves by both landlines and mobile phones. PLDT, Globe, Ditto, and Converge operate landline phones using underground installation of fiber optic cable where their telecom box is located at Barangays Alagao and Sinala; and Manghinao I and San Roque, Poblacion, and upland barangays of Baguilawa, San Agustin and Manalupang respectively. Smart, Globe and Ditto Telecommunity Corporation cellular communication networks are also available. Refer to Table 18 or the location of cellists/guyed pole/telecom box.

Table 7-51 Cell Site Network, Year 2020

Location	Area Occupied (sq.m.)	Antenna Height	Date Installed	Catchment Radius	Owner
Gulibay	144.00 sq.m.	40.00 m	09/10/1998	No available data	Digital Telecommunication Phils. Corp.

Location	Area Occupied (sq.m.)	Antenna Height	Date Installed	Catchment Radius	Owner
Orense	400.00 sq.m.	40.00 m	9/14/2000	No data available	Globe Telecom
Orense	300.00 sq.m.	45.73 m	07/11/2001	No data available	Smart Communication
Poblacion II	20.47 sq.m.	30.00 m	02/20/2003	No data available	Digital Telecommunication Phils. Corp.
Manghinao I	143.10 sq.m.	26.00 m	2/28/2005	No data available	Globe Telecom
Alagao	256.00 sq.m.	42.00 m	07/07/2005	No data available	Globe Telecom
Orense	225.00 sq.m.	30.00 m	7/13/2006	No data available	Digitel Mobile Phils. Inc.
Sta. Maria	400.00 sq.m.	48.00 m	10/27/2006	No data available	Globe Telecom Inc.
Sampaguita	256.00 sq.m.	42.00 m	12/20/2006	No data available	Globe Telecom Inc.
San Pablo	256.00 sq.m.	42.00 m	12/20/2006	No data available	Globe Telecom Inc.
Inicbulan	256.00 sq.m.	42.00 m	2/23/2007	No data available	Globe Telecom Inc.
Manghinao I	256.00 sq.m.	42.00 m	6/28/2007	No data available	Digitel Mobile Phils. Inc.-Suncellular
Sinala	1.12 sq.m.	n/a	10/12/2007	No data available	PLDT
Alagao	n/a	n/a	10/12/2007	No data available	PLDT
Alagao	300.00 sq.m.	45.00 m	12/20/2007	No data available	Smart Communication Inc.
Gulibay	100.00 sq.m.	45.00 m	12/20/2007	No data available	Smart Communication Inc.
Poblacion II	256.00 sq.m.	42.00 m	8/28/2006	No data available	Globe Telecom Cell Site
Sta. Maria	256.00 sq.m.	42.00 m	7/22/2010	No data available	Digitel Mobile Phils. Inc.-Suncellular

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Gulibay	144.00 sq.m.	40.00 m	4/20/2010	No data available	Globe Telecom Inc.
As-Is	256.00 sq.m.	42.00 m	3/21/2011	No data available	Digital Telecom Phils.
Alagao	144.00 sq.m.	40.00 m	01/09/2015	No data available	Dominer Pointe Inc. w/ Bell Telecommunication Phils. Inc.
Manghinao Proper	300.00 sq.m.	35.00 m	6/19/2017	No data available	Smart Communications. Inc
San Roque	288.00	42.00 m	9/13/2018	No available	Digitel Mobile
Location	**Area Occupied (sq.m.)**	**Antenna Height**	**Date Installed**	**Catchment Radius**	**Owner**
	sq.m.			data	Phils. Inc.-Suncellular
Sta. Maria	144.00 sq.m.	35.50 m	12/10/2019	No data available	Dito Telecommunity Corporation
Inicbulan	144.00 sq.m.	34.50 m	12/10/2019	No data available	Dito Telecommunity Corporation
Gulibay	225.00 sq.m.	42.00 m	12/10/2019	No data available	Dito Telecommunity Corporation
Manghinao Proper	144.00 sq.m.	36.00 m	12/10/2019	No data available	Dito Telecommunity Corporation
Poblacion II	144.00 sq.m.	36.00 m	09/08/2020	No data available	Dito Telecommunity Corporation
Manghinao Proper	144.00 sq.m.	30.00 m	09/08/2020	No data available	Dito Telecommunity Corporation
Manghinao Proper	300.00 sq.m.	41.20 m	12/23/2021	No data available	Unity Digital Infrastructure Inc.
Poblacion IV	144.00 sq.m.	30.00 m	12/09/2021	No data available	Globe Telecom Inc.

Source: Bauan MPDC and MEO
Notes:
•Catchment Radius – refers to the service radius covered by the cell site network.
•Owner – refers to the company owner of the cell site network

The available information and communications facilities in the municipality provide access of the population to all types and classes of information available in the world. The basic and older forms of communications such as postal services and mass media are still present and vibrant in the municipality. The municipality and its people are also abreast of the modern-day developments in information and communications technology. Presence of state-of the art facilities for electronic messaging through mobile cellular phones, cellists, computers, and other present-day gadgets provide the population access and participation in the global information highway.

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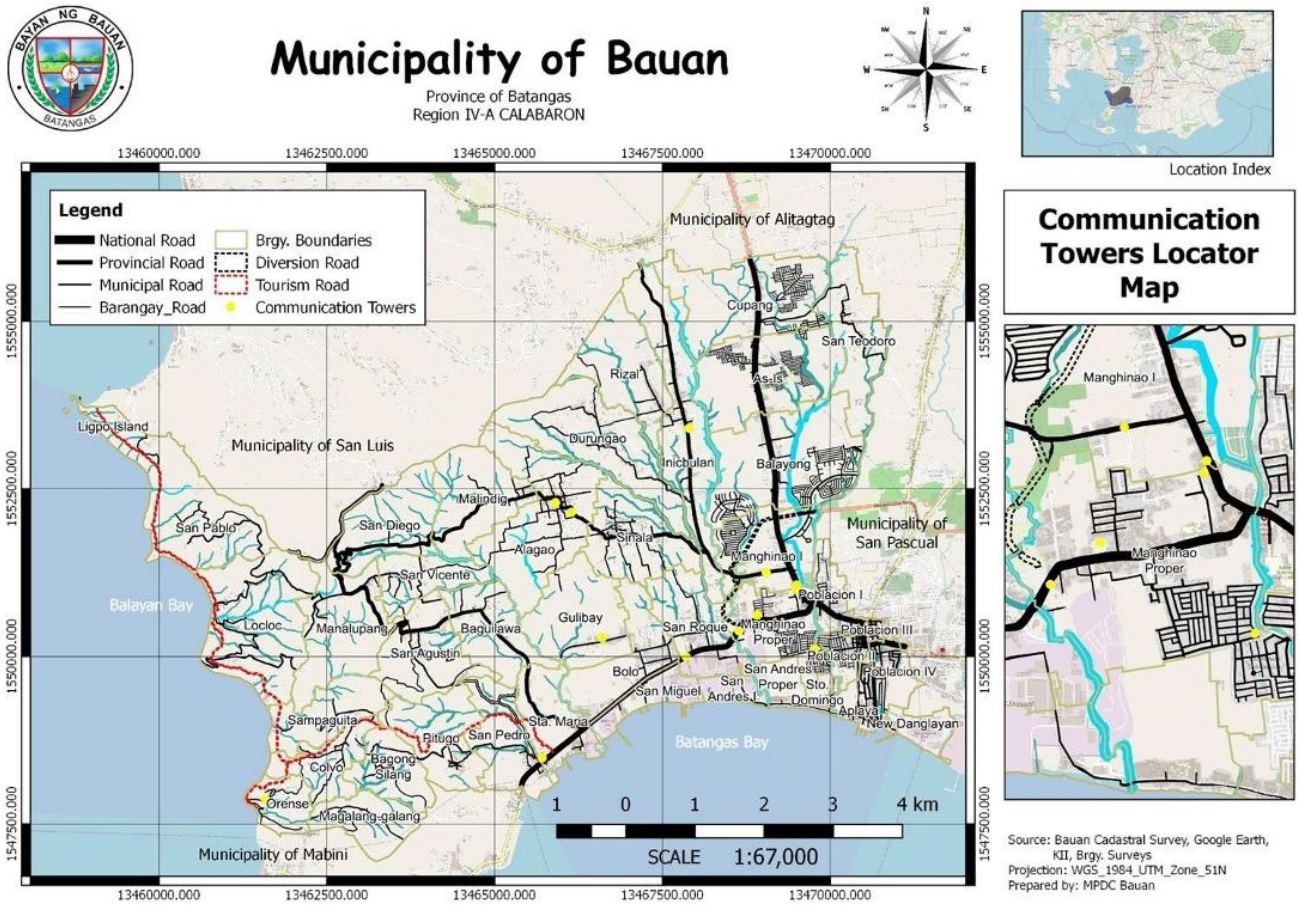

Figure 7-65 Communication Towers Locator Map

Protective Services

- *Facilities and Equipment*

The Philippine National Police (PNP) force stationed in Bauan is responsible for the maintenance of peace and order in the municipality. They are also at hand when it comes to responding to calamities and disasters. They are the chief implementers of Bayanihan Act 2020 to eradicate the spread of COVID 19. The police station is located in the Municipal Hall. The strength of the Bauan Municipal Police Station is within 54 personnel composed of two (2) PCOs and 52 PNCOs, headed by PLTCOL. Roderick DP Tonga, Chief of Police. The present policeman to population ratio is 1:1,886.

The Bauan Fire Station has a total of 22 personnel. Personnel to population ratio is 1:4,631 which is below the standard of 1 personnel per 2,000 populations. They have three fire trucks and they maintain 24 fire hydrants, 21 in the Poblacion and three in Aplaya.

There is insufficient number of police personnel vis-à-vis the current population and the number of industrial and commercial establishments. There is a compelling need for additional organic personnel to meet one PNP Personnel per Barangay to closely monitor and supervise the activities of Barangay Peace keeping Action Teams (BPATS) in relation to the Adopt a Barangay Program and to be more effective in the implementation of anti-crime strategies.

For fire protective services, there is a need to augment the fire truck and equipment needed to safeguard the lives and properties of the residents.

- *Barangay Security Force and Volunteers by Type of Service*

Barangay security force services include traffic, peace and order, disaster and auxiliary services. There are total of 404 volunteers, 50 of these are volunteers for traffic management, 247 for peace and order, 75 for disaster response and 32 for auxiliary services. Facilities and equipment include outpost, radio transceiver, batuta, flashlights, raincoats and patrol car/ambulance.

- *Fire Incidence*

The Bauan Fire Station responded to twenty (20) fire incidents of different establishments and origins in the municipality over the period of five years. The fire station recorded no fire incidence in the year 2016, two in 2017 and 2019, one in 2018, and fifteen fire incidences in the year 2020. Most of these fire incidents were grass fires during the hot months of March to May. BFP Bauan conducted a Fire Brigade Safety Seminar in seven (7) establishments. They also conducted regular inspections of business establishments and occasional rescue operations, particularly during disasters and calamities.

- *Crime Incidence for Adults*

Crime incidents in Bauan as it merely had a common denominator in RA 9165 or the so-called dangerous drug act. Though the figures are not quite low, still the Bauan Police Force made their efforts to eradicate these dangerous drug dependents. Manghinao Proper is the leading barangay with the greatest number of surrenderers. 31 out of 40 barangays in Bauan are now drug free and other 9 barangays are on their way to process theirs.

- *Crime Incidence for Children (below 18 years old)*

Theft is the only recorded crime involving children. There were total of 8 theft incidents in 2018 committed by children under 18 years of age, one in barangay Aplaya, one in barangay Sto. Domingo and six in barangay San Miguel. For 2019, there were a total of two theft incidents both of which belong to barangay Inicbulan. The Municipal Social Welfare and Development Office are the primary department that responds to the needs of these children in conflict with the law by giving them counseling sessions.

In terms of crime rate, the in-migration of workers could potentially lead to an increase in crime, as new individuals will be joining the community. However, BIPI's hiring policy prioritizes local residents whenever possible, especially when the required skills are available within the population.

Additionally, the proponent will continue to enforce a strict Code of Conduct for all employees and workers to ensure both their safety and that of the host community.

Availability of Public Services in Terms of Education

Highest Educational Attainment

Based on available education statistics for the population aged five (5) years and over in Bauan, a small proportion of the population (2.01%) has no grade completed, while the majority (97.99%) has attended at least pre-school education. The sex distribution of this population shows near parity, with males comprising 49.92% and females 50.08%.

In terms of highest educational attainment, out of a total population of 82,147 aged five (5) years and over, 9,896 individuals are elementary graduates, 21,600 are high school graduates, 2,901 have completed post-secondary education, 13,070 are college graduates or academic degree holders, and 55 have completed post-baccalaureate studies.

Sex-disaggregated patterns indicate that females slightly outnumber males among college and post-

baccalaureate graduates, while males are more represented among individuals with incomplete basic education. This distribution provides baseline context on the educational composition of the local population and the availability of skills across different educational levels.

Table 7-52 Total Population 5 Years Old and Over by Highest Grade/Year Completed/Educational Attainment and Sex, Year 2015

Highest Grade / Year Completed	Both Sexes		M	ale	Female	
	Number	Percentage	Number	Percentage	Number	Percentage
No Grade Completed	1,651	2.01	848	2.07	803	1.95
Pre-School	2,095	2.55	1,062	2.59	1,033	2.51
Special Education	41	0.05	22	0.05	19	0.05
Elementary	**22,755**	**27.7**	**11,050**	**26.93**	**11,705**	**28.47**
1st – 4th Grade	9,485	11.55	4,819	11.74	4,666	11.35
5th – 6th Grade	3,374	4.11	1,695	4.13	1,679	4.08
Graduate	9,896	12.05	4,536	11.05	5,360	13.04
High School	**30,751**	**37.43**	**16,479**	**40.16**	**14,272**	**34.71**
Undergraduate	9,151	11.14	4,656	11.35	4,495	10.93
Graduate	21,600	26.29	11,823	28.81	9,777	23.78
Post-Secondary	**3,054**	**3.72**	**1,557**	**3.79**	**1,497**	**3.64**
Undergraduate	153	0.19	72	0.18	81	0.2
Graduate	2,901	3.53	1,485	3.62	1,416	3.44
College Undergraduate	8,675	10.56	4,376	10.66	4,299	10.46
Academic Degree Holder	13,070	15.91	5,615	13.68	7,455	18.13
Post Baccalaureate	55	0.07	24	0.06	31	0.08
Total	**82,147**		**41,033**		**41,114**	

Source: PSA 2015

Availability of Public Services in Terms of Recreational Facilities / Sports Facilities

Sports and Recreation

Sports and recreation services are delivered by the Sangguniang Kabataan in every barangay, headed by an elected Chairman from among all the SK Presidents from the 40 barangays. The sports fests are conducted during the summer months in time with the school vacation. Ballgames, specifically, basketball and volleyball are the youth and crowds' favorites. These sports competitions are usually inter-color at the barangay level and inter-barangay at the municipal level. Municipal government funds, specifically, SK funds for every barangay are being utilized for the purpose.

There are also sports and recreation programs and activities implemented by the District Office of the Department of Education participated in by the pupils and students from elementary and secondary levels schools; both junior and senior high school students. These are funded out of the Special Education Fund (SEF) being managed by the Local School Board (LSB).

Leisure and relaxation are also provided to the people by recreational establishments present in the

municipality. These establishments include a public library, a physical fitness center, a dance studio, a music school, video games and play stations, billiard halls, multi-purpose halls and gymnasiums, and beach resorts. The municipality also has a lone park in the Poblacion with an area of 0.1481 hectares. The former Plaza Recto measuring 0.1734 hectare is now under leased contract with Adventure Land and Leisure Corporation. The second level is converted into a DTI accredited hotel while the ground level is a commercial establishment. The former recreational area in Poblacion IV is now converted to house different institutions like the office of the Barangay Captains, Municipal Agriculture, Senior Citizens and the office of Municipal Disaster Risk Reduction Management. A portion of natural spring in the area still serves as a relaxation area for the youth. Rivers and beaches in barangays also serve as relaxation places.

Exiting Sports and Recreation Facilities

Sports facilities are found in almost all barangays of Bauan, specifically basketball courts that also serve as volleyball courts and for other sports and recreational purposes. Forty-eight (48) public basketball courts and covered courts are distributed in the 40 barangays of Bauan. Other sports facilities are also located in private companies and subdivisions. Other recreational facilities include the Bauan Town Plaza, Pansol Park, and the Dambana ng mga Bayani.

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Threat to Public Health and Safety

Health and Sanitation

Health service delivery systems that are safe, accessible, high quality, people centered, and integrated are critical for moving towards universal health coverage. Service delivery systems are responsible for providing health services for patients, persons, families, communities and populations in general. While patient-centered care is commonly understood as focusing on the individual seeking care (the patient), people-centered care encompasses these clinical encounters and also includes attention to the health of people in their communities and their crucial role in shaping health policy and health services.

Service delivery systems should also consider the whole spectrum of care from promotion and prevention to diagnostic, rehabilitation and palliative care, as well all levels of care including self-care, home care, community care, primary care, long-term care, hospital care, etc., in order to provide integrated health services throughout the life course. Bauan Health Services also includes responding to calamities and disasters and supporting the countries in moving towards universal health coverage through improving the efficiency and effectiveness of their health service delivery systems.

General Health Situation

The crude birth rate is generally high in Bauan. For the year 2020, CBR is 17.8%. The average total fertility rate is 2 (computed from the data of live births and age specific fertility rates for age group 1549), which means that a woman would bear and average of 2 children by the end of her child bearing years if she were to pass through those years bearing children at currently observed age-specific rates.

Consultation number in both RHUs in 2016 was 21,540 and decreased to 16,677 in 2017. It increased to 25,701 in 2018 and decreased again in 2019 and 2020 to 10,268 and 6,557 respectively. The number of hospitalizations in 2016 was 32,400 and decreased to 14,186 in 2020.

The crude death rates in the years 2016 and 2017 are a little above 5% and it decreased to 4% in 2018. It then increased to 7.7% in 2019 and decreased again to 6.2% in the year 2020. The average infant mortality rate is 7.38 in the last five years while the average maternal mortality rate is 62.2.

Table 7-53 General Health Situation for the Past Five Years

Health Indicator	City / Municipal										Provincial	
	2016		2017		2018		2019		2020		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Fertility	1,696	19.5	1,531	16.8	1,500	15.3	1,707	17.0	1,884	17.8	-	14.24
Crude Birth Rates (CBR)	-	2	-	2	-	3	-	2	-	2	-	-
Total fertility Rate (TFR)	-	-	-	-	-	-	-	-	-	-	-	-
Morbidity	-	-	-	-	-	-	-	-	-	-	-	-
General Medical	-	-	-	-	-	-	-	-	-	-	-	-
Consultative Rate	21,540	-	16,677	-	25,701	-	10,268	-	6,557	-	-	-
Hospitalization Rate	32,400	-	51,278	-	31,073	-	15,959	-	14,183	-	-	-
Mortality	-	-	-	-		-	-	-		-	-	-
Crude Death Rate (CDR)	485	5.5	468	5.1	426	4	774	7.7	633	6.2	-	4.55

Proportioned Mortality Rate (PMR)	-	-	-	-	-	-	-	-	-	-	-	-
Infant Mortality Rate (IMR)	6	7.5	7	4.5	18	12	13	7.6	10	5.30	-	5.11
Young Child Mortality Rate (YCMR)	-	-	-	-	-	-	-	-	-	-	-	-
Maternal Mortality Rate (MMR)	3	176.8	1	65.3	1	71	0	0	0	0	-	97.87

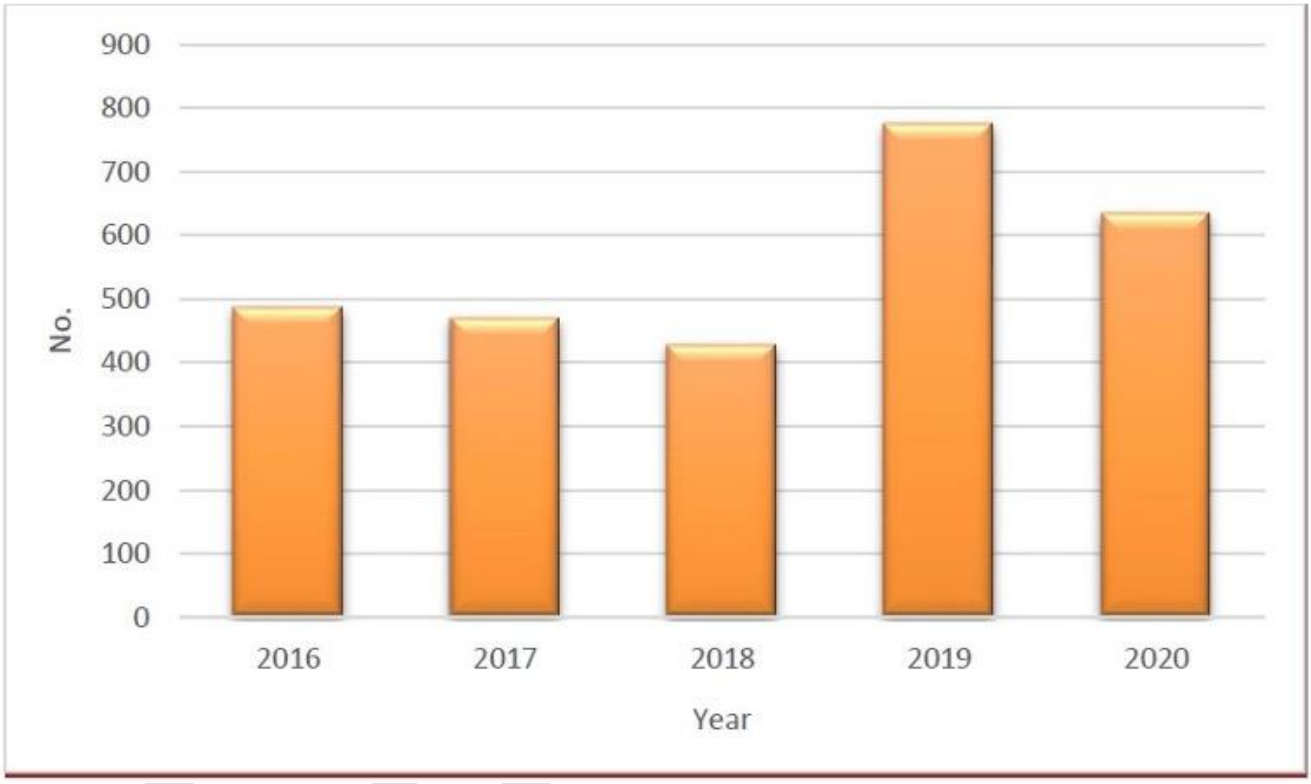

Figure 7-66 General Health Situation for the Past Five Years: Crude Birth

Facilities and Personnel

Health facilities in Bauan offer health and medical services not only to the people of the municipality, but also to those of the neighboring towns. These facilities can be grouped into two (2) types: the private and the public types. Bauan Doctors' General Hospital is a private hospital. Bauan General Hospital and Rural Health Units 1 and 2 are public. Bauan General Hospital offers primary level health services and is classified in terms of facilities as referral hospitals. This hospital is also considered as a municipal or primary care hospital with a service area radius of 30 kilometers, catering to the hospital needs of the people within its scope.

Bauan General Hospital (BGH) popularly known as Medicare, is a general and a primary level government hospital, owned and administered by the municipal government of Bauan. It is headed by the Municipal Mayor and assisted by the Deputy Hospital Administrator. The hospital is located in Poblacion IV and has a total land area of 4,631 square meters. It started its operation in 1974. Since then, BGH is serving not only Bauangueños but also residents from the municipalities of San Pascual, Mabini, Tingloy, Alitagtag, San Luis, Lemery, Taal, and some barangays of Batangas City like Sta. Rita, Bolbok, and Calicanto.

Medical services offered are emergency service, medicine, surgery, obstetrics/gynecology (OBGYNE),

pediatrics, anesthesiology, ophthalmology, eye-ear-nosethroat (EENT), neonalogy dietary service, pharmacy service, OR-DR service, psychiatric, dermatology, physical rehabilitation, and orthopedic. Auxiliary services include out-patient service, dental, rehabilitation units and health stations. The laboratory services are urinalysis, complete blood count, malarial smear, stool exam, sputum exam, radiology (x-ray), ECG and ultrasound. Other services include medicolegal, ambulance call, medical and social service records, ICU/CCU, nursing and maintenance services.

There are two government rural health units operating in the municipality of Bauan. Rural Health Unit I, categorized as Category VII is located at the Municipal Hall, at Poblacion 1 and covers barangays Poblacion I-IV and eastern barangays of Bauan with 18 barangays. Rural Health Unit II, categorized as Category VII is located at Barangay Aplaya and covers western parts of Bauan composed of 24 barangays. Bauan Rural Health Unit I serves a total population of 42,081 or 46% of the total population with 9,685 households and Bauan Rural Health Unit II has a clientele of 49,216 or 54% of the total population with 11,009 households.

The physical condition of all health facilities present in the municipality is fair and operational while the hazard susceptibility level of each facility is from low to moderate.

In terms of staffing, there are 134 personnel providing health, sanitation, and medical services to the people of Bauan. These are distributed to the three (3) municipal government's managed medical facilities. Of these numbers, 12 are assigned to Rural Health Unit I, 18 are assigned to Rural Health Unit II and 104 are working at Bauan General Hospital. Doctors, nurses, midwives and sanitary inspectors from the two RHUs serve the barangays that each RHU is responsible for. (Although, there are still casual employees, job orders and Barangay Health Workers – BHW assisting in the delivery of health services.) As per the Municipal Government's Municipal Health Office Plantilla, there is one (1) MGDH-MHO who heads the Municipal Health Office and Rural Health Unit I; two (2) Rural Health Physicians who is designated Head of Rural Health Unit II and one is designated Deputy Administrator of the Bauan General Hospital. Six (6) more doctors are assigned at Bauan General Hospital and are part of providing hospital services.

Standards in RHU Personnel Population per RA 1082 showed additional requirements for medical personnel in each unit:

RHU I needs
- Ø One (1) doctor,
- Ø One (1) nurse,
- Ø and One (1) sanitary inspector at present
- Ø Midwives are sufficient

RHU II needs
- Ø One (1) doctor
- Ø and one (1) sanitary inspector
- Ø Nurses excess in numbers while midwives are sufficient

The determined needs in terms of health personnel are considered augmented by the presence of medical officers and nurses at the Bauan General Hospital. There are 13 Barangay Health Stations also augmenting the services of the two Rural Health Units.

Figure 7-67 Bauan Health Facilities

Ten Leading Causes of Morbidity

The leading causes of morbidity are hypertension, diabetes, respiratory tract infection, viral infection, asthma, disorders of the urinary system, dermatitis, and bronchitis. Among these illnesses, only hypertension and type I diabetes mellitus recorded cases of deaths. See Table 7-54.

Table 7-54 Ten Leading Causes of Morbidity for the Past Five Years

Causes	No. of Deaths				
	2016	2017	2018	2019	2020
Essential (Primary) Hypertension	0	22	19	14	4
Type I Diabetes Mellitus	0	15	13	19	
Acute Upper Respiratory Tract Infections of Multiple & Unspecified sites	0	0	0	0	
Acute Lower Respiratory Infection	0	0	0	0	

Diabetes Mellitus	0	0	0	0	
Viral Infection of Unspecified site	0	0	0	0	
Asthma	0	0	0	0	
Other Disorders of Urinary System	0	0	0	0	
Atopic Dermatitis	0	0	0	0	
Acute Bronchitis	0	0	0	0	

Source: Annual Report of RHU 1 and RHU 2

Ten Leading Causes of Mortality

The leading causes of mortality for 2016 to 2020 includes pneumonia, Acute Myocardial Infarction, heart diseases, cancer of all kinds and hypertensive diseases. Pneumonia contributes to an average of 31.16% for the past five years while acute myocardial infarction has an average of 22.98%. See Table 7-55.

Table 7-55 Ten Leading Causes of Mortality for The Past Five Years

Municipal															Provincial		
2016			2017			2018			2019			2020			2020		
Causes	%	Total	Causes	%	Total	Causes	%	Total	Causes	%	Total	Causes	%	Total	Causes	%	Total
Pneumonia	22.74	93	Pneumonia	34.65	140	Pneumonia	33.68	130	Respiratory Disorders	29.90	206	Acute Myocardial Infarction	44.48	133	Acute Myocardial Infarction	28.16	822
Acute Myocardial Infarction	14.18	58	Ischemic Heart Disease and other Form of Heart Disease	16.58	67	Acute Myocardial Infarction	19.17	74	Complications of Ill-defined descriptions of heart disease	22.50	155	Pneumonia	30.43	91	Pneumonia	16.75	489
Ischemic Heart Disease and other Form of Heart Disease	13.69	56	Acute Myocardial Infarction	8.91	36	Cancer of All Kinds	11.40	44	Pneumonia	17.56	121	Cancer of All Kinds	4.35	13	Hypertensive Diseases	13.84	404
Other Forms of Heart Diseases	11.25	46	Other Cerebrovascular Diseases	7.67	31	Hypertensive Diseases	6.99	27	Acute Myocardial Infarction	8.42	58	Other Cerebrovascular Diseases	4.35	13	Type II Diabetes Mellitus	8.56	250
Viral Infections characterized by skin and	11.00	45	Cancer of All Kinds	6.68	27	Other Symptoms and Signs involving the Circulatory and Respiratory system	6.99	27	Cancer of All Kinds	4.79	33	Chronic Nephritic Syndrome	3.34	10	Cardiac Arrest	7.47	218
Malignant (Primary) Neoplasm	7.58	31	Hypertensive Diseases	6.68	27	Other Cerebrovascular Diseases	6.22	24	Malignant (Primary) Neoplasm	4.64	32	Hypertensive Diseases	3.01	9	Chronic Renal Failure	5.69	166
Cancer of All Kinds	5.38	22	Malignant Neoplasm	6.19	25	Complications of Ill-defined descriptions of Heart-Disease	4.92	19	Hypertensive Diseases	3.77	26	Complications of Ill-defined descriptions of Heart-Disease	3.01	9	Chronic Obstructive Pulmonary Disease	5.10	149
Cerebrovascular Diseases	5.38	22	Cerebrovascular Diseases	5.69	23	Chronic Nephritic Syndrome	4.15	16	Other Cerebrovascular Diseases	3.63	25	Stroke, not specified as Hemorrhage or infarction	3.01	9	Acute Upper Respiratory Infections	4.93	144

Other Cerebrovascular Diseases	4.89	20	Type I Diabetes Mellitus	3.71	15	ype I Diabetes Mellitus	3.37	13	ype I Diabetes Mellitus	2.76	19	Other General Symptoms and organs	2.01	6	Cerebral Infarction	4.86	142
Other Symptoms and Signs involving the	3.91	16	Other Bacterial Diseases	3.22	13	Neonatal Cardiac Failure	3.11	12	Chronic Nephritic Syndrome	2.03	14	Status Asthmaticus	2.01	6	Malignant leoplasm of Breast	4.62	135

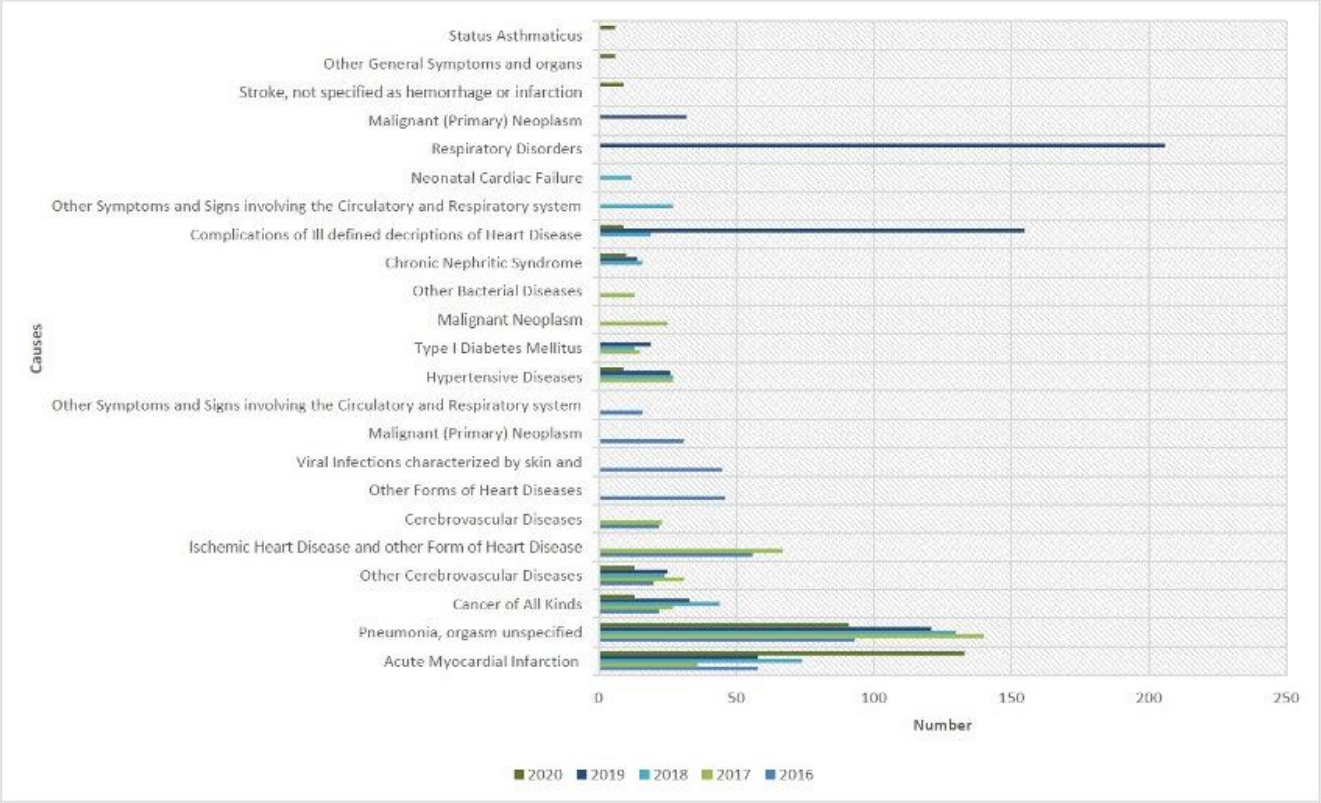

Figure 7-68 Causes of Mortality for the Past Five Years

Nutritional Status

The targets for nutrition development are the children ages 0-6 years old or those children 0-72 months old. This constitutes about 12.22% or 12,452 of the projected total population in 2020 computed based on NSO data 2015. Of this number, 12,806 or 104% are weighed. The percentage is high because the children from nearby municipalities are also weighed.

Nutritional status of children weighed under Operation Timbang for the CY 2020 is generally normal. There are seven (7) children that fall on the second degree of malnutrition and one (1) child that falls within the third degree of malnutrition accounting to a total of 0.03% of the total number of children aged 0-15 years. This should be the concern of nutrition programs and projects within the planning period. Table 7-56 shows nutritional status of children weighed in both RHUs.

Table 7-56 Malnourished Children for The Past Five Years

Degree of Malnutrition	City / Municipal									
	2016		2017		2018		2019		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%
1st										

2nd	20	0.07	17	0.06	5	0.02	4	0.01	7	0.02
3rd	2	0.01	1	0.00	1	0.00	2	0.01	1	0.00
TOTAL	22	0.08	18	0.06	6	0.02	6	0.02	8	0.03
Total No. of Children (0-15 years)	27,516		28,127		28,751		29,389		30,042	

Covid-19 Situation

Since the beginning of the global pandemic caused by the covid-19 virus, thousands of people have died all across the world. The disease's spread has had a significant impact on our perceptions of the world, our interactions with others, and our daily lives. The rate of infection and the manner of transmission have put human life in jeopardy. The Municipal Health Office of Bauan recorded a total of 605 Covid-19 cases in 2020. Majority of these cases are from the urban barangays, with a total of 477 cases while barangays from the rural areas recorded 128 cases. The total recorded number of deaths were 21.

Table 7-57 Covid-19 Confirmed Cases by Barangay 2020

Barangay	Total Cases			Number of Recoveries			Number of Deaths		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban	**332**	**145**	**477**	**322**	**141**	**463**	**10**	**4**	**14**
Aplaya	36	35	71	33	33	66	3	2	5
As-is	11	12	23	10	12	22	1	0	1
Balayong	7	4	11	6	4	10	1	0	1
Poblacion I	4	3	7	4	3	7	0	0	0
Poblacion II	14	14	28	13	14	27	1	0	1
Poblacion III	2	3	5	2	3	5	0	0	0
Poblacion IV	12	12	24	12	11	23	0	1	1
Bolo	128	20	148	127	20	147	1	0	1
Gulibay	13	4	17	12	3	15	1	1	2
Manghinao Proper	26	19	45	25	19	44	1	0	1
Manghinao I	1	6	7	1	6	7	0	0	0
San Miguel	1	2	3	1	2	3	0	0	0
San Roque	12	5	17	12	5	17	0	0	0
Sta. Maria	65	6	71	64	6	70	1	0	1
Rural	**71**	**57**	**128**	**66**	**55**	**121**	**5**	**2**	**7**
Alagao	1	2	3	1	2	3	0	0	0
Bagong Silang	2	1	3	2	1	3	0	0	0
Baguilawa	16	13	29	16	13	29	0	0	0
Colvo	0	0	0	0	0	0	0	0	0
Cupang	6	0	6	6	0	6	0	0	0
Durungao	2	1	3	2	1	3	0	0	0
Inicbulan	3	1	4	3	1	4	0	0	0
Locloc	0	0	0	0	0	0	0	0	0
Magalanggalang	0	0	0	0	0	0	0	0	0
Malindig	0	0	0	0	0	0	0	0	0
Manalupang	2	2	4	1	2	3	1	0	1
New Danglayan	10	5	15	9	5	14	1	0	1
Orense	0	1	1	0	1	1	0	0	0

Pitugo	1	1	2	1	1	2	0	0	0
Rizal	2	0	2	2	0	2	0	0	0
Sampaguita	0	1	1	0	1	1	0	0	0
San Agustin	1	1	2	1	1	2	0	0	0
San Andres Proper	4	11	15	4	10	14	0	1	1
San Andres I	0	0	0	0	0	0	0	0	0
San Diego	1	0	1	1	0	1	0	0	0
San Pablo	0	0	0	0	0	0	0	0	0
San Pedro	4	4	8	4	3	7	0	1	1
San Teodoro	0	1	1	0	1	1	0	0	0
San Vicente	1	0	1	1	0	1	0	0	0
Sto. Domingo	12	10	22	9	10	19	3	0	3
Sinala	3	2	5	3	2	5	0	0	0
Total	**403**	**202**	**605**	**388**	**196**	**584**	**15**	**6**	**21**

Generation of Local Benefits from the Proposed Project

Socio-economic Profile

Agriculture

Agriculture remains the basic economic activity in the municipality. It is still the most stable and sustainable source of income for the farmer households of the Municipality and Bauan has 2,256.01 hectares intended for agricultural development. These areas are devoted to crop production, livestock and poultry production, CARPable areas and Leasehold Scope. Livestock and poultry production is backyard and commercial scale. Fishing also provides employment to rural folks living along the coastlines.

- *Crop Production and Land Utilization by Type*

Agricultural crops being cultivated in the municipality are rice, sugarcane, corn, coconuts, fruits and fruit trees, and vegetables consisting of fruit vegetables, root vegetables, and legumes. Fruit and fruit bearing trees include mango, chico, bananas, lanzones, atis, coffee, citrus, avocado, guava, jackfruit, tamarind, santol, duhat, star apple, and papaya. Fruit vegetables are eggplant, ampalaya, cucumber, squash, patola, okra, upo, tomato, and pepper. Root vegetables are cassava, camote, ube, and gabi. Legumes include peanut, limabeans, sitao, and mongo. These are planted to a total land area of 115 hectares in different barangays of the municipality.

In support of agriculture, there is a mango Hot Water Treatment (HWT) facility established in this municipality at Barangay Inicbulan. The establishment of the said facility was financed by the Department of Agriculture Regional Field Unit No. IV-A with the support of the Local Government of Bauan and the Bauan Mango Growers and Contractors Multi-purpose Cooperative (BAMAGCO). The said facility is an effective post-harvest treatment for 'Carabao' mango. It requires dipping newly harvested fruits in hot water to minimize anthracnose and stem-end rot infestation, the two major causes of post-harvest losses in 'Carabao' mangoes. Unfortunately, this is not operational as of this writing.

- *Livestock and Poultry Production*

The total agricultural area devoted to livestock and poultry raising is 22.36 hectares. Commercial scale can be found in Barangays Rizal, San Agustin, Manalupang, and Baguilawa. Backyard raising can be found in almost all rural barangays. Hogs are butchered in the slaughterhouse and are mostly for local consumption. Some are transported to nearby markets and Metro Manila.

- *Fishing Grounds*

There are no aquaculture or inland fisheries in Bauan. Only marine fisheries can be found in the two coasts of the municipality. Average fish catch (kg) / fishing trip in the year 2020 was estimated at 360 kgs. and municipal fish production per year was 100.1 tons.

Only municipal fishing vessels or those vessels with a gross revenue ton (GRT) of three or less can be found in the municipal waters. These vessels are classified into motorized and non-motorized. There are 331 motorized and 145 non-motorized fishing boats in the municipality.

The office of the Municipal Agriculturist has organized and created 11 Barangay Fisheries and Aquatic Resources Management Council for coastal barangays along Batangas and Balayan Bays as well as the Municipal Fisheries and Aquatic Resources Management Council. The agriculture sector also employs 1,571 workers.

Commerce and Trade

The total declared commercial areas total to 145.08 hectares. Of these commercial areas, 114.27 hectare are in urban barangays of Poblacion I, Poblacion II, Poblacion III, Poblacion IV, Aplaya, As-is, Balayong, Bolo, Gulibay, Manghinao Proper, San Miguel, San Roque, and Sta. Maria.

The area of concentration of these establishments is more notable in the Poblacion barangays specifically within the influenced areas of the public market. These areas can also be considered as the Central Business District (CBD) of the municipality. The CBD has a total area of 56,293.45 square meters or 5.6293 hectares. It covers the public market as the core at Poblacion III, western side of the road from Poblacion III to IV with the Bauan East Central School and Bauan High School on the east, both sides along the stretch of J.P. Rizal St. from Poblacion II to IV, along Kapitan Ponso Street which is a national highway), and whole stretch of F. Mangobos St. from Manghinao Proper to Poblacion I (portion of the national highway). Notable commercial establishments in the areas are Citimart, e-Life, Me & City, Mr. DIY, Pramea Building in Poblacion II, Consorcia Building at Manghinao I, and junction at Manghinao Proper going to Mabini and Lemery.

There are 2,771 registered commercial establishments in the Municipal Government of Bauan for the year 2020. This showed a decrease of about 9% from that of the year 2019 which recorded a total of 3,033 establishments. This decrease can be attributed to the Covid19 Pandemic which greatly affected the commercial sector worldwide.

The commercial establishments in the municipality are generally classified as tertiary or services industries. Of the 2,771 commercial establishments in 2020, wholesale and retail trade economic activities are the largest with a total of 1,777 establishments constituting about 64% of the total commercial establishment in the municipality. It includes the market stalls and small stores or sari-sari stores distributed in all barangays of the municipality.

Industry

Bauan is host to various types of industries such as shipbuilding, fabrication, manufacturing, storage, feed milling, and knitting or garments industry. There are 39 industrial establishments located in the different barangays. Atlantic Gulf and Pacific Co. Inc. is an industry that is Philippine Economic Zone (PEZA) accredited. It's host to different companies like Mitsubishi Hitachi Philippines, Inc. (MHPS), and BIPI. Likewise, Keppel Philippines is also PEZA accredited. Batangas Bay Terminal, Inc. (BBTI) at Barangay San Miguel is also an industrial compound/park considered as an industrial area.

The actual aggregate land area occupied by the different industrial establishments total 572.30 hectares.

Tourism

Tourist attractions of the municipality include: natural physical features such as scenic beaches with pristine waters and underwater dive sites along the coastline of Balayan Bay on the western front of the municipality, mountainous areas, and rolling hills and terrains overlooking Batangas Bay offering a breathtaking view of the winding shoreline where it meets the horizon on the southern gap between Matuco Pt and Isla Verde Island. Miniature waterfalls; religious/cultural/historical edifices and buildings; and festivals and cultural activities. Some of these attractions are fully developed and are presently catering to the rest and relaxation needs of the native population as well as tourists and guests in the municipality both from local and international origin.

There are existing tourism support facilities and services located in the urban and rural barangays that make Bauan more appealing to tourists. Aside from the hospitality of the people of Bauan, various delicacies like londres, tiping, empanada and pianono are Bauan's pride.

Traffic Conditions

Road Network/ Systems

Transportation

The town lies 120 kms south of Manila, the Philippine capital, and 7 kms. West of Batangas City, the provincial capital. The municipality is regarded as one of the most strategically situated towns in the archipelago for its impressive accessibility through modern road network and distinct coastlines. The town also serves as one of the province's services and administration centers. It is also centrally located within the province and is easily accessible from all cities and municipalities of the province through major road networks, i.e., from the north through Lipa City-Alitagtag Road, from the south through Mabini-Bauan road, from the east via Batangas City, and from the west through Bauan-Palico road. Its proximity to Batangas International Port is an added advantage.

Batangas-Palico highway in the southern portion of the province of Batangas connects the western towns of Batangas-to-Batangas City, the provincial capital. This connects it to the Star Toll Way, the SLEX, and finally Metro Manila. The Batangas- Palico highway passes through the coastal towns of the province where heavy and light industries are located. The highway traverses through the very center of the town proper of Bauan. These industries' demand for raw material supplies and the finished products transported to Metro Manila, result in a large volume of trailer trucks plying this arterial road. The sheer volume of trucks servicing these industries and those located in the town of Mabini and southwestern barangays of Bauan have the greatest impact on the traffic congestion of Bauan town proper. Those trucks pass through the narrow streets of the Central Business Center (CBD) of Bauan, creating extreme traffic every time the truck ban needs lifting.

Bauan Town Proper has narrow streets as it was originally designed and built in the pre-war era. However, as time passes and demand grows, this kind of unchanged streetscaping devolves into a problem. And so, as response to this, Bauan plans to undergo a road widening program. The plans for road widening within the Town Center though is yet to materialize as of this writing. And given the existing buildings and ancestral homes along this section, the widening project is expected to be limited and shall regretfully only have a minimal impact on the current traffic situation. There is however, an on-going road widening project outside the town proper in Bauan's growth nodes, north of the CBD. This includes the barangays Manghinao Proper and Manghinao 1. Although resulting in minor traffic congestion in the Manghinao Junction, this effect is expected to only be temporary. Further cause of traffic are jeepneys from other municipalities passing through the town center. Although having designated jeepney stops, these PUVs most often than not, stop to board and alight passengers everywhere, thus the traffic.

Also, all streets in the vicinity of the Bauan Public Market serve as terminals of PT Jeepneys and tricycles with different routes. Half of the streets are utilized as parking with the area around the Bauan Public Market serving as the jeepneys' and tricycles' parking zones. The BINAY PROPERTY, a vacant lot near Bauan Colleges Inc. under the jurisdiction of the municipality of San Pascual, serves as the holding area for jeepneys belonging to various JODAs. Jeeps bound for Mabini and Lemery also use the area in front of Bauan Colleges Inc. as parking.

Further problems arise in the fact that the main road or the National Road which functions as an arterial road has a lot of designated stops. Tricycles also pass through these roads because there is no alternative route

for them, causing severe traffic.

As such, Poblacion being the Central Business District (CBD) which has institutions such as schools, hospitals, churches, and supermarkets – all of which demand heightened people activity - results in the convergence of transport providers. This causes traffic logjams made worse by indiscriminate vehicle parking everywhere.

Inventory of Roads and Bridges (external / internal linkages)

The road network of Bauan consists of four types: national, provincial, municipal, and barangay. National roads, functionally classified as arterial roads, serve as the main thoroughfares of Bauan's road network. Provincial, municipal, and barangay roads, functionally classified as collector and service roads, serve as means of access to the arterial roads.

Land transportation is the major means of transporting people and goods in the municipality. At present, Bauan has a total of 131.17898 km. total length of roads. Of this length, 117.4692 km. is concrete, 1.5 km is asphalt, and 12.2098 km. is gravel and earth road.

National Roads

The major or main roads in the municipality is the national road which runs across the north passing barangays Poblacion I-IV, Manghinao I, Balayong, As-is, and Cupang, and across the west passing barangays Manghinao Proper, San Roque, San Miguel, Sta. Maria and San Pedro. It measures 6.312 kilometers running along a south-north direction going to the Municipality of Alitagtag, and 5.2722 kilometers running along east-west direction going to the Municipality of Mabini. The pavement is 100% concrete and is in good condition. It constitutes about 8.83% of the total road length. With the road right of way of 8 meters wide, the area occupied by the national road is about 9.2673 hectares of land. It is a portion of the national road from the City of Manila, extending toward CALABARZON Region to the southeastern and western shores of Verde Island in Batangas Province, particularly the Batangas and Balayan Bays, which are the coastal boundaries of mainland Luzon with the Mindoro Provinces.

The road is the major thoroughfare of the municipality and is the Central Business District. Commercial, Institutional and Industrial uses are present on both sides of the road. It is the major arterial road where a sub-network of collector roads emanates and ends or vice-versa.

Provincial Roads

Provincial roads passing through the municipality total to 16.2983 kilometers or about 12.42% of the total road length and 100% concrete pavement and are in good/fair condition. It occupies a total land area of 8.1491 hectares. The road systems consist mainly of provincial roads systems with portions of barangay roads included. The barangays covered by Provincial Roads are Barangays Alagao, Sinala, Malindig, Baguilawa, Inicbulan, Manghinao I, San Agustin, Sta. Maria, Manalupang, San Diego, Aplaya, Poblacion II, and Poblacion IV.

Municipal Roads

Municipal Roads total to 20.1398 kilometers which constitute about 15.35% of the total road length. Concrete municipal roads are almost 91.56% while the remaining 8.44% are gravel type of pavement and are in good/fair condition. These municipal roads are in barangays Rizal, San Pedro, Manalupang, Pitugo, San Vicente, San Pedro-San Agustin, Aplaya and most of the municipal roads (21 municipal roads) are in Poblacion areas, barangays Poblacion I, II, III and IV. Municipal roads occupy 10.0699 hectares of land.

Barangay Roads

Barangay roads total to 83.1568 kilometers which is about 63.39% of the total road length. Of this road length, 85.56% have concrete pavement, 1.80% have asphalt, and 12.64% have gravel. Barangay roads provide access and mobility within the territorial boundaries of respective barangays. They serve as an internal road system in each barangay.

Table 7-58 Inventory of Roads by System Classification and Type of Pavement, 2019

Roads By System Classification	Road Surface Type													Hazard Susceptibility							
	Right Of Way (ROW)	Total Length (Km)	CONCRETE			ASPHALT			GRAVEL			EARTH			Fl	Tc	Eq	Vo	Ln	Ts	Su	O
			L (Km)	%	C	L (Km)	%	C	L (Km)	%	C	L (Km)	%	C								
National	8	11.58	11.58	100	Fair	0	0		0	0		0	0		L-M	L	L	L	L	L	L	L
Provincial	5	16.30	16.30	100	Fair	0	0		0	0		0	0		L	L	L	L	L-M	L	L	L
Municipal	5	20.14	18.44	91.56	Fair	0	0		1.7	8.44		0	0		L	L	L	L	L	L	L	L
Barangay Road	4	83.16	71.15	85.56	Fair	1.5	1.8		10.51	12.64		0	0		L	L	L	L	L-M	L	L	L
Alley		0																				
Footpath		0																				
Total		**131.18**	**117.47**	**89.55**		**1.5**	**1.14**		**12.21**	**9.31**		**0**										

Table 7-59 shows the barangays with road networks by classification and type of pavement.

Table 7-59 Inventory of Road Networks by Barangay, Classification and Type of Pavement, Year

Name of Road / Barangay	Classification (National, Provincial City, Municipal, Barangay)	Total Length (km.)	Length by Type of Pavement			Condition
			Concrete (km)	Asphalt (km)	Earth Gravel (km)	
1. Poblacion	National	1.32	1.32			Fair
2. Manghinao	National	1.302	1.302			Fair
3. Balayong	National	1.35	1.35			Fair
4. As-is	National	1.155	1.155			Fair
5. Cupang	National	1.185	1.185			Fair
6.Manghinao Proper	National	1.56	1.56			Fair
7.San Roque	National	0.829	0.829			Fair
8.San Miguel	National	1.58878	1.58878			Fair
9.Sta.Maria	National	0.8444	0.8444			Fair
10.San Pedro	National	0.45	0.45			Fair
Total	**National**	**11.58418**	**11.58418**			
11.Alagao	Provincial	0.70867	0.70867			Fair
12.Sinala	Provincial	1.3481	1.3481			Fair
13.Malindig	Provincial	0.6617	0.6617			Fair
14.Baguilawa	Provincial	1.5496	1.5496			Fair
15.Inicbulan	Provincial	5.0471	5.0471			Fair
16.Manghinao I	Provincial	0.392	0.392			Fair
17.San Agustin	Provincial	1.2257	1.2257			Fair
18.F. Mangobos St.	Provincial	0.324	0.324			Fair

19.Binay St. (formerly Resurreccion St.)	Provincial	0.1533	0.1533			Fair
20.J.Y. Orosa St.	Provincial	0.4815	0.4815			Fair
21.Ylagan St.	Provincial	1.13	1.13			Fair
22.Sta. Maria	Provincial	1.584	1.584			Fair
23.Manalupang	Provincial	1.6926	1.6926			Fair
Total	Provincial	**16.29827**	**16.29827**			
24.La Correa Street	Municipal	0.3957	0.3957			Fair
25.La Paz Street	Municipal	0.889	0.889			Fair
26.Los Remedios St.	Municipal	0.373	0.373			Fair
27.Sta. Cruz Street	Municipal	0.35	0.35			Fair
28.J.Y. Orosa Ext.	Municipal	1.05	1.05			Fair
29.P. Munoz Street	Municipal	0.4	0.4			Fair
30.Son Quintin Castillo	Municipal	0.462	0.462			Fair
31.San Agustin Street	Municipal	0.2803	0.2803			Fair

Name of Road / Barangay	**Classification (National, Provincial City, Municipal, Barangay)**	**Total Length (km.)**	**Length by Type of Pavement**			**Condition**
			Concrete (km)	**Asphalt (km)**	**Earth Gravel (km)**	
32.San Street Rafael	Municipal	0.3237	0.3237			Fair
33.San Street Jose	Municipal	0.32763	0.32763			Fair
34.San Street Daniel	Municipal	0.16863	0.16863			Fair
35.San Sebastian Street	Municipal	0.1693	0.1693			Fair
36.San Vicente Street	Municipal	0.07975	0.07975			Fair
37.San Diego Street	Municipal	0.413	0.413			Fair
38.San Francisco Street	Municipal	0.5254	0.5254			Fair
39.Kap Ponso Street	Municipal	0.498	0.498			Fair
40.Padre Blaco St.	Municipal	0.069	0.069			Fair
41.Nursery	Municipal	2.8875	2.8875			Fair
42.P. Munoz Ext.	Municipal	0.12	0.12			Fair

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43.Cesar Arada Street	Municipal	0.43117	0.43117			Fair
44.Aplaya	Municipal	1.4587	1.4587			Fair
45.Buendia Street	Municipal	0.299	0.299			Fair
46.Rizal	Municipal	0.312	0.312			Fair
47.San Pedro	Municipal	1.186	1.186			Fair
48.Manalupang	Municipal	1.975	1.975			Fair
49.Pitugo	Municipal	1.324	1.324			Fair
50.San Vicente	Municipal	1.558	1.558			Fair
51.San Pedro – San Agustin	Municipal	1.814	0.114		1.7	Fair
Total	**Municipal**	**20.13978**	**18.43978**	**0**	**1.7**	
52.Sto.Domingo	Barangay	0.547	0.547			Fair
53.New Danglayan	Barangay	0.9285	0.9285			Fair
54.San Andres I	Barangay	1.8	0.7467		1.0533	Fair
55.Sinala	Barangay	5.214	4.266		0.948	Fair
56.Alagao	Barangay	8.633	5.726	1.5	1.407	Fair
57.Malindig	Barangay	2.731	1.991		0.74	Fair
58.Baguilawa	Barangay	1.293	1.293			Fair
59.Sta.Maria	Barangay	0.9385	0.891		0.0475	Fair
60.Sampaguita	Barangay	2.495	2.495			Fair
61.Colvo	Barangay	3.0845	3.0845			Fair
62.Rizal	Barangay	1.074	1.074			Fair
63.Durungao	Barangay	10.662	7.52		3.142	Fair
Name of Road / Barangay	**Classification (National, Provincial City, Municipal, Barangay)**	**Total Length (km.)**	**Length by Type of Pavement**			**Condition**
			Concrete (km)	**Asphalt (km)**	**Earth Gravel (km)**	
64.Inicbulan	Barangay	2.1361	0.8245		1.3116	Fair
65.Locloc	Barangay	5.557	5.399		0.158	Fair
66.San Roque	Barangay	2.564	2.297		0.267	Fair
67.Orense	Barangay	2.809	2.609		0.2	Fair
68.Magalanggalang	Barangay	2.86565	2.42525		0.4404	Fair
69.San Andres P.	Barangay	0.63	0.63			Fair
70.San Agustin	Barangay	4.555	4.555			Fair
71.Manalupang	Barangay	0.861	0.861			Fair
72.Gulibay	Barangay	2.01	1.67		0.34	Fair
73.Bolo	Barangay	2.3265	2.3265			Fair
74.San Pablo	Barangay	4.053	3.748		0.305	Fair

75.Bagong Silang	Barangay	3.1616	3.1616			Fair
76.Pitugo	Barangay	0.701	0.701			Fair
77.San Pedro	Barangay	1.0855	1.0855			Fair
78.San Teodoro	Barangay	2.1445	2.1445			Fair
79.San Diego	Barangay	2.493	2.493			Fair
80.San Vicente	Barangay	0.676	0.676			Fair
81.Manghinao I	Barangay	1.438	1.288		0.15	Fair
82.San Miguel	Barangay	0.5055	0.5055			Fair
83.Aplaya	Barangay	0.6439	0.6439			Fair
84.Sitio Nangkaan, Locloc	Barangay	0.15	0.15			Fair
85.Alagao	Barangay	0.17	0.17			Fair
86.Gulibay	Barangay	0.22	0.22			Fair
87.Colvo	Barangay	0				Fair
Total	**Barangay**	**83.15675**	**71.14695**	**1.5**	**10.5098**	
Total Road Length		**131.17898**	**117.4692**	**1.5**	**12.2098**	

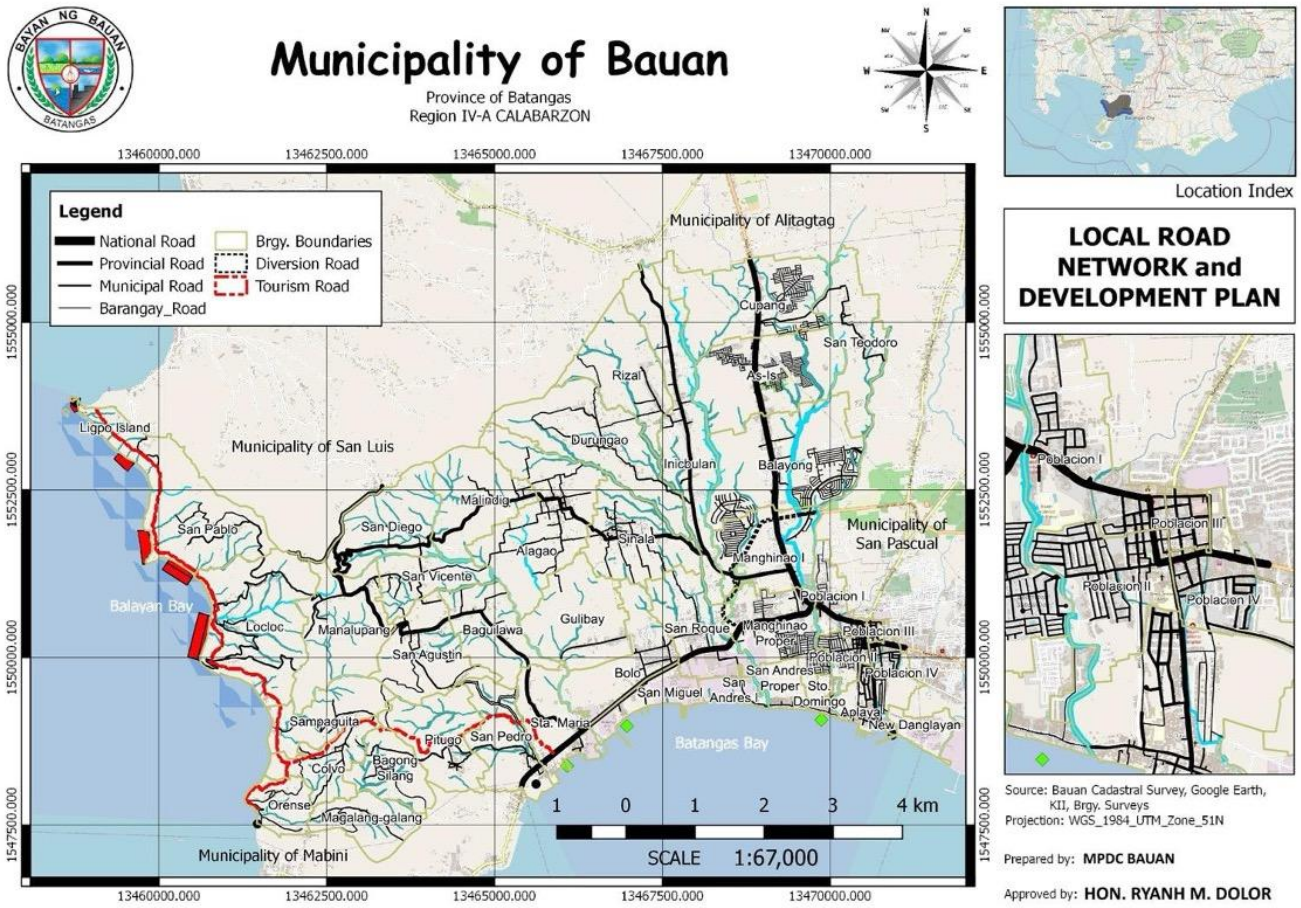

Figure 7-69 Road Network Map

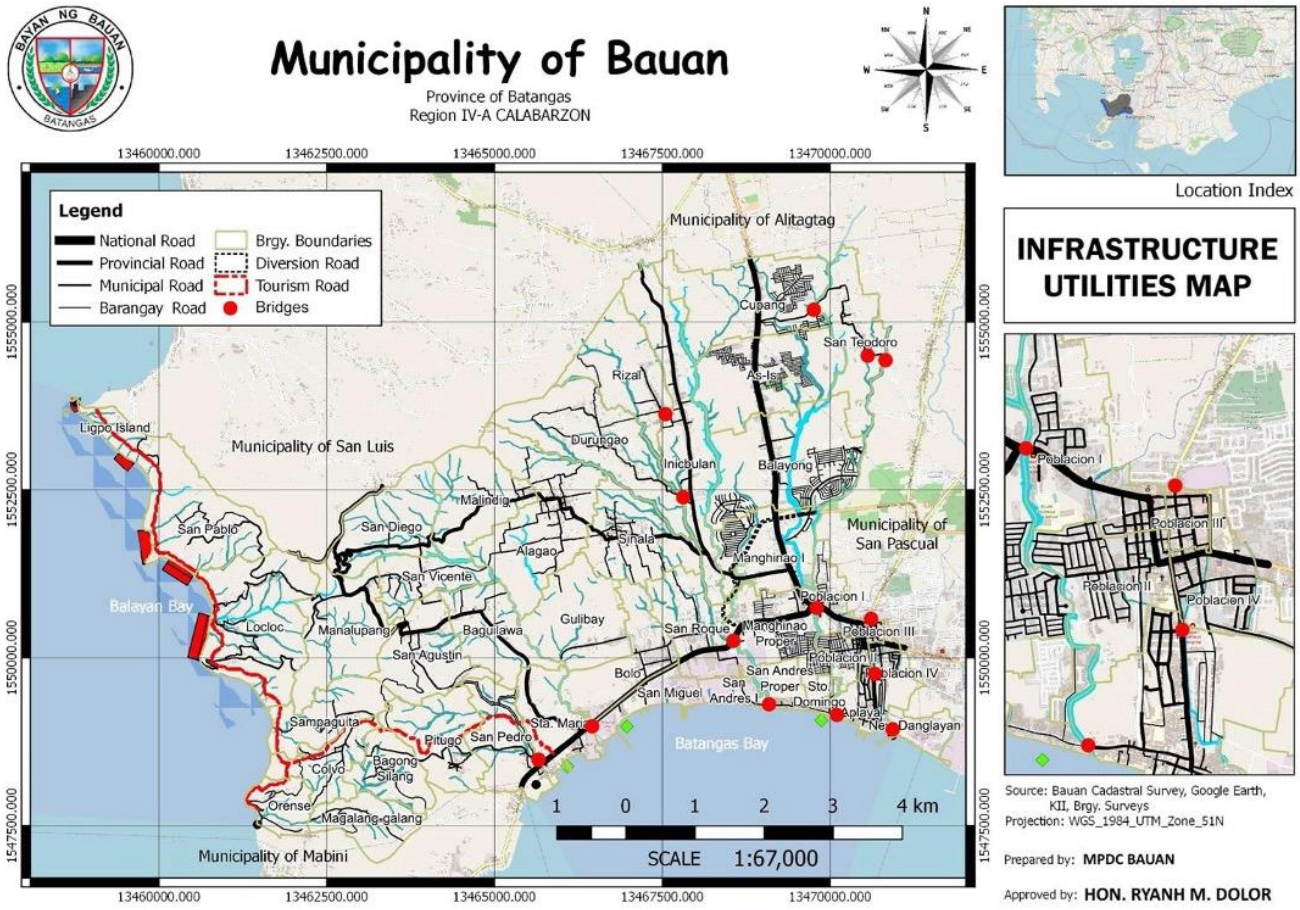

Figure 7-70 Infrastructures Utilities Map

Bridges

Bauan has a total of 20 bridges. Of this number, 18 are concrete and the other two (2) are timber. Five (5) bridges are maintained by the national government and the rest by the municipal government. Table 7-60 for the Inventory of Bridges.

Table 7-60 Inventory of Bridges by Location, by Type, Capacity and Condition, 2019

Bridge Name	Location (Barangay)	Type	Length (in meters)	Load Capacity (Tons)	Physical Condition	Hazard Susceptibility							
						Fl	Tc	Eq	Vo	Ln	Ts	Su	O
Manghinao Bridge	Boundary of Bauan & San Pascual (Poblacion IV)	Concrete	11	15	Poor	L	L	L	L	L	L	L	L
Manghinao Bridge	Manghinao Proper	Concrete	35	15	Good	L	L	L	L	L	L	L	L
San Roque Bridge	San Roque	Concrete	61	15	Poor	L	M	L	L	L	L	L	M
Sta. Maria Bridge	Sta. Maria	Concrete	46	15	Good	L	L	L	L	L	L	L	L

San Pedro Bridge	San Pedro	Concrete	28	15	Good	L	L	L	L	L	L	L	L
Medicare Bridge	Aplaya	Concrete	12	15	Good	M	L	L	L	L	L	L	L
Lagunlong Bridge	Durungao	Concrete	10	15	Critical	L	M	M	L	L	L	L	M
Rizal Bridge	Rizal	Concrete	12	15	Good	L	L	L	L	L	L	L	L
Silangan Bridge	New Danglayan	Concrete	6	15	Good	M	M	M	L	L	M	M	M
Talisay Bridge	San Andres	Concrete	15	15	Critical	L	L	L	L	L	L	L	L
Sto. Domingo Bridge	Sto. Domingo	Concrete	15	15	Good	L	L	L	L	L	L	L	L
San Teodoro Bridge I	San Teodoro	Concrete	7	15	Poor	M	M	M	L	M	L	L	L
San Teodoro Bridge II	San Teodoro	Timber	6	15	Poor	M	M	M	L	M	L	L	L
San Teodoro Bridge III	San Teodoro	Timber	6	15	Poor	M	M	M	L	M	L	L	L

Mode of transport by type

Bauan has a well-developed road transportation system to meet its growing transport demand. The road transport modes include cars, vans, motorcycles, trucks, public utility buses, jeepneys, and tricycles. The most common means of transportation in the municipality are jeepneys and tricycles. There are 1,500 more or less public utility jeepneys that serve the localities traveling from Bauan to Batangas City, Lemery, or Mabini, and vice versa, or from Poblacion to barangays and vice versa. There are also 2,562 tricycles in the municipality that serve the residents of Poblacion and nearby barangays of Bauan and San Pascual. See Table 7-61.

Table 7-61 Inventory of Public Land Transportation Vehicles by Type and Service Routes, Year 2020

Type of Public Utility Vehicle		Registered in Municipality				From Other Municipality	
	Total No.	Route/Destination				Total No.	Route/Destination
		Within Barangay	Barangay to Barangay	Barangay to Municipal Center	Municipal Center		
Buses	0						Nasugbu to Batangas City & Vice –versa

Jeepney	1,359	√		√			Lemery and Mabini to Batangas City
Van	0						SM & Palapala, Cavite
Tricycles	2,562	√	√	√	√	597	

Other Modes of Transport and Facilities

Bauan is a coastal municipality, hence, the sea transport system is very important. Ports play a vital role in the development of trade, commerce, and industry in the municipality, particularly in transporting goods.

Bauan has a government port and seven (7) private ports. The government port operates under the Philippine Ports Authority (PPA) while the private ports are owned by the large industrial firms along Batangas Bay. See Table 7-62.

Table 7-62 Private and Government Ports

Name of Port	Location (Barangay)	Owner
Bauan Port	Aplaya	Government
Port of AG&P	San Andres I	Private
Port of BHPI	San Andres I	Private
Port of BBTI	San Miguel	Private
Port of Keppel I	San Miguel	Private
Port of Keppel II	San Miguel	Private
Port of PNOC	San Miguel	Private
Port of EEI	Sta. Maria	Private

The Port of Bauan has a total land area of 4,207.10 square meters. It is a thirty (30) minute-drive from the Administrative Building of the Port Management Office (PMO) Batangas. It is a reinforced concrete pier on concrete piles used in handling general cargoes, agricultural and industrial products.

Bauan Port is located at Latitude 13°46'80" N, Longitude 121°01' E, Northeast coast of Batangas Bay, South of Luzon Island in Barangay Aplaya, Bauan, Batangas. It has no available navigational aids. Master Mariners were guided by the Dome of Legendary Church of Immaculate Conception Parish.

The total volume of top 10 domestic cargoes, inbound and outbound, is 63,578 MT based on the 2009 data of Terminal Management Office (TMO) of Bauan. And based on Shipping Statistics of Terminal Port – Bauan at Berth and Anchorage in 2007, the total number of domestic vessels is 292 and the gross registered tonnage is 74,323.

PORT FACILITIES

Berthing Area/s:	R.C. Pier (94.5m x 9.00m, 850.50sq.m.)
Wharf	(40.00m x 15.00m, 600sq.m.)
RORO Ramp	(9.00m x 4.50m, 40.50sq.m.)

Draft: Draft is 3.00m – 6.00m Anchorage: Anchorage is 15 miles from shoreline, southwest of the piers with depth of 27 meters mud bottom. During the southwest monsoon, vessels may anchor off Mabini, Batangas. Good holding grounds off 400 miles from the shoreline, with depth of 22m. Foreign vessels find good anchorage west of the pier with a depth of 27 meters mud bottom. This anchorage area is the same as the anchorage area of the Port of Batangas (Base port). Storage: An Open storage area of approximately 3,492 square meters is available.

OTHER PORT FACILITIES:

Back-up Area – TMO Bauan has only one back-up area. It is located at the eastern side of the terminal near the fence, adjacent to the office of PPA and Arrastre. Its total lot area is 1,750 square meters. Though it is not yet paved, it is being utilized as a holding area for cargo vehicles.

Equipment - The terminal has two equipment, forklift and a crane. This equipment is being used by the MLD Brokerage Arrastre Services, Inc., the cargo handling operator for the Port of Bauan for loading/unloading purposes.

Transport Terminal

The municipality has no transport terminal. There is a plan to transfer Bauan East Central School (BECS) to Bauan Technical High School (BTHS) compound and construct Transport Terminal at the vacated BECS old site located near Bauan Public Market, but this is a long-term plan since the main stakeholder that will be affected is DepEd.

There is however an ongoing construction of elevated parking at the premises of Bauan Public Market. It is on a phase-to-phase basis taking into account the availability of budget. This project aims to minimize traffic and deliver a more efficient circulation through less street parking along the vicinity of the public market. Bauan is also considering a Public-Private Partnership (PPP) with the municipality of San Pascual for the use of their vacant lot beside Bauan High School as an alternative site for a terminal.

7.3.6 Labor and OSH

ICTSI continues its focus on operating a safe and efficient business across its international portfolio. The table below shows BIPI's safety performance throughout the last five years.

Table 7-63 5-year OSH Performance Data

	2020	2021	2022	2023	2024
Fatality	0	0	0	0	0
Lost Time Injury	0	0	0	0	0
Exposure Hours	143.65K	126.19K	131.16K	177.35K	184.17K
Lost Time Injury Frequency Rate	0.00	0.00	0.00	0.00	0.00

BIPI has fully complied with the Department of Labor and Employment (DOLE) requirement for the Mandatory Eight-Hour Safety and Health Training. This program equips employees with essential knowledge on hazard identification, risk assessment, emergency response, and other key OSH principles, fostering a safer and healthier work environment.

Complementing this, ICTSI Global Academy continues to strengthen organizational capability through three core training programs such as Terminal Executive Diploma (TED) for CEOs, COOs, and Directors; Terminal Operations Management (TOM) for middle management and superintendents; and Driving Performance for team members and supervisors. Each program integrates safety elements to ensure health, safety, and well-being remain a core priority at every level of leadership.

BIPI's safety culture is further reinforced through accurate reporting of near misses and incidents. BIPI adheres to global standards, ensuring that reports are investigated and managed in full compliance with the Global Safety Reporting Definitions, Decision Tree, and Reporting Matrix. This commitment promotes transparency, accountability, and continuous improvement in safety performance.

8 Evaluation / Assessment of Environmental and Social Risk Impact

This section presents the identification, prediction, and evaluation of environmental and social risks and impacts associated with the Bauan International Port Redevelopment Project across its pre-construction, construction, operation, and decommissioning phases. The assessment follows a structured and risk-based approach consistent with the AIIB ESF and internationally recognized good practices.

The assessment considers direct, indirect, induced, and cumulative impacts on the physical environment, biodiversity, socio-economic conditions, labor and occupational health and safety, and community health and safety.

8.1 Impact Identification and Assessment Framework

Impact identification was informed by:

- Project design and construction methodologies, including dredging, piling, backfilling, and marine traffic;
- Baseline environmental and social conditions presented in Chapter 7;
- Applicable regulatory and policy requirements;

8.2 Impact Significance Evaluation

Impact significance was evaluated based on a structured impact rating matrix, adapted from established Asian Development Bank (ADB) and International Finance Corporation (IFC) environmental assessment practice and consistent with international good practice. The methodology assesses the interaction between Project activities and environmental and social receptors during the construction, operation, and decommissioning phases.

Impact significance was determined through a qualitative evaluation of

- Impact magnitude, taking into account the sacle and intensity of the impact, spatial extent, duration, reversibility, and likelihood of occurrence; and
- Receptor sensitivity, informed by baseline environmental and social conditions, conservation or protection status, legal or regulatory designation, and social value.

For each identified impact, a pre-mitigation significance rating was assigned by combining impact magnitude and receptor sensitivity using the impact rating matrix presented above. The resulting significance categories (negligible, minor, moderate, or major) provide an indication of the inherent level of project risk prior to the application of mitigation measures.

Elevated receptor sensitivity was applied to the following receptors due to their ecological, social, or regulatory importance:

- Marine ecosystems within Batangas Bay and the Verde Island Passage Marine Corridor (VIPMC);
- Natural habitats and biodiversity receptors assessed under the Critical Habitat Assessment (CHA); and
- Displaced informal settler families.

Table 64. Impact Significance Rating Matrix (Pre-Mitigation)

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Receptor Sensitivity	Low Impact Magnitude	Medium Impact Magnitude	High Impact Magnitude
Low Sensitivity	Negligible	Minor	Moderate
Medium Sensitivity	Minor	Moderate	Major
High Sensitivity	Moderate	Major	Major

Table 65. Impact Magnitude Classification Matrix

Magnitude Level	Scale & Intensity	Spatial Extent	Duration	Reversibility	Likelihood
Low	Low-intensity change, barely distinguishable from baseline conditions	Highly localized, confined to the immediate work area	Short-term or intermittent	Fully reversible through natural recovery or routine management	Unlikely to occur or occurs infrequently
Medium	Measurable change of moderate intensity	Extends beyond the immediate site but remains within the Project Area of Influence	Medium-term or occurs repeatedly over the Project phase	Largely reversible with targeted mitigation measures	Likely to occur under normal Project conditions
High	Substantial change of high intensity	Widespread or extending beyond the Project Area of Influence	Long-term or permanent	Difficult to reverse or irreversible	Very likely or certain to occur

Table 66. Receptor Sensitivity Classification Matrix

Sensitivity Level	Environmental / Social Value	Legal / Regulatory Status	Vulnerability	Adaptive Capacity
Low	Low environmental or social value; highly modified or artificial systems	No specific legal or regulatory protection	Low vulnerability to disturbance	High capacity to absorb change without lasting effects
Medium	Recognized environmental or social value	Some regulatory protection or planning designation	Moderate vulnerability to disturbance	Moderate adaptive capacity
High	High ecological, social, cultural, or livelihood importance	Legally protected, conservation-designated, or socially safeguarded	Highly vulnerable to disturbance	Low capacity to absorb change

Elevated receptor sensitivity was applied to receptors of high ecological, social, or regulatory importance. Post-mitigation (residual) impact significance was determined by considering the effectiveness of mitigation and

management measures defined in the Environmental and Social Management Plan (ESMP), consistent with the mitigation hierarchy.

8.3 Physical Environment

8.3.1 Intensification of Industrial Land Use within an Existing Project Footprint

Impact Discussion

The Bauan International Port Redevelopment Project involves the upgrading, expansion, and optimization of port facilities within an existing, long-established industrial port estate. Baseline land use assessment confirms that the Project footprint is already zoned and utilized for port and maritime activities, comprising reclaimed land, paved container yards, cargo handling areas, warehouses, administrative buildings, access roads, and utility corridors.

The proposed redevelopment does not introduce new land use types, nor does it result in the conversion of residential, agricultural, forest, or other non-industrial lands. Instead, the Project represents an intensification of existing industrial land use, characterized by increased cargo throughput, upgraded infrastructure, and more efficient use of already developed port space. This intensification may lead to higher levels of on-site activity, including increased movement of equipment and vehicles, greater demand for utilities, and more continuous operational use of the port area.

Given the existing industrial character of the site and its long history of port operations, receptors potentially affected by land use intensification are limited to on-site port workers, adjacent industrial users, and immediate port surroundings. No displacement of land users, loss of access to land, or incompatibility with surrounding land uses is anticipated. The Project remains consistent with local land use plans and port development strategies.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low
- Sensitivity / vulnerability: Low (existing industrial land use context)
- Spatial extent: Local (within the established port estate)
- Duration: Long-term

Given that the Project footprint is already industrial, and the proposed activities are compatible with existing zoning and land use patterns, the magnitude of change introduced by land use intensification is limited. The sensitivity of receptors is low due to the absence of residential or sensitive land uses within or adjacent to the port estate.

Accordingly, the overall impact significance of industrial land use intensification is assessed as Minor.

Table 8-67 Intensification of Industrial Land Use within an Existing Project Footprint

Impact Description	Intensification of Industrial Land Use within an Existing Project Footprint							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large

Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

Consistent with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be implemented:

- Restrict all redevelopment and operational activities to the legally approved port boundary and designated industrial zones;
- Maintain clear functional zoning within the port estate to separate operational, storage, maintenance, and administrative areas and minimize land use conflicts;
- Implement traffic management and circulation plans to optimize internal movement and reduce congestion within the port area;
- Ensure adequate buffer distances and operational controls between intensified port activities and adjacent non-industrial land uses, where applicable;
- Integrate land use efficiency considerations into port master planning to avoid unnecessary expansion beyond the existing footprint.

Residual Impact Significance

With the implementation of the above measures, intensification of industrial land use will remain compatible with the existing port function and surrounding land use context. No significant adverse land use conflicts are expected. Therefore, the residual impact significance is assessed as Negligible to Minor.

8.3.2 Further Modification of an Already Developed Coastal-Industrial Frontage

Impact Discussion

The Bauan International Port Redevelopment Project involves additional modification and reinforcement of an existing coastal-industrial frontage that has been long developed for port and maritime functions. Baseline conditions indicate that the shoreline within the Project footprint is already highly engineered, comprising quay walls, revetments, reclaimed platforms, berthing facilities, and associated port infrastructure. Natural coastal landforms such as beaches or undeveloped shoreline segments are absent within the port estate.

The proposed works will further modify this already developed frontage through upgrading of berthing structures, quay extensions, reclamation refinements, and installation of associated port facilities. These activities will result in incremental changes to the physical configuration and use of the coastal edge, primarily to improve operational efficiency, safety, and capacity. The modifications will remain confined within the established port boundary and will not extend into adjacent undeveloped coastal areas or alter coastal land uses beyond the industrial estate.

Potential land-related impacts are therefore associated with permanent alteration of the engineered coastal interface, increased structural footprint along the shoreline, and intensified use of hardened coastal infrastructure. Given the pre-existing industrial character of the frontage, receptors are limited to port infrastructure, port operations, and adjacent industrial users. No displacement of coastal land users or loss of access to public coastal areas is anticipated.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low to Medium
- Sensitivity / vulnerability: Low (already hardened, industrial shoreline)
- Spatial extent: Local (within existing port frontage)
- Duration: Long-term to permanent

While the modification is permanent, the magnitude of change is incremental and occurs within a coastal zone that has already been substantially altered. The sensitivity of land receptors is low due to the absence of natural coastal landforms or sensitive land uses.

Accordingly, the overall impact significance is assessed as Minor.

Table 8-68 Further Modification of an Already Developed Coastal-Industrial Frontage

Impact Description	Further Modification of an Already Developed Coastal-Industrial Frontage							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

In line with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be applied:

- Confine all coastal frontage modifications strictly within the approved and existing port boundary;
- Optimize the design of quay walls, revetments, and coastal structures to minimize additional land take while maintaining structural stability and safety;
- Integrate new structures with existing coastal infrastructure to avoid unnecessary fragmentation or redundancy;
- Implement construction management measures to maintain the integrity and stability of adjacent port structures during works;
- Maintain clear delineation between industrial port frontage and any adjacent non-industrial coastal areas.

Residual Impact Significance

With the implementation of the proposed mitigation measures, further modification of the coastal-industrial frontage will remain compatible with the existing land use and functional character of the port estate. No significant adverse land-use conflicts or land stability issues are anticipated.

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The residual impact significance is assessed as Negligible.

8.3.3 Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks

Impact Discussion

The Bauan International Port Redevelopment Project will require earthworks activities within the existing port estate, including excavation, grading, compaction, reworking of reclaimed surfaces, and preparation of foundations for upgraded port infrastructure. Baseline land assessment confirms that the Project Area is predominantly composed of reclaimed land and engineered fill materials that have been in place and operational for an extended period. These surfaces are already highly modified, compacted, and designed to support heavy port operations.

During construction, temporary disturbance of these reclaimed and filled land surfaces will occur as a result of earthmoving activities, operation of heavy equipment, temporary stockpiling of materials, and movement of construction vehicles. Such disturbance may locally affect surface stability, compaction, and ground condition, particularly in active work zones. However, no excavation of natural soil horizons or undisturbed landforms is anticipated, and earthworks will be confined to the approved port footprint.

The disturbance is inherently temporary and limited to the construction phase. Following completion of earthworks, affected areas will be re-compacted, surfaced, and reinstated in accordance with engineering design specifications suitable for long-term port operations.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low
- Sensitivity / vulnerability: Low (engineered reclaimed land)
- Spatial extent: Localized (active construction areas)
- Duration: Short-term and reversible

Given the engineered nature of the baseline land surfaces, the absence of natural soils, and the temporary character of the disturbance, the magnitude of impact is low and receptor sensitivity is low.

Accordingly, the overall impact significance is assessed as Minor.

Table 8-69 Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks

Impact Description	Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

Consistent with the IFC General EHS Guidelines and good international construction practice, the following measures will be implemented:

- Limit earthworks strictly to designated construction areas within the approved port footprint;
- Implement phased construction sequencing to minimize the extent of disturbed land at any given time;
- Apply appropriate compaction standards to reclaimed and filled surfaces following excavation or grading;
- Stabilize exposed surfaces promptly through temporary surfacing or reinstatement to prevent degradation;
- Restrict construction traffic to designated haul routes to avoid unnecessary disturbance of adjacent paved or compacted areas;
- Conduct regular site inspections to identify and address localized ground instability during earthworks.

Residual Impact Significance

With the application of the above mitigation measures and proper reinstatement of disturbed surfaces, temporary disturbance of reclaimed and filled land will not result in long-term land degradation or loss of functionality.

The residual impact significance is assessed as Negligible to Minor.

8.3.4 Minor Change in Visual Character within an Industrial Waterfront Setting

Impact Discussion

The Project will introduce new or upgraded port structures, equipment, and facilities along an already developed industrial waterfront. Baseline conditions indicate that the visual character of the Project Area is dominated by industrial elements such as cranes, warehouses, quay walls, paved yards, and utility structures.

Redevelopment activities will result in incremental changes to the scale, form, and arrangement of existing port infrastructure. These changes may alter views within and immediately adjacent to the port estate; however, they will occur within a setting that is already visually industrial in character. No scenic coastal viewpoints or visually sensitive landscapes are located within the Project footprint.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low
- Sensitivity / vulnerability: Low (industrial visual context)
- Spatial extent: Local
- Duration: Long-term

Given the compatibility of new structures with the existing industrial waterfront, the impact significance is assessed as Negligible to Minor.

Table 8-70 Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks

Impact Description	Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks

Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance	✓	Negligible		Minor		Moderate		Major

Proposed Mitigation Measures

- Integrate new structures with existing port architecture and layout;
- Maintain orderly site layout and clear delineation of operational areas;
- Implement good housekeeping and maintenance of structures to avoid visual clutter;
- Use functional, non-reflective finishes where practicable.

Residual Impact Significance

Residual visual impacts remain negligible to Minor and consistent with the established industrial character of the area.

8.3.5 Potential Localized Soil Contamination from Improper Solid and Hazardous Waste Management

Impact Discussion

Baseline land conditions indicate that soils within the port estate consist primarily of reclaimed and engineered fill materials that have supported long-standing industrial use. During construction and operation, improper handling, storage, or disposal of solid and hazardous wastes could result in localized soil contamination, particularly in areas used for equipment maintenance, fuel storage, or waste staging.

Such contamination would be limited in extent and is preventable through appropriate waste management practices. No routine disposal of hazardous materials onto bare ground is planned, and waste generation will be consistent with typical port and construction activities.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low
- Sensitivity / vulnerability: Moderate (industrial soils with contamination potential)
- Spatial extent: Localized
- Duration: Long-term if unmanaged

Overall impact significance is assessed as Minor.

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Table 8-71 Potential Localized Soil Contamination from Improper Solid or Hazardous Waste Management

Impact Description	Potential Localized Soil Contamination from Improper Solid or Hazardous Waste Management							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

- Implement a solid and hazardous waste management plan consistent with regulatory requirements;
- Store hazardous wastes in designated, impermeable, and bunded areas;
- Ensure timely collection, transport, and disposal by accredited waste contractors;
- Train workers in proper waste handling and spill response;
- Conduct routine site inspections to identify and address improper waste practices.

Residual Impact Significance

With effective waste management controls in place, the risk of soil contamination will be minimized. Residual impact significance is Low to Minor and acceptable.

8.3.6 Impact on Surface Hydrology and Drainage Patterns

Impact Discussion

The Bauan International Port Redevelopment Project is located within an existing coastal-industrial port estate characterized by reclaimed land, paved operational areas, and engineered stormwater drainage systems. As documented in the ESIA baseline section, surface hydrology within the Project Area is governed by established drainage alignments that convey rainfall runoff toward Batangas Bay through engineered channels and minor creeks hydraulically connected to the Baliti (Tabok) River system. GIS-based watershed delineation confirms that the Project footprint does not intersect major upstream catchments, natural floodplains, or regional drainage corridors.

Proposed Project activities include earthworks, regrading of reclaimed surfaces, foundation works, and reconfiguration of paved yards. These activities may temporarily influence micro-scale surface runoff patterns within active construction zones by altering surface gradients or temporarily obstructing overland flow if not properly managed. However, the Project does not involve permanent diversion of natural waterways, infilling of drainage channels, modification of watershed boundaries, or reduction of downstream drainage capacity.

Post-construction, surface drainage patterns will be governed by engineered drainage design intended to maintain existing discharge points and runoff directions. Any changes to surface hydrology will therefore be limited to internal reconfiguration of engineered surfaces within the port estate and will not affect off-site drainage behavior or downstream hydrological connectivity.

Impact Evaluation and Significance

- **Impact nature:** Negative, direct
- **Impact type:** Direct
- **Severity / magnitude:** Low
- **Sensitivity / vulnerability:** Low (engineered, industrial land setting)
- **Spatial extent:** Local (within the port footprint)
- **Duration:** Short-term during construction; stabilized during operation

Given the engineered baseline condition, the absence of natural drainage features within the Project footprint, and the retention of existing discharge pathways, the magnitude of impact on surface hydrology is low and receptor sensitivity is low.

Accordingly, the **overall impact significance is assessed as Minor**, reducing to **Negligible with mitigation**.

Table 8-72 Impact on Surface Hydrology and Drainage Patterns

Impact Description	Impact on Surface Hydrology and Drainage Patterns							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance	✓	Negligible		Minor		Moderate		Major

Proposed Mitigation Measures

In accordance with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be implemented:

- Maintain existing drainage alignments and discharge points throughout construction and operation;
- Integrate surface drainage considerations into detailed engineering design to ensure post-construction runoff patterns remain consistent with baseline conditions;
- Implement temporary drainage controls during earthworks to prevent ponding or unintended diversion of surface flows;
- Prohibit obstruction, infilling, or unapproved modification of drainage channels, culverts, and stormwater inlets;
- Conduct regular inspection, cleaning, and maintenance of drainage systems, particularly during the rainy season;
- Reinstate and stabilize disturbed surfaces promptly following construction activities.

Residual Impact Significance

With appropriate drainage design and construction-phase controls in place, surface hydrology and drainage patterns will remain functionally consistent with existing conditions. No adverse downstream effects or land stability issues are anticipated.

The residual impact significance is assessed as Negligible.

8.3.7 Impact on Flood Risk and Flood Susceptibility

Impact Discussion

The Bauan International Port Redevelopment Project is located within a low-lying coastal-industrial zone that is classified as flood-prone under regional flood susceptibility mapping, as documented in the Water baseline section. Baseline assessments indicate that flooding in the area is primarily associated with extreme rainfall events, tidal backflow, and coastal processes linked to storm surge, rather than obstruction or alteration of drainage systems within the port estate.

The proposed redevelopment will be implemented entirely within an existing port footprint and does not involve infilling of natural waterways, construction of flood barriers, diversion of surface runoff, or modification of watershed boundaries. Existing drainage pathways, discharge points, and stormwater conveyance systems will be retained and managed to preserve baseline flood conveyance capacity.

Temporary construction activities—such as earthworks, stockpiling, and equipment staging—may locally increase exposure to short-term ponding or surface water accumulation if drainage systems are obstructed or poorly maintained. However, these effects are limited to active work zones and do not represent a mechanism for inducing or exacerbating flooding beyond the Project boundary.

Overall, the Project does not introduce new flood drivers but increases exposure of land-based infrastructure to flooding inherent to the coastal setting if controls are not applied.

Impact Evaluation and Significance

- Impact nature: Negative, indirect
- Impact type: Indirect
- Severity / magnitude: Low
- Sensitivity / vulnerability: Moderate (coastal, flood-prone classification)
- Spatial extent: Local
- Duration: Event-based and reversible

Considering the low magnitude of Project-related influence and the moderate baseline flood susceptibility of the area, the overall impact significance is assessed as Minor, reducing to Negligible with mitigation.

Table 8-73 Impact on Surface Hydrology and Drainage Patterns

Impact Description	Impact on Flood Risk and Flood Susceptibility			
Impact Nature		Positive	✓	Negative
Impact Type	✓	Direct		Indirect

Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance	✓	Negligible		Minor		Moderate		Major

Proposed Mitigation Measures

To prevent project-induced flooding or increased flood susceptibility, the following measures shall be applied:

- Preserve existing surface runoff routes and avoid any alteration that may reduce drainage capacity;
- Conduct regular clearing of drainage channels, culverts, and stormwater inlets to prevent sediment and debris accumulation;
- Avoid stockpiling of materials or parking of equipment in low-lying areas that may impede surface runoff;
- Integrate flood risk considerations into construction scheduling, particularly during peak rainfall periods;
- Maintain emergency preparedness procedures for extreme rainfall events.

Residual Impact Significance

With the application of appropriate drainage management, construction controls, and flood preparedness measures, the Project is not expected to increase flood risk or susceptibility beyond existing baseline conditions.

The residual impact significance is assessed as Negligible.

8.3.8 Impact on Groundwater Quality

Impact Discussion

Groundwater underlying the Bauan International Port estate occurs beneath reclaimed and filled coastal land that has been subject to long-standing industrial and urban land uses. As documented in the Water baseline section, baseline groundwater quality results indicate compliance with most physicochemical parameters; however, bacteriological contamination exceeds potable water criteria, reflecting pre-existing conditions associated with domestic wastewater inputs and surrounding land use practices rather than Project activities.

Construction and operational phases of the Project will involve handling and storage of fuels, oils, lubricants, construction materials, and solid and hazardous wastes. If not properly managed, accidental spills, leaks, or improper waste handling could result in localized infiltration of contaminants through permeable fill materials, posing a risk to groundwater quality. These risks are land-based and preventable through appropriate site management and containment measures.

The Project does not include intentional discharge to the subsurface, unlined waste disposal, or deep excavation that would directly intersect aquifers. Sanitary wastewater will be contained and managed through approved systems, and groundwater abstraction will be regulated under separate permitting requirements. As such, potential impacts on groundwater quality are limited to localized contamination risks associated with improper material handling rather than systematic degradation of the aquifer.

Impact Evaluation and Significance

- **Impact nature:** Negative, direct
- **Impact type:** Direct
- **Severity / magnitude:** Low
- **Sensitivity / vulnerability:** Moderate (groundwater present and in use, but already requires treatment)
- **Spatial extent:** Localized

- **Duration:** Long-term if unmanaged

Given the low likelihood of contamination when standard controls are applied and the absence of direct discharge pathways, the **overall impact significance is assessed as Minor**.

Table 8-74 Impact on Groundwater Quality

Impact Description	Impact on Groundwater Quality							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

Consistent with IFC General EHS Guidelines, the following measures will be implemented:

- Store fuels, oils, chemicals, and hazardous materials in designated, bunded, and impermeable areas;
- Implement spill prevention, control, and emergency response procedures, including provision of spill kits;
- Ensure proper segregation, storage, and disposal of solid and hazardous wastes by accredited service providers;
- Provide sealed sanitation facilities and prevent seepage of wastewater into the subsurface;
- Conduct routine site inspections to detect leaks, spills, or improper storage practices;
- Undertake groundwater quality monitoring as required by regulatory approvals.

Residual Impact Significance

With effective implementation of spill prevention, waste management, and site control measures, the likelihood of groundwater contamination will be minimal and confined to preventable incidents.

The residual impact significance is assessed as Minor.

8.3.9 Impact on Groundwater Quantity due to Abstraction

Impact Discussion

The Bauan International Port Redevelopment Project will utilize groundwater sourced from a deep well to meet a portion of its operational and domestic water requirements. As documented in the Water baseline section, baseline

groundwater conditions in the Project Area do not indicate evidence of over-abstraction, declining groundwater levels, saltwater intrusion, or competition with community water use.

Groundwater abstraction associated with the Project will be undertaken through permitted wells and regulated abstraction volumes in accordance with national regulatory requirements. No uncontrolled extraction, expansion of abstraction beyond approved limits, or dewatering of shallow aquifers is planned. The Project does not involve activities that would alter regional groundwater flow regimes, induce land subsidence, or affect groundwater availability outside the port estate.

While groundwater abstraction represents a long-term demand on subsurface water resources, abstraction volumes are expected to remain within the sustainable yield of the aquifer system and will be managed through water efficiency and conservation measures.

Impact Evaluation and Significance

- **Impact nature:** Negative, direct
- **Impact type:** Direct
- **Severity / magnitude:** Low
- **Sensitivity / vulnerability:** Moderate (groundwater resource used for multiple purposes)
- **Spatial extent:** Local
- **Duration:** Long-term

Given the regulated nature of abstraction, the absence of baseline indicators of aquifer stress, and the limited scale of Project demand, the **overall impact significance is assessed as Minor**.

Table 8-75 Impact on Groundwater Quantity due to Abstraction

Impact Description	Impact on Groundwater Quantity due to Abstraction							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

In accordance with IFC General EHS Guidelines, the following measures will be implemented:

- Operate only permitted groundwater wells and comply strictly with approved abstraction limits;
- Install flow meters and maintain accurate abstraction records;
- Implement water conservation and efficiency measures throughout port operations;
- Periodically review groundwater demand relative to operational requirements;
- Monitor groundwater levels where required by regulatory approvals.

Residual Impact Significance

With abstraction controls, monitoring, and water efficiency measures in place, Project-related groundwater extraction is not expected to cause measurable depletion or adverse effects on groundwater availability.

The residual impact significance is assessed as Minor.

8.3.10 Impact on Marine Water Quality - Batangas Bay

Impact Discussion

Batangas Bay is a semi-enclosed coastal system influenced by tidal exchange, coastal circulation associated with the Verde Island Passage, and land-based inputs from rivers and coastal settlements. Baseline marine water quality within the coastal waters fronting the Project Area generally complies with the applicable Class SC standards, with observed coliform levels attributable to upstream river discharge and surrounding land-based sources rather than port operations.

The Bauan International Port Redevelopment Project will not discharge untreated wastewater to marine waters during either construction or operation. Sanitary and operational wastewater will be managed through approved containment and treatment systems. Potential Project-related influences on marine water quality are therefore limited to temporary, construction-phase effects, primarily associated with dredging, seabed disturbance, and increased vessel and equipment activity. These activities may result in short-term increases in turbidity and suspended solids within and immediately adjacent to active work areas.

Given the existing industrial port setting and naturally dynamic sediment regime of Batangas Bay, any construction-related changes to marine water quality are expected to be localized, short-lived, and reversible. No permanent alteration of marine water quality conditions or downstream degradation is anticipated once construction activities cease.

Impact Evaluation and Significance

- Impact nature: Negative, direct
- Impact type: Direct
- Severity / magnitude: Low to Medium (construction phase only)
- Sensitivity / vulnerability: Moderate (coastal receiving waters)
- Spatial extent: Localized (near active works)
- Duration: Short-term and reversible

Considering the confined footprint of marine works, the absence of operational discharges, and the temporary nature of construction-related effects, the overall impact significance is assessed as Minor.

Table 8-76 Impact on Marine Water Quality – Batangas Bay

Impact Description	Climate change and micro-climatic effects associated with the port redevelopment							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large

Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

In accordance with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be implemented:

- Prohibit discharge of untreated wastewater, fuels, oils, or chemicals into marine waters;
- Implement controlled and phased dredging methods to minimize sediment disturbance;
- Deploy silt curtains or other containment measures where practicable during dredging;
- Implement spill prevention, control, and emergency response procedures for marine and nearshore works;
- Schedule marine construction activities to avoid periods of severe weather where feasible;
- Conduct visual and/or instrumental monitoring of turbidity during active dredging and marine works.

Residual Impact Significance

With the application of standard construction controls, spill prevention measures, and wastewater management practices, any Project-related effects on marine water quality will remain localized and temporary.

The residual impact significance is assessed as Minor.

8.3.11 Impact on Bathymetry and Seabed Morphology due to Dredging

Impact Discussion

The Bauan International Port Redevelopment Project includes dredging activities within the existing port basin and approach areas to achieve and maintain design depths required for safe navigation and efficient port operations. Baseline bathymetry and seabed morphology within the Project Area already reflect extensive historical modification associated with long-standing port development, maintenance dredging, and land reclamation.

Proposed dredging will result in localized and permanent modification of seabed elevations within the approved dredging footprint. These modifications are confined to areas designated for port use and do not extend into undeveloped offshore zones or natural seabed formations. The dredging works are designed to refine and maintain engineered seabed profiles rather than introduce new large-scale geomorphological changes.

Given the limited spatial extent of dredging and the dynamic hydrodynamic regime of Batangas Bay, the Project is not expected to alter regional sediment transport patterns, shoreline stability, or broader seabed morphology beyond the immediate port area.

Impact Evaluation and Significance

Given the dynamic hydrodynamic conditions and absence of sensitive benthic habitats within the dredging area:

- Impact nature: Negative, direct

- Impact type: Direct
- Severity / magnitude: Medium
- Sensitivity / vulnerability: Low (previously modified, industrial seabed)
- Spatial extent: Localized (within dredging footprint)
- Duration: Permanent (within footprint only)

Although bathymetric changes are permanent within the dredged areas, they are limited to an already engineered port environment where seabed modification is an established and functional land-use activity.

Accordingly, the overall impact significance is assessed as Minor.

Table 8-77 Impact on Bathymetry and Seabed Morphology due to Dredging

Impact Description	Climate change and micro-climatic effects associated with the port redevelopment							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

In accordance with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be implemented:

- Restrict dredging activities strictly to approved footprints and design depths;
- Apply precision dredging techniques to minimize over-dredging and unnecessary seabed disturbance;
- Sequence dredging works to reduce cumulative seabed modification;
- Conduct pre- and post-dredging bathymetric surveys to verify compliance with design specifications;
- Dispose of dredged materials only at approved disposal or reuse sites in accordance with regulatory requirements.

Residual Impact Significance

With adherence to approved dredging plans and implementation of engineering controls, bathymetric and seabed modifications will remain localized to operational port areas and will not result in unintended geomorphological effects.
The residual impact significance is assessed as Minor.

8.3.12 Air Quality, Noise, and Climate Impacts and Mitigation

The project site is located within an established port and light industrial environment where surrounding activities and existing infrastructure are already aligned with industrial operations. Baseline climatological conditions are defined by a Type I climate regime with predictable seasonal patterns and favorable dispersion characteristics, based on long-term data from the PAGASA Ambulong Synoptic Station. Results of ambient air quality and noise monitoring undertaken within the project area demonstrate good baseline environmental quality. Measured levels

of TSP, PM_{10}, SO_2, and NO_2 were consistently below the applicable National Ambient Air Quality Guideline Values, while recorded daytime noise levels were well within the allowable limits for Class C areas.

These baseline conditions indicate that the project area is not subject to elevated air or noise pollution and has adequate environmental carrying capacity. The succeeding sections therefore focus on identifying and managing short-term construction-related emissions and noise, as well as ensuring that operational activities remain compliant with applicable standards through the implementation of appropriate mitigation and monitoring measures.

8.3.12.1 Climatological Changes

Impact Discussion

The proposed Bauan International Port (BIPI) redevelopment will involve port expansion works, construction activities, and increased operational movements within an existing project footprint. Based on long-term climatological records from the PAGASA Ambulong Synoptic Station, the project footprint is located in a Type I climate zone characterized by distinct wet and dry seasons, prevailing monsoon wind regimes, and stable regional meteorological patterns. PAGASA data indicate that the Bauan area experiences an annual mean temperature of approximately 27.7°C, average relative humidity of about 82%, and typical wind speeds of around 2 m/s, which provide favorable conditions for atmospheric mixing and dispersion.

Historical observations presented in the baseline section indicate that the existing BIPI port operations have not resulted in any measurable changes in local temperature, rainfall patterns, or wind regimes. Consequently, the proposed port expansion—which will take place within the same project footprint—is likewise not expected to induce any significant changes in the local micro-climate, including temperature, rainfall distribution, humidity, wind patterns, or cloud cover.

At the regional scale, however, PAGASA climate projections for Batangas Province indicate that climate change is expected to result in an increase in average temperatures of about 1.8°C to 2.2°C by 2050, along with variable changes in rainfall patterns ranging from a decrease of up to 23.1% to an increase of up to 17.2%, and a higher frequency of extreme events such as days with temperatures exceeding 35°C and heavy rainfall episodes. These projected changes are driven by global greenhouse gas emissions and regional climate processes and are not attributable to the BIPI redevelopment project. The project's contribution to greenhouse gas emissions is expected to be minimal, as emissions will primarily originate from construction equipment, delivery trucks, and operational vehicles, with standby generators used only during power interruptions.

Impact Evaluation and Significance

The project will not introduce new land uses or large-scale land cover changes that could alter surface roughness, albedo, or evapotranspiration in a manner sufficient to modify local climatic conditions. The redevelopment will occur within an already developed port and industrial area, and no significant vegetation clearing or creation of heat-retaining urban structures beyond the existing baseline will occur. PAGASA data and historical records confirm that current port operations have not influenced local climatology, and the proposed expansion is not expected to alter prevailing meteorological conditions.

Climate change projections for Batangas Province indicate that regional temperature increases, rainfall variability, and extreme weather events are expected by 2050 regardless of the project. Therefore, the project's contribution to climate change, through its greenhouse gas emissions, is considered very small when compared with national and global emission inventories.

Given these considerations:

- Severity/Magnitude of climatological change attributable to the project is Low, as no measurable alteration of local or regional climate patterns is expected.
- Sensitivity/Vulnerability of the receptor (local climate system and surrounding communities) is Medium, because Batangas is projected to experience increasing temperatures, rainfall variability, and more extreme weather events under climate change scenarios.
- Spatial Extent is Local, confined to the project area.
- Duration is Long-term in the context of climate change, but the project-induced contribution remains negligible.

With Low magnitude and medium sensitivity, the overall impact significance is assessed as Minor.

Table 8-78 Climate change and micro-climatic effects associated with the port redevelopment

Impact Description	Climate change and micro-climatic effects associated with the port redevelopment							
Impact Nature		Positive			✓	Negative		
Impact Type		Direct			✓	Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

It is expected that the following mitigation measures will be embedded in the design, construction, and operation of the Bauan International Port redevelopment to ensure climate resilience and minimize the project's contribution to climate change:

- Design port infrastructure to be climate-resilient, including quays, berths, pavements, drainage systems, buildings, and foundations, to withstand increased rainfall intensity, flooding, storm surges, and stronger winds associated with climate change;
- Provide adequate and well-maintained stormwater drainage systems and paved surfaces to prevent flooding, ponding, and erosion during heavy rainfall events;
- Locate, elevate, or protect critical electrical and mechanical equipment to reduce vulnerability to flooding and extreme weather conditions;
- Maintain and regularly service all construction and operational equipment, vehicles, and standby generators to ensure efficient fuel combustion and minimize greenhouse gas and air pollutant emissions;
- Minimize unnecessary engine idling of trucks, cargo handling equipment, and other port vehicles through operational controls and traffic management;
- Optimize port layout, internal traffic circulation, and cargo handling logistics to reduce travel distances, congestion, and fuel consumption;
- Gradually adopt fuel-efficient and low-emission equipment and vehicles, including electric or hybrid units where technically and economically feasible, as part of fleet upgrading;
- Require or encourage visiting vessels to comply with international fuel and engine emission standards while operating within port waters;

- Encourage reduced ship propulsion power within port areas where this can be safely implemented to lower fuel use and emissions;
- Support the future provision of shore-based power (cold-ironing) for vessels at berth, where technically feasible, to reduce engine use and emissions while docked;
- Periodically review climate change risks (e.g., extreme rainfall, heat, strong winds, and storm surges) and integrate these into port operation, maintenance, and emergency response planning.

Residual Impact Significance

With the implementation of the climate-resilient design measures, operational controls, and greenhouse gas minimization practices described above, the proposed Bauan International Port redevelopment will not result in any measurable or significant alteration of local or regional climatological conditions. The project's contribution to greenhouse gas emissions will remain very small in comparison with national and global emission sources, and existing PAGASA data confirm that historical port operations have not affected local temperature, rainfall patterns, or wind regimes.

In addition, the incorporation of climate change adaptation and resilience measures—such as improved drainage, flood protection, equipment protection, and operational preparedness for extreme weather—will further reduce the vulnerability of port facilities and surrounding receptors to projected future climate variability.

Accordingly, after mitigation, the residual impact on climatological conditions is assessed to be of *Minor* significance, and no unacceptable risks to the climate system, port operations, or surrounding communities are expected over the life of the project.

8.3.12.2 Contribution to Greenhouse Gas Emissions

Impact Discussion

During the construction phase of the Bauan International Port Redevelopment Project, greenhouse gas (GHG) emissions will be generated primarily from the operation of heavy construction equipment and the transport of construction materials and personnel. These activities will involve diesel-powered equipment and delivery trucks, resulting in the emission of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are the principal anthropogenic greenhouse gases contributing to global warming.

During the operational phase, GHG emissions will mainly originate from vehicular traffic entering and exiting the port facility and from the use of standby generators during power interruptions. However, these generators are used only intermittently and for emergency or backup purposes, resulting in limited contribution to total emissions. The proposed port expansion is therefore not expected to be a major source of greenhouse gases during routine operations.

Climate change is a global phenomenon, and the significance of any individual project must be assessed in relation to national and global emission inventories. The Philippine greenhouse gas inventory submitted to the United Nations Framework Convention on Climate Change (UNFCCC) shows that national emissions are dominated by the energy, industrial, agriculture, and waste sectors, while the overall national balance is influenced by land-use and forestry carbon sinks. Against this national baseline, emissions from the BIPI port expansion represent only a very small fraction of total Philippine GHG emissions.

Impact Evaluation and Significance

The magnitude of GHG emissions from the Project is considered Low, as emissions are limited to fuel combustion from construction equipment, delivery trucks, and operational vehicles, with standby generators contributing only marginally. There are no large stationary emission sources such as power plants, industrial furnaces, or continuous high-volume combustion units within the Project scope.

The sensitivity of the impact receptor is considered Medium, since climate change is a global-scale phenomenon and greenhouse gas emissions accumulate in the atmosphere regardless of their local point of release. However, the extent of impact attributable to the Project is global but extremely diffuse, given the very small contribution of Project-related emissions relative to national and global GHG inventories.

The duration of emissions is long-term, as GHGs persist in the atmosphere for extended periods, although the emission rate from the Project itself is low and largely associated with construction and normal port traffic operations.

Taking into account the Low magnitude of emissions and the medium sensitivity of the global climate system, the overall impact significance of the Project's contribution to greenhouse gas emissions is assessed as Minor.

Table 8-79 Contribution to Greenhouse Gas Emissions

Impact Description	Contribution to Greenhouse Gas Emissions							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

It is expected that the following mitigation measures will be embedded to all activities during construction and operation of the Bauan International Port Redevelopment Project to minimize the Project's contribution to greenhouse gas emissions:

- Use fuel-efficient and low-emission construction equipment, cargo-handling equipment, and vehicles, including trucks, cranes, forklifts, and service vehicles, to reduce CO_2 and other greenhouse gas emissions from fuel combustion;
- Optimize routing, scheduling, and logistics of construction vehicles, material deliveries, and port traffic to minimize travel distances, congestion, and unnecessary fuel consumption and engine idling;
- Ensure all construction equipment, port vehicles, and cargo-handling machinery switch off their engines when stationary and enforce strict idling control during loading, unloading, and queuing activities;
- Conduct regular inspection, preventive maintenance, and emissions monitoring of construction equipment, transport units, and standby generators to maintain fuel efficiency and prevent excessive greenhouse gas emissions due to poor engine condition or incomplete combustion;
- Upgrade or procure, where practicable, low-emission or alternative-energy vehicles and port equipment (e.g., electric, hybrid, or cleaner-fuel units) to progressively reduce greenhouse gas emissions from land-based port operations;

- Design and manage port layout, cargo transfer routes, and internal traffic circulation to minimize re-handling, travel distances, and transfer points, thereby reducing energy consumption and associated greenhouse gas emissions;
- Maintain and properly manage standby generators used during power interruptions to ensure efficient operation, limited running hours, and minimal contribution to greenhouse gas emissions; and
- Integrate greenhouse gas emission control measures into the Project's air quality and environmental management system, including record-keeping on fuel use, equipment operating hours, and maintenance activities to support continuous improvement in emissions performance.

Residual Impact Significance

With the implementation of the strengthened greenhouse gas mitigation measures—particularly the use of fuel-efficient and low-emission equipment, optimized routing and scheduling, strict idling control, regular maintenance and emissions monitoring of vehicles and generators, and the progressive adoption of cleaner technologies—the Project's contribution to greenhouse gas emissions will be effectively minimized in accordance with Good International Industry Practice for ports and terminals.

Given that baseline assessments indicate that the existing and expanded BIPI port operations have not resulted in measurable changes in local climatological conditions, and that Project-related emissions represent only a very small fraction of national and global greenhouse gas inventories, the remaining emissions after mitigation will be limited to routine port traffic and intermittent generator use.

Accordingly, the residual impact of the Project's contribution to greenhouse gas emissions is assessed to be of *Negligible to Minor* significance, and is not expected to result in any material or measurable influence on local, regional, or national climate patterns.

8.3.12.3 Positive impacts of GHG Mitigation Initiatives

Impact Discussion

The Bauan International Port, Inc. (BIPI) redevelopment is being implemented in a context where climate change and greenhouse gas (GHG) emissions are recognized as global and national concerns. As indicated in the baseline, greenhouse gases such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are primarily generated from fuel combustion associated with electricity use, transport, and industrial activities, including port operations. Although the project's contribution to national and global GHG emissions is relatively small, BIPI has committed to implementing initiatives that help mitigate its carbon footprint while improving operational efficiency.

For the proposed port expansion, GHG emissions are expected to arise mainly from the operation of heavy equipment and delivery vehicles during construction, and from vehicle traffic and standby generators during the operational phase. In response, the project incorporates a set of GHG mitigation initiatives that aim to progressively reduce emissions associated with these activities. These include the gradual shift toward cleaner and more sustainable sources of electricity through renewable energy procurement, the phased replacement of older diesel-powered equipment with more efficient hybrid, near-zero-emission (NZE), or electric units, and the continued implementation of routine operational and energy-efficiency measures.

Emission-reduction strategies such as the use of fuel-efficient and low-emission vehicles, optimized routing and scheduling to minimize fuel use and idling, and regular maintenance and emissions monitoring of equipment and transport units are also part of BIPI's standard operating practices. These initiatives not only support climate change mitigation but also improve the overall environmental performance of port operations.

Impact Evaluation and Significance

The GHG mitigation initiatives associated with the BIPI port redevelopment are considered to have a positive and long-term impact on the project's contribution to climate change. While construction and operational activities inevitably generate emissions from equipment, vehicles, and standby generators, the baseline indicates that these emissions are expected to be minimal in scale. The application of cleaner energy sourcing, the progressive re-fleeting of equipment to hybrid, NZE, or electric units, and continuous operational efficiency improvements further reduce the project's carbon intensity.

Because port infrastructure and associated equipment operate over long periods, the cumulative effect of these initiatives is expected to increase over time as more efficient technologies are adopted and energy use is optimized. In this way, the project not only limits its own GHG emissions but also contributes to broader national and global efforts to mitigate climate change. Accordingly, the impact of the project's GHG mitigation initiatives is assessed as *Positive*.

Table 8-80 Positive Impact of GHG Mitigation Initiatives

Impact Description	Positive Impact of GHG Mitigation Initiatives			
Impact Nature	✓	Positive		Negative
Impact Type	✓	Direct		Indirect

8.3.12.4 Impacts on Degradation of Air Quality

Impact Discussion

During the construction phase of the Bauan International Port Redevelopment Project, degradation of ambient air quality will occur primarily from the operation of heavy equipment, delivery trucks, and support vehicles associated with site preparation, material handling, and port infrastructure development. Emissions will mainly originate from the combustion of diesel fuel in construction equipment and transport vehicles, resulting in the release of nitrogen oxides (NO_x), sulfur oxides (SO_x), particulate matter (TSP, PM_{10}), and other exhaust pollutants. Fugitive dust will also be generated from earthworks, material stockpiles, and the movement of vehicles and equipment, particularly on exposed surfaces and during dry weather conditions.

The climatological conditions of the Bauan area influence the behavior and dispersion of air pollutants. The project site lies within a Type I climate zone, characterized by a pronounced dry season from November to April and prevailing northeast monsoon (Amihan) winds from October to May. These conditions increase the likelihood of dust generation and dispersion during construction activities, particularly when rainfall is low and wind speeds facilitate the transport of suspended particles.

During the operational phase, air emissions will primarily originate from port-related vehicular traffic, cargo-handling equipment, and the use of standby generators during power interruptions. However, historical records indicate that the existing BIPI port has not caused any observable degradation of local air quality or climatological conditions. Consequently, the proposed expansion, which will take place within the same area, is likewise not expected to result in significant long-term deterioration of ambient air quality

Impact Evaluation and Significance

Baseline ambient air quality monitoring conducted within the project area established that concentrations of Total Suspended Particulates (TSP), PM_{10}, sulfur oxides (SO_x), and nitrogen oxides (NO_x) are within the limits

prescribed by the Philippine Clean Air Act (Republic Act 8749) and its Implementing Rules and Regulations. This indicates that the existing air quality in the Bauan Port area is generally good prior to project implementation.

The main air quality impacts during project implementation will be associated with construction activities, including operation of diesel-powered equipment, truck traffic, and earthmoving works. These activities will generate exhaust emissions and fugitive dust, which may cause short-term, localized increases in particulate and gaseous pollutant concentrations. The effects will be more noticeable during the dry season when rainfall is low and relative humidity decreases, reducing the natural suppression of dust, and during periods when wind speeds are sufficient to disperse particulates over short distances.

The impact area will be largely confined to the port site and its immediate surroundings, including access roads used by construction and service vehicles. The nearby receptors consist mainly of port workers, road users, and surrounding communities in Bauan. Given the industrial character of the area, the absence of sensitive ecological receptors, and the temporary nature of construction activities, the sensitivity of receptors is considered Medium. The spatial extent of the impact is Local, and the duration is Short-term, limited mainly to the construction period, with intermittent effects during operations.

Considering that baseline air quality is within regulatory standards and that emission sources are largely temporary and localized, the magnitude of air quality degradation is assessed as Medium. With Medium magnitude and Medium sensitivity of receptors, the overall impact significance of air quality degradation is therefore assessed as Moderate.

Table 8-81 Impacts on Degradation of Air Quality

Impact Description	Impacts on Degradation of Air Quality							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible		Minor	✓	Moderate		Major

Proposed Mitigation Measures

The following mitigation measures shall be implemented during construction and operation of the port redevelopment project:

- Develop and implement an Air Quality Management Plan (AQMP) covering construction and operational phases, including dust control, emission management, and monitoring of PM, NO_x and SO_x, consistent with IFC Good International Industry Practice.
- Apply dust suppression measures such as regular water spraying on exposed surfaces, unpaved roads, stockpiles, and active earthworks, particularly during the dry season and periods of high wind.
- Provide wheel-washing and tire-cleaning facilities for all trucks exiting the construction site, and ensure that adequate paved road length is maintained between the wheel wash and site exit to prevent track-out of dust onto public roads.

- Cover or confine stockpiles and transport vehicles carrying fine or dry materials, and minimize free-fall of materials by using chutes, enclosed conveyors, or telescoping arms where applicable.
- Ensure all construction and port equipment is regularly maintained and inspected, including emission controls for generators, cranes, trucks, and cargo-handling equipment, to reduce exhaust emissions.
- Require engines to be switched off when vehicles or equipment are idle, and discourage unnecessary idling during loading, unloading, and queuing activities.
- Optimize logistics, routing, and scheduling of deliveries to minimize traffic congestion, queuing, and cumulative exhaust emissions in and around the port.
- Use fuel-efficient and low-emission vehicles and equipment, including where practicable the use of modern engines and cleaner fuels, consistent with IFC port air quality management practices.
- Conduct emissions testing and monitoring for standby generators and key equipment, with maintenance and operating records kept in accordance with Philippine environmental regulations.
- During operations, maintain cargo-handling and port vehicles in good working condition and apply operational controls to minimize dust and exhaust emissions from routine port activities

Residual Impact Significance

With the consistent application of the above mitigation measures, particularly dust suppression, equipment maintenance, emission controls, and logistics management, residual air quality impacts will be limited to minor, short-term, and localized effects. Continuous compliance with the Air Quality Management Plan and Philippine air quality standards, supported by IFC-aligned operational practices, will ensure that ambient air quality remains within acceptable limits.

Accordingly, the residual impact on air quality is assessed as *Minor significance*.

8.3.12.5 Impacts on Increase in Ambient Noise Level

Impact Discussion

During the pre-construction and construction phases of the Bauan International Port Redevelopment Project, ambient noise will be generated primarily from the mobilization and operation of heavy equipment, construction machinery, and support vehicles. Typical noise-generating sources include earthmoving equipment, cranes, pile drivers, concrete mixers, trucks, and other mechanical installations associated with port expansion works. These activities will result in intermittent and localized increases in sound pressure levels within and immediately adjacent to the project footprint, particularly along access roads and active work zones.

Baseline noise monitoring conducted on 02 August 2025 at four (4) stations around the project area recorded daytime noise levels ranging from 48.9 to 54.9 dBA, which are significantly lower than the 70 dBA daytime limit for Class C (light industrial) areas prescribed under the National Pollution Control Commission (NPCC) noise standards.

The existing acoustic environment is therefore considered relatively quiet for an industrial port setting, with dominant background noise sources limited to intermittent vehicle movement, human conversation, and natural sounds such as bird calls.

With the commencement of construction and expansion works, noise levels are expected to increase above baseline conditions, particularly near active work areas. However, these impacts will remain largely confined to the port premises and immediate surroundings, as most activities will be carried out within an already industrialized and operational port environment.

Impact Evaluation and Significance

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The nature of the impact is negative and direct, arising from construction-related noise emissions from heavy machinery, transport vehicles, and port-related activities.

Based on baseline measurements, existing noise levels in the area are well below regulatory limits, indicating a low existing acoustic stress level.

The receptors potentially affected include port workers, adjacent industrial users, and nearby community areas such as San Roque and areas near the main gates of Global Marine and BIPI.

The spatial extent of the impact is local, limited to the construction footprint and nearby receptors within audible range of construction activities.

The duration is temporary, as elevated noise levels will occur primarily during the pre-construction and construction phases and will subside once major civil works are completed.

The frequency is intermittent, depending on the type and timing of equipment operation.

Given the relatively low baseline noise environment, the proximity of light-industrial and community receptors, and the intensity of construction activities, the sensitivity of receptors is assessed as Medium. The magnitude (severity) of noise increase during construction is also assessed as Medium, as noise-generating activities will be noticeable but limited in duration and extent.

Accordingly, the overall impact significance of increased ambient noise during construction is assessed as Moderate.

Table 8-82 Impacts on Increase in Ambient Noise Level

Impact Description	Impacts on Increase in Ambient Noise Level							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible		Minor	✓	Moderate		Major

Proposed Mitigation Measures

It is expected that the following mitigation measures will be embedded to all activities such as site clearing, dredging, piling, reclamation, construction of port facilities, buildings, roads, utilities, and installation of equipment:

- Develop and implement a Noise Management Plan that includes identification of major noise sources, establishment of noise control zones, and regular monitoring of sound levels at work areas and near sensitive receptors, in accordance with Philippine Ambient Noise Standards for Class C areas and IFC EHS Guidelines;

- Install mufflers, silencers, and acoustic enclosures on all heavy equipment, generators, compressors, and construction machinery to reduce engine and mechanical noise at source;
- Conduct regular preventive maintenance and inspection of all noise-generating equipment to ensure proper functioning and prevent excessive noise due to worn or faulty components;
- Limit construction, piling, and demolition activities to daytime hours (9:00 AM to 6:00 PM) and avoid night-time and early-morning works, particularly near community and residential areas, to minimize disturbance;
- Install temporary noise barriers, acoustic screens, or shielding around high-noise equipment and work areas, especially where construction activities are close to nearby communities or sensitive receptors;
- Provide and enforce the use of appropriate personal protective equipment (PPE) such as earplugs and earmuffs for workers exposed to elevated noise levels, in compliance with occupational health and safety requirements;
- Pave and level construction and port operation areas, where practicable, to minimize vibration and rattling noise from vehicles and cargo-handling equipment;
- Use electrically powered equipment where feasible in place of diesel-driven units to reduce operational noise and vibration;
- Minimize noise from warning alarms, horns, and signal bells by using visual alarms or low-noise alternatives where safety is not compromised;
- Monitor ambient noise levels periodically at representative locations within the port and at nearby sensitive receptors to verify compliance with NPCC noise standards and IFC guideline values, and implement corrective actions if exceedances are recorded.

Residual Impact Significance

With the implementation of the prescribed noise control and management measures—including the use of mufflers and acoustic enclosures, installation of temporary noise barriers, regular equipment maintenance, daytime scheduling of construction activities, and the provision of personal protective equipment—the potential increase in ambient noise levels will be effectively minimized. Baseline monitoring results indicate that existing daytime noise levels in the project area (48.9–54.9 dBA) are substantially below the applicable 70 dBA limit for Class C areas, providing a sufficient margin to accommodate temporary construction-related noise. Consequently, noise impacts will remain localized, intermittent, and confined to the construction period, with no exceedance of regulatory thresholds expected at nearby receptors. Therefore, after mitigation, the residual impact on ambient noise levels is assessed to be of *Minor significance* and is considered acceptable.

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8.4 Biodiversity Impacts

Across terrestrial, freshwater, and marine components, biodiversity impacts associated with the Project are low in magnitude, localized, and manageable, reflecting the highly modified baseline condition of the Project footprint. Ecological sensitivity arises from the regional Verde Island Passage context, not from site-specific habitat quality. With implementation of standard mitigation measures consistent with international good practice, no significant residual biodiversity impacts are expected, and no Critical Habitat requirements are triggered under AIIB ESF and IFC PS6.

8.4.1 Impact on Terrestrial Biodiversity

Impact Discussion

During the pre-construction and construction phases of the Bauan International Port Redevelopment Project, terrestrial biodiversity will be affected primarily through localized site clearing, vegetation trimming, tree removal where required for infrastructure placement, and increased human activity within the fenced port footprint. These activities may result in temporary disturbance to fauna using landscaped areas, verges, and drainage edges, particularly common birds and bats that opportunistically forage or roost in planted trees.

Baseline ecological surveys confirm that the terrestrial environment within the Project footprint is a highly modified, engineered port landscape, dominated by ornamental landscaping, ruderal vegetation, and disturbance-tolerant fauna. No natural terrestrial habitats, mangrove stands, remnant forests, or ecologically intact green spaces are present. Recorded flora and fauna consist entirely of common, widespread, non-threatened species adapted to urban and industrial settings, including Eurasian tree sparrow, rock pigeon, yellow-vented bulbul, commensal rodents, and house geckos.

No plant or animal species listed under DENR Administrative Order 2017-11 (Threatened Plants) or DENR Administrative Order 2019-09 (Threatened Fauna) were recorded within the Project footprint. The absence of natural habitats and legally protected species indicates that terrestrial ecological value at site level is intrinsically low, with sensitivity driven primarily by broader regional context rather than by on-site habitat quality.

During construction, potential impacts include short-term disturbance to nesting or roosting individuals, minor loss of ornamental vegetation, and temporary displacement of edge-foraging birds due to noise, lighting, and human presence. During operation, incremental effects from night-time lighting, vehicle movement, and routine port activities may slightly reduce use of verges and quay edges by light-sensitive fauna, but these conditions already characterize the baseline environment.

Impact Evaluation and Significance

The impact is negative and direct, arising from construction-related land clearing, vegetation management, and increased activity within an already industrialized port environment.

- Receptors: Common terrestrial flora and synanthropic fauna (birds, bats, small mammals, reptiles).
- Spatial extent: Localized and confined to the port footprint and immediate verges.
- Duration: Temporary during construction; permanent only where hardstand replaces landscaped areas.
- Frequency: Intermittent during construction; continuous but low-intensity during operation.

Given the absence of natural habitats, the dominance of common non-threatened species, and the already engineered baseline condition, receptor sensitivity is assessed as Low. The magnitude of impact is low, as effects are limited to minor, reversible disturbance and small-scale vegetation loss without population-level consequences.

Accordingly, the pre-mitigation impact significance is assessed as Minor.

Table 83. Impacts on Terrestrial Biodiversity

Impact Description	Impacts on Terrestrial Biodiversity							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

The following measures will be integrated into construction and operational management, consistent with IFC EHS Guidelines and good international port practice:

- Limit vegetation clearing strictly to the approved construction footprint and retain existing shade trees where feasible;
- Conduct pre-construction checks for active bird nests or bat roosts in trees scheduled for trimming or removal, and avoid works where active nesting is confirmed until fledging is complete;
- Implement replacement planting using non-invasive, site-appropriate native or ornamental species to maintain landscaped cover;
- Use downward-shielded, task-focused lighting to minimize light spill into vegetated verges and quay edges;
- Enforce good housekeeping, solid waste management, and spill-prevention measures to avoid attracting pest species and secondary ecological effects;
- Maintain a simple wildlife observation log for incidental sightings of protected species, with procedures for reporting and response if encountered.

Residual Impact Significance

With the application of the above measures, terrestrial biodiversity impacts will remain site-bounded, low in magnitude, and largely reversible. No loss of important local species, no population-level effects, and no Critical Habitat implications are anticipated. The residual impact significance is assessed as Negligible.

8.4.2 Impacts on Freshwater Biodiversity (Baliti River (Tabok River))

Impact Discussion

Freshwater biodiversity impacts associated with the Project relate to potential indirect stressors on the Baliti River (Tabok River) during construction and operation, including sediment runoff, accidental spills, and increased human activity near the river mouth. The Project does not involve water abstraction from the river, direct wastewater discharge, channel modification, or alteration of river morphology.

Baseline surveys demonstrate that the Baliti River (Tabok River) is a highly stressed, low-gradient, tide-influenced system characterized by shallow depths, high turbidity, sediment accretion, limited freshwater flushing, and degraded water quality driven by existing household discharges and urban runoff. Aquatic biodiversity is extremely limited, with fish assemblages dominated by the invasive Blackchin tilapia (*Sarotherodon melanotheron*), sparse macro-invertebrate communities composed of pollution-tolerant gastropods, and low-diversity, diatom-dominated plankton communities (Shannon–Wiener H′ < 1).

No endemic, threatened, or economically important freshwater species were recorded, and no fisheries use occurs within the river. Observed ecological conditions reflect long-standing degradation unrelated to Project activities.

Project-related impacts are therefore limited to incremental contributions to an already degraded system, primarily through potential sediment-laden runoff during construction if unmanaged.

Impact Evaluation and Significance

The impact is negative and indirect, arising from secondary pathways rather than direct interaction with freshwater habitats.

- Receptors: Degraded freshwater biota (invasive fish, tolerant macro-invertebrates, plankton).
- Spatial extent: Localized to the lower reaches of the Baliti River (Tabok River).
- Duration: Temporary and episodic, linked to construction activities.
- Frequency: Intermittent during rainfall events or accidental releases.

While receptor vulnerability is assessed as low , reflecting the already degraded ecological condition and dominance of pollution-tolerant species,, the magnitude of impact is assessed as Medium due to the proximity of port activities and the potential for episodic runoff-related stressors during construction activities.

Based on the combination of Medium impact magnitude and the river's limited resilience, the overall pre-mitigation impact significant is assessed as Moderate.

Table 84. Impacts on Freshwater Biodiversity

Impact Description	Impacts on Freshwater Biodiversity							
Impact Nature		Positive			✓	Negative		
Impact Type		Direct			✓	Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		
Significance		Negligible		Minor	✓	Moderate		Major

Proposed Mitigation Measures

Mitigation measures consistent with IFC EHS Guidelines include:

- Strict erosion and sediment control measures (silt fences, stabilized stockpiles, covered transport of materials);
- Prohibition of direct wastewater or concrete washout discharge to the river;
- Spill prevention and response procedures for fuels, oils, and hazardous materials;
- Regular inspection of drainage systems, especially during the wet season;
- Worker training on pollution prevention and emergency response.

Residual Impact Significance

With effective implementation of sediment and pollution controls, Project-related contributions to freshwater ecological stress will be negligible relative to existing baseline conditions. No measurable changes in species abundance, distribution, or ecosystem function are anticipated. The residual impact significance is assessed as Minor.

8.4.3 Impacts on Marine Biodiversity (Nearshore Batangas Bay / Verde Island Passage Context)

Impact Discussion

Marine biodiversity impacts are primarily associated with construction-phase dredging, shoreline works, and permanent backfilling activities, as well as increased vessel activity during operation. While dredging-related effects are largely temporary, backfilling represents a permanent modification of nearshore seabed conditions, resulting in localized and irreversible loss of soft-bottom benthic habitat within the defined footprint.

Baseline marine surveys confirm that the nearshore area fronting the Project Site is dominated by coarse to fine sand substrates, shaped by continuous sediment inputs from the Baliti River (Tabok River). No seagrass beds, coral reefs, mangroves, or other critical benthic habitats were recorded within the nearshore impact area. However, these soft-bottom habitats form part of the broader nearshore seascape of Batangas Bay, which contributes to ecological connectivity within the Verde Island Passage through sediment dynamics, plankton productivity, and trophic support for mobile species. Fisheries resources are dominated by small pelagic species categorized as IUCN Least Concern, and no turtle nesting sites, dugong habitats, or regular megafauna use were identified.

Although the Project lies within the broader Verde Island Passage, baseline evidence demonstrates that the immediate nearshore zone adjacent to the Project does not function as Critical Habitat under IFC PS6 or AIIB ESF criteria, due to unsuitable habitat conditions and long-standing modification.

Assessment of Potential Influence on Bauan Marine Protected Area

The Bauan Marine Protected Area (Bulacan Reef) is located approximately 6.25 km from the Project site and lies outside the Project footprint and the defined marine Area of Influence. Potential pathways through which project activities could influence this marine protected area were evaluated using the baseline environmental conditions presented in Chapter 7, including oceanographic processes, marine water quality conditions, and ecological characteristics of Batangas Bay.

Hydrodynamic Connectivity

Baseline oceanographic conditions described in Section 7.1.5 (Oceanography) indicate that coastal circulation in Batangas Bay is driven primarily by tidal exchange and localized wind forcing. These processes promote dispersion and dilution of suspended materials with increasing distance from nearshore sources. Given the localized nature of dredging activities and the absence of large-scale hydrodynamic alterations, changes in current velocity or direction are expected to remain confined to the immediate vicinity of the Project site. Hydrodynamic

effects associated with dredging are therefore anticipated to be limited to the near-field zone and are not expected to extend beyond approximately 1 kilometer from the active works area under conservative conditions.

Considering the separation distance of approximately 6.25 km between the Project site and the Bauan Marine Protected Area (Bulacan Reef), hydrodynamic transport capable of influencing offshore receptors is considered negligible, and no measurable changes in circulation patterns are expected at the MPA.

Sediment Transport and Turbidity

Dredging and marine works associated with the Project may temporarily increase turbidity and suspended sediments in the immediate vicinity of the port. However, these effects are expected to be localized and short-term due to controlled dredging practices and sediment containment measures.

The use of mechanical grab dredging, combined with staged excavation and direct loading of dredged materials to barges, minimizes sediment resuspension and limits dispersion at source. In addition, sediment characteristics in the Project area—dominated by relatively cohesive and fine to medium-grained materials—promote rapid settling and reduce the persistence of suspended particles in the water column.

Based on these factors, suspended sediment plumes are expected to remain confined within the near-field zone, typically within a few hundred meters to approximately 1 kilometer from the dredging area under conservative (worst-case) conditions, with rapid attenuation due to settling and tidal dispersion.

At distances approaching 6 km from the Project site, suspended sediment concentrations are expected to return to background levels, and no significant sediment deposition or turbidity impacts are anticipated at the Bauan Marine Protected Area (Bulacan Reef).

Underwater Noise

Marine construction activities may generate underwater noise associated with dredging equipment and vessel operations. However, underwater noise attenuates rapidly with distance due to geometric spreading and absorption in shallow coastal waters. Considering the separation distance between the Project site and the Bauan Marine Protected Area, underwater noise levels generated during construction are expected to decline substantially before reaching Bulacan Reef.

Pollution Pathways

Potential pollution pathways include wastewater discharge, stormwater runoff, and accidental spills during construction or operation. The Project incorporates wastewater management systems, spill prevention measures, and emergency response procedures consistent with DENR regulations and international good practice. These controls substantially reduce the likelihood of contaminants reaching offshore ecological receptors such as the Bauan Marine Protected Area.

Navigational Footprint

Operational vessel traffic associated with the port will remain concentrated within established navigation routes and port approach channels in Batangas Bay. Project-related vessel movements are therefore not expected to occur within or adjacent to the Bauan Marine Protected Area.

Based on the baseline environmental conditions of Batangas Bay, the separation distance between the Project site and the Bauan Marine Protected Area, and the implementation of environmental mitigation measures described in this ESIA, potential construction and operational effects are expected to remain localized within the nearshore port environment and are not anticipated to result in measurable adverse impacts on the ecological integrity or conservation objectives of the Bauan Marine Protected Area (Bulacan Reef).

Impact Evaluation and Significance

The impact is negative and direct during construction, and indirect during operation.

- Receptors: Soft-bottom benthic communities, plankton, small pelagic fisheries, transient marine fauna.
- Spatial extent: Localized to the nearshore zone adjacent to the Project Site and designated marine works area, and not extending to offshore receptors such as the Bulacan Reef located approximately 6.25 from the project site
- Duration: Permanent for backfilled areas, short-term and reversible for dredging-related effects
- Frequency: Continuous for habitat loss associated with backfilling; intermittent for dredging and vessel activity.

Although the affected habitats are degraded and lack features qualifying as Critical Habitat, they form part of a functionally connected nearshore seascape within Batangas Bay. Accordingly, receptor vulnerability is assessed as Medium, reflecting the permanent nature of seabed alteration and the ecological role of soft-bottom habitats at the seascape scale. The magnitude of impact is assessed as Medium, due to the permanent loss of benthic habitat within a confined area and the introduction of long-term physical change to the nearshore environment.

Based on the combination of Medium impact magnitude and Moderate receptor sensitivity, the pre-mitigation impact significance is assessed as Moderate.

Table 85. Impacts on Marine Biodiversity

Impact Description	Impacts on Marine Biodiversity							
Impact Nature		Positive			✓	Negative		
Impact Type		Direct			✓	Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible		Minor	✓	Moderate		Major

Proposed Mitigation Measures

Mitigation measures aligned with IFC EHS Guidelines include:

- Spatial confinement and engineering control of backfilling works, ensuring that permanent seabed modification is limited strictly to the approved design footprint and does not extend into adjacent nearshore areas;

- Controlled and phased dredging, sequenced to minimize sediment disturbance and limit the extent of sediment plume dispersion;

- Use of dredging and backfilling methods appropriate for sandy substrates, designed to promote material stability and minimize resuspension;

- Implementation of dredging controls (including staged excavation, defined work zones, and direct loading of dredged material to barges) to limit sediment dispersion and ensure that suspended sediment plumes remain confined within the near-field zone, typically within a few hundred meters to approximately 1 kilometer from active dredging areas under conservative conditions;

- Implementation of stormwater and runoff management measures within port and construction areas to prevent the transport of sediments and contaminants into nearshore waters;

- Spill prevention, oil containment, and emergency response preparedness, including equipment availability and personnel training;

- Vessel speed controls, defined navigation routes, and exclusion zones to reduce disturbance to marine fauna and avoid unnecessary seabed interaction;

- Avoidance of marine works beyond approved design limits, with strict adherence to construction boundaries; and

- Routine water quality monitoring during marine construction activities, including turbidity and relevant physico-chemical parameters.

- Implement marine mammal observation procedures during active piling, dredging, or intensive vessel operations, with trained observers monitoring the presence of marine fauna within the work area;

- Apply soft-start (ramp-up) procedures for piling and other high-noise marine activities to allow marine fauna to move away from the immediate construction zone prior to full-intensity operations;

- Establish clearly marked marine exclusion zones around sensitive nearshore habitats where identified, and avoid disturbance of soft-bottom habitats (including potential seagrass patches) to the extent practicable;

Residual Impact Significance

With the implementation of the above measures, residual marine impacts will be spatially confined to a small, clearly defined area of already modified nearshore seabed.

Dredging-related increases in turbidity and suspended sediments are expected to be localized and short-term, with sediment plume dispersion limited to the immediate vicinity of the works and not extending beyond the near-field zone (generally within approximately 1 km). This is consistent with the controlled dredging methodology and the physical characteristics of sediments in the Project area.

While the seabed alteration associated with backfilling is permanent, it is limited in extent and does not affect critical habitats, protected areas, or key biodiversity features. In particular, the Bauan Marine Protected Area (Bulacan Reef), located approximately 6.25 km from the Project site, lies well beyond the maximum predicted extent of sediment plume dispersion and hydrodynamic influence, and is therefore not expected to experience measurable impacts.

No population-level or ecosystem-level effects are anticipated, and the broader ecological functions of Batangas Bay and the Verde Island Passage are not expected to be compromised.

Accordingly, the residual impact significance is assessed as Low and acceptable.

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8.5 Socio-Economic and Community Impacts and Mitigation Measures

8.5.1 Impacts on Physical Cultural Resources

Impact Discussion

During the construction and redevelopment of the Bauan International Port facilities, activities such as site clearing, earthworks, excavation for foundations, installation of port infrastructure, and construction of ancillary facilities will be undertaken within the existing BIPI property. These activities involve the use of heavy equipment such as excavators, cranes, piling rigs, dump trucks, and other construction machinery, which may disturb surface and subsurface materials.

However, according to the baseline assessment, no archaeological, paleontological, historical, aesthetic, or cultural resources—whether tangible or intangible—have been identified within the Project Area. There are likewise no known immovable objects, structures, or natural features of cultural importance present on site. The project footprint lies entirely within an area already classified and utilized for industrial and port-related activities, and therefore does not overlap with any declared heritage zones or recognized cultural properties.

During the operational phase, port operations will be confined to built infrastructure within the same industrial footprint, involving cargo handling, vessel berthing, and logistics activities, which do not require additional land disturbance or ground-intrusive works. Consequently, no routine operational interaction with physical cultural resources is expected.

Impact Evaluation and Significance

Because no archaeological, paleontological, historical, aesthetic, or cultural resources—whether tangible or intangible—have been identified within the Project Area, and there are no significant or immovable objects, structures, or natural features of cultural importance present, the Project is not expected to result in adverse impacts on physical cultural resources.

The proposed redevelopment will be implemented entirely within the existing BIPI industrial property, which has long been subject to port operations and ground disturbance, further reducing the likelihood that intact physical cultural resources are present. While construction activities such as excavation, piling, and earthworks could theoretically result in chance finds, this represents only a remote and highly unlikely risk rather than a foreseeable impact pathway. Accordingly, the magnitude of impact is classified as Negligible, and the sensitivity of receptors is Low due to the absence of known physical cultural resources within the area of influence. With Negligible magnitude and Low sensitivity, the overall impact significance is assessed as Negligible.

Table 8-86 Impacts on Physical Cultural Resources

Impact Description	Impacts on Physical Cultural Resources							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct				Indirect		
Severity/ Magnitude	✓	Negligible		Low		Medium		Large
Severity/ Vulnerability	✓	Low		Medium		High		

Significance	✓	Negligible		Minor		Moderate		Major

Proposed Mitigation Measures

Consistent with the findings that no known physical cultural resources exist in the project area, the following mitigation measures shall be implemented:

- Implement a Chance Find Procedure covering all earthworks, excavation, dredging, and piling activities. This procedure shall define actions to be taken if any archaeological, historical, or culturally significant materials are discovered, including immediate cessation of work, site protection, and notification of relevant authorities.
- Train construction supervisors and site workers to recognize potential physical cultural resources (e.g., artifacts, bones, old foundations, shells, pottery, or culturally significant materials) and to follow the chance-find procedure.
- Restrict all construction and ground-disturbing activities strictly within the approved project footprint and existing BIPI property boundaries, where no PCR have been identified.
- Coordinate with the National Museum of the Philippines and relevant LGUs should any chance finds be discovered, and resume works only after written clearance is issued.
- Document and report any chance finds, including location, description, and actions taken, as part of the ESMP.

These measures are consistent with IFC EHS Guidelines, which require that projects apply good international practice in managing cultural heritage risks and ensure that unexpected finds are appropriately protected and assessed.

Residual Impact Significance

Given that no physical cultural resources are known to exist within the Project Area and that a formal Chance Find Procedure and institutional coordination mechanisms will be in place, the risk of damage, loss, or disturbance to physical cultural resources will be effectively controlled.

With these mitigation measures properly implemented and monitored, any residual impact on physical cultural resources is assessed as Negligible, localized, and fully manageable under standard construction and environmental management practices.

Accordingly, the residual impact significance is classified as *Minor.*

8.5.2 Impacts associated with Land Acquisition and Resettlement

Impact Discussion

During the site preparation and pre-construction phase, land repossession from informal settlers and land acquisition from private landowners will be undertaken to enable the development of the container yard, quay, and associated port infrastructure. These activities are confined within the existing Bauan International Port property in Barangay San Andres Uno, Bauan, Batangas and are required to ensure the structural integrity, safety, and operational viability of the terminal.

The Project affects 131 informal settler households occupying approximately 5,000 m² of BIPI-titled land and 25 private landowners occupying approximately 3,000 m² (15 in the marine area and 10 in the Ilaya area). These areas lie within the footprint of the new container yard and quay and therefore must be cleared prior to construction.

To address these impacts, the Proponent has adopted a voluntary, socially responsible, and community-centered resettlement approach that goes beyond Philippine legal requirements. Informal settler households will be relocated to a purpose-built resettlement community in Barangay Aplaya, located approximately 1.3 km from the existing settlement. Each household will receive secure land tenure in the form of a designated residential lot, financial assistance, and logistical support for physical relocation. Community facilities currently located within the project area, including the chapel, daycare center, basketball court, and barangay stage, will be reconstructed and upgraded in the resettlement site to ensure continuity of community services.

The close proximity of the relocation site ensures that there will be no loss of access to livelihoods, employment, social networks, or essential services. The new site allows affected households to continue their existing economic activities, including fishing, informal work, and skilled trades, and to maintain access to schools, markets, and public services. For fishing households in particular, continued access to the sea is retained, ensuring no disruption to income sources. The relocation site's location closer to the town center further improves access to public services and commercial activities, thereby strengthening long-term socioeconomic opportunities.

Private landowners will be compensated at values significantly above zonal rates, with marine-area landowners receiving compensation per square meter and residential lots at the relocation site to preserve community cohesion, while Ilaya landowners will be compensated based on market-responsive valuation.

Impact Evaluation and Significance

Land acquisition and resettlement will result in physical relocation and tenure transition for informal settlers and land acquisition for private landowners. These impacts are direct and unavoidable because the affected areas are required for the port yard and quay.

The sensitivity of the receptors is considered High, as the affected community includes senior citizens, children, persons with disabilities, and households with critical illness, and many households depend on local livelihoods such as fishing, informal employment, and skilled trades.

The extent of impact is Local, confined to Barangay San Andres Uno and Barangay Aplaya, while the duration is Long-term, as relocation permanently changes residential locations. However, because the relocation site is only 1.3 km away, households will retain full functional access to employment areas, fishing grounds, schools, markets, healthcare, and social networks. As a result, no loss of access to livelihoods, services, or community networks is expected.

The severity/magnitude of the impact is assessed as Medium. While households will experience a transition, this is offset by secure land ownership, larger housing plots, improved infrastructure, cash assistance, upgraded community facilities, and better access to services, compared to the current situation of overcrowded and insecure dwellings.

With Medium magnitude and High sensitivity, the pre-mitigation significance of land acquisition and resettlement is assessed as Major due to the duration of the impact and the number of affected persons.

Table 8-87 Impacts associated with Land Acquisition and Resettlement

Impact Description	Impacts associated with Land Acquisition and Resettlement			
Impact Nature		Positive	✓	Negative
Impact Type	✓	Direct		Indirect

Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability		Low		Medium	✓	High		
Significance		Negligible		Minor		Moderate	✓	Major

Proposed Mitigation Measures

To avoid, minimize, and compensate for the social and economic impacts associated with land acquisition and resettlement, the Project will implement the Resettlement Plan in full, consistent with national law, AIIB ESS 2, and IFC Performance Standard 5. The mitigation framework is designed to ensure that all affected households and landowners are treated in a fair, transparent, and humane manner, and that no household experiences a loss of access to housing, livelihoods, services, or social networks as a result of relocation. The measures focus on securing land tenure, restoring and improving living conditions, maintaining livelihood continuity, supporting vulnerable groups, and ensuring effective consultation and grievance redress throughout the resettlement process.

- Implement the approved Resettlement Plan in coordination with the LGU of Bauan and affected Barangays, ensuring compliance with due process, consultation, notice requirements, and humane relocation procedures;
- Provide all informal settler households with secure land tenure through designated residential lots at the Aplaya relocation site;
- Ensure secure land tenure for affected informal settler households through relocation to a nearby site in Aplaya, supported by financial and logistical assistance to minimize livelihood disruption.
- Ensure full access to water, sanitation, roads, electricity, schools, markets, and health services prior to physical relocation;
- Provide fair compensation to private landowners;
- Prioritize affected households for employment during construction and operations to maintain and enhance livelihoods;
- Implement targeted assistance for vulnerable groups including senior citizens, PWDs, and households with illness;
- Maintain a grievance redress mechanism and ongoing stakeholder engagement consistent with IFC and AIIB standards.

Residual Impact Significance

With the full implementation of the Resettlement Plan and AIIB ESS 2-aligned mitigation measures, the Project will ensure that affected households experience no loss of access to livelihoods, services, or social networks, while benefiting from secure land tenure, improved housing conditions, upgraded community infrastructure, and proximity to economic opportunities.

Any remaining impacts will be limited to temporary relocation-related adjustment during the transition period. Accordingly, the residual impact of land acquisition and resettlement is assessed as *Minor* and socially positive over the long term, consistent with good international practice for large port developments.

8.5.3 Impacts to the availability of the public services (Water supply, Power supply, Telecommunication, Education, and Recreational Facilities)

Impact Discussion

During the land clearing, construction, and redevelopment of the Bauan International Port facilities, additional demand on public services will be generated by the mobilization of construction workers, equipment, and support facilities. The workforce will increase to approximately 2,035 workers during the construction phase and 471 employees during operations, which will require reliable water supply, power, telecommunications, and access to community services. The influx of workers, although largely temporary during construction, may exert pressure on existing municipal utilities and public facilities, particularly in barangays near the project site.

Water supply within the Municipality of Bauan is provided through a combination of Aqua Data, Inc. systems and barangay-managed waterworks, covering all 40 barangays, with Level III (house-to-house) connections serving about 96% of households. Sixteen barangays covering approximately 63.65% of the population are served by Aqua Data, Inc., while the remaining barangays are served by cooperatives and barangay councils. An existing artesian source (Gripo de Tarcena) and subdivision-based water systems also supplement supply, providing additional resilience during peak demand periods

Power supply, telecommunications, education, and recreational services are already established in the urbanized and industrial areas of Bauan, where the project is located. The project site falls within a light-intensity industrial zone, and similar industrial operations are already supported by existing utility networks. As a result, no physical displacement or permanent disruption of public infrastructure is anticipated. The port facilities will rely primarily on internal systems, with regulated connections to municipal networks for redundancy and emergency support

Impact Evaluation and Significance

The primary impact pathway is resource competition resulting from increased population and workforce during construction and early operation. This may temporarily increase demand for water, electricity, telecommunications bandwidth, and access to community services in nearby barangays such as Aplaya, Manghinao Proper, San Roque, and Sta. Maria, which are among the most populated and are within the service area of Aqua Data, Inc.

However, the existing water infrastructure already serves more than 90,000 residents, with redundancy provided by private subdivision systems and industrial self-supply wells. Aqua Data, Inc. and barangay cooperatives are supported by municipal funding allocations for system rehabilitation and upgrading, which increases system resilience. Moreover, industrial establishments in Bauan, including BIPI, typically operate independent water supply systems, further reducing competition with domestic users.

The sensitivity of receptors (households and community facilities) is considered Medium because public services are widely available but may be vulnerable to short-term increases in demand. The spatial extent is Local, limited to barangays within the project's service catchment. The duration of the impact is primarily Short-term during construction and early operation.

Given that no permanent loss of services or infrastructure is expected and that redundancy and institutional capacity exist, the severity/magnitude of the impact is assessed as Low. With Medium sensitivity and Low magnitude, the overall impact significance is Minor.

Table 8-88 Impacts to the availability of the public services (Water supply, Power supply, Telecommunication, Education, and Recreational Facilities)

Impact Description	Impacts to the availability of the public services (Water supply, Power supply, Telecommunication, Education, and Recreational Facilities)			
Impact Nature		Positive	✓	Negative
Impact Type	✓	Direct		Indirect

Severity/ Magnitude		Negligible	✓	Low		Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible	✓	Minor		Moderate		Major

Proposed Mitigation Measures

The mitigation measures are intended to ensure that port development does not compromise community access to basic services while maintaining good international industry practice for utility management and community relations. The following measures shall be implemented during construction and operation:

- Use of independent utility systems for the port, including on-site water supply, wastewater treatment, and power systems, to minimize reliance on municipal utilities and avoid competition with residential users;
- Coordination with Aqua Data, Inc., barangay water cooperatives, and LGUs to monitor demand and ensure that construction and operation do not exceed local service capacities;
- Water-use efficiency measures at the port (e.g., leak detection, low-flow fixtures, recycling of non-potable water for dust suppression and washing) to reduce abstraction from shared sources;
- Emergency and backup systems for water, power, and telecommunications within the port to prevent service interruptions affecting nearby communities;
- Worker accommodation and camp management plans requiring contractors to provide dedicated water, power, and sanitation facilities for construction workers;
- Community engagement and grievance mechanisms to allow residents to report any service disruptions and enable timely corrective action.

These measures are consistent with Good International Industry Practice (GIIP), which requires infrastructure projects to avoid over-loading public utilities and to ensure continuity of essential services to host communities.

Residual Impact Significance

With the implementation of independent utility systems, coordination with service providers, and efficiency measures, the project will not materially reduce the availability or quality of water, power, telecommunications, education, or recreational services for surrounding communities. Given the existing coverage, redundancy, and institutional capacity in Bauan, any temporary increase in demand during construction will be effectively managed.

Accordingly, the residual impact on the availability of public services is assessed as Minor and not significant..

8.5.4 Threat to Public Health and Safety

Impact Discussion

During the construction and re-development of the Bauan International Port, potential threats to public health and safety will be generated from the mobilization of workers, heavy equipment, construction vehicles, and port machinery. The equipment to be used includes crawler cranes, truck cranes, excavators, dump trucks, container handlers, forklifts, generators, welding units, and service vehicles. These activities introduce risks associated with traffic accidents, exposure to noise, dust, exhaust emissions, handling of hazardous materials, and interaction between workers and surrounding communities.

The construction phase will require approximately 2,035 workers, while the operational phase will employ about 471 personnel, which may lead to increased movement of people, higher demand for sanitation, and greater interaction with nearby barangays such as Aplaya, Manghinao Proper, San Roque, Sta. Maria, Cupang, and the

Poblacion areas. These barangays are characterized by relatively high population densities and reliance on shared transport corridors and public services.

During the operational phase, potential public safety risks will be associated with marine vessel movements, cargo loading and unloading, storage and handling of fuel and hazardous materials, and increased truck traffic within and outside the port area. However, these risks will be managed through controlled access, standard port operating procedures, and emergency response systems in accordance with international port safety practices

Impact Evaluation and Significance

The Municipality of Bauan has a total population of 90,819 distributed across 40 barangays, with several urban barangays having population densities exceeding 2,600 persons per square kilometer, indicating relatively high community exposure to industrial and transport-related risks.

The project area and access routes are located near residential and commercial zones, increasing the likelihood of interaction between port activities and the public.

Public health and safety risks are mainly associated with traffic movement of heavy vehicles, workforce influx, exposure to construction- and port-related hazards, and potential incidents involving fuels, cargo, or equipment. The extent of the impact is considered Local, as it will primarily affect barangays adjacent to the port and along transport routes. The duration of the impact will be short- to medium-term during construction and long-term during operation.

Considering the scale of port activities and workforce size, the severity/magnitude of the impact is assessed as Medium. The sensitivity of receptors is also Medium, due to the proximity of densely populated barangays and the dependence of communities on shared roads and services. With Medium magnitude and Medium sensitivity, the impact significance is Moderate.

Table 8-89 Threat to Public Health and Safety

Impact Description	Threat to Public Health and Safety								
Impact Nature		Positive			✓	Negative			
Impact Type	✓	Direct			✓	Indirect			
Severity/ Magnitude		Negligible		Low	✓	Medium		Large	
Severity/ Vulnerability		Low	✓	Medium		High			
Significance		Negligible		Minor	✓	Moderate		Major	

Proposed Mitigation Measures

It is expected that the following mitigation measures will be embedded in all project activities such as construction, cargo handling, port operations, and maintenance, in line with the national requirements and the IFC Environmental, Health and Safety Guidelines for Ports, Harbors and Terminals:

- Develop and implement a Traffic and Transport Management Plan to regulate construction and operational vehicle movement, designate haul routes, enforce speed limits, and install safety signage and barriers near communities;
- Establish controlled access, fencing, and security systems within port facilities to prevent unauthorized entry and reduce community exposure to operational hazards;
- Provide adequate worker accommodation, sanitation, potable water, and solid waste management facilities to prevent public health risks associated with labor influx;
- Ensure inclusion of labor management procedures including workers' code of conduct in works contracts and undertake the necessary training for workers, including gender-related training (see separate section on Gender Impacts);
- Implement health screening, hygiene promotion, and communicable disease prevention programs for all workers;
- Ensure safe storage, labeling, and handling of fuels, chemicals, and hazardous cargo, including bunded storage areas, spill kits, and fire protection systems;
- Develop and implement an Emergency Preparedness and Response Plan covering fire, explosion, spill, vessel collision, and medical emergencies, in coordination with local LGUs, hospitals, and disaster response units;
- Conduct regular safety training, drills, and inspections for workers and security personnel;
- Establish and maintain a Grievance Redress Mechanism (GRM) for communities to report safety, traffic, or health-related concerns.

Residual Impact Significance

If the mitigation measures above are implemented effectively and monitored regularly, risks to public health and safety from port construction and operation will be substantially reduced. Although interactions between port activities and surrounding communities will continue, they will be managed through engineering controls, administrative procedures, and emergency preparedness systems.

Accordingly, the residual impact on public health and safety is assessed as *Minor.*

8.5.5 Impact of Traffic Congestion

Impact Discussion

During the land clearing, construction, and re-development of the Bauan International Port facilities, traffic congestion will be generated from the mobilization of construction equipment, construction materials, and workers, as well as the movement of delivery trucks and heavy cargo vehicles. The construction phase will involve the frequent entry and exit of dump trucks, trailers, cranes, forklifts, and service vehicles to and from the port area, particularly in Barangays San Roque and San Andres I, where the port is located. The transport of construction materials and equipment will be carried out through the existing road network, which includes national, provincial, municipal, and barangay roads.

The Bauan road network is already heavily utilized, particularly the Batangas–Palico Highway and the National Road passing through the Bauan town proper, which serves as the primary arterial road linking Bauan to Batangas City, Mabini, Lemery, and Metro Manila. These roads pass directly through the Central Business District (CBD), where narrow pre-war streets, jeepney and tricycle terminals, roadside parking, and high pedestrian activity converge, resulting in recurring traffic congestion. A large volume of trailer trucks servicing existing industrial ports and facilities along Batangas Bay already ply these roads, significantly contributing to congestion in the town proper

During the operational phase, the re-developed port is expected to handle increased cargo volumes, which will translate to higher truck traffic to and from the port. Without proper traffic management, this could further compound congestion in surrounding barangays and on the National Road. However, BIPI has developed a Traffic Management Plan that includes designated entry and exit points, off-peak scheduling of truck movements,

installation of road signage, and the construction of a new access road and junction perpendicular to the Bauan–Mabini Road to segregate port traffic from local traffic flows

Impact Evaluation and Significance

The existing traffic condition in Bauan is already constrained by narrow town-center streets, high volumes of public utility jeepneys and tricycles (about 1,500 jeepneys and 2,562 tricycles), roadside parking, and the convergence of transport terminals in the CBD, particularly around the Bauan Public Market.

In addition, the National Road functions as a major arterial route for both industrial freight and daily commuter traffic, making it highly sensitive to any additional traffic load.

The Project will introduce temporary but intensive traffic movements during construction, especially along access roads in Barangays San Roque and San Andres I, where the port is located. These movements will include heavy trucks, construction equipment, and workforce transport, which may cause localized congestion, delays, and reduced road safety. During the operational phase, regular cargo truck movements are expected to continue, although these will be managed through a dedicated traffic flow system and new access roads.

The sensitivity of the impact receptor is considered Medium, as the affected road network already experiences congestion due to industrial truck traffic, public transport operations, and limited road width in the CBD.

The extent of the impact is Local, primarily affecting barangays adjacent to the port and the main road corridors linking the port to the regional highway network. The duration of the impact during construction is Short-term (temporary), while during operations it is Long-term but managed through engineered traffic controls.

Considering the Medium magnitude of additional traffic generated by construction and port operations and the Medium sensitivity of the existing road network and surrounding communities, the overall impact significance is assessed as Moderate.

Table 8-90 Impact to Traffic Congestion

Impact Description	Impact to Traffic Congestion								
Impact Nature		Positive			✓	Negative			
Impact Type	✓	Direct				Indirect			
Severity/ Magnitude		Negligible		Low	✓	Medium		Large	
Severity/ Vulnerability		Low	✓	Medium		High			
Significance		Negligible		Minor	✓	Moderate		Major	

Proposed Mitigation Measures

The Proponent will implement the following integrated measures during construction and operation:

- Implement a Traffic Management Plan (TMP) in coordination with the Bauan LGU, DPWH, DOTR, and municipal traffic management office, including designated entry and exit points, traffic marshals, and continuous monitoring of traffic conditions.
- Schedule delivery of construction materials, heavy equipment, and cargo trucks during off-peak hours to minimize interference with commuter, school, and commercial traffic in the town proper and CBD.
- Use a dedicated new access road and junction perpendicular to the Bauan–Mabini Road to segregate port truck traffic from local and public traffic flows, thereby reducing congestion along the National Road.
- Install appropriate traffic signage, warning lights, and pedestrian controls around port access points, haul routes, and nearby barangays to improve safety and manage vehicle–pedestrian interactions.
- Provide designated parking and holding areas for cargo trucks and port vehicles within the port site to prevent roadside queuing and illegal parking that contributes to CBD congestion.
- Coordinate regularly with barangays San Roque and San Andres I and affected communities to inform them of truck schedules, road works, and traffic changes, and to receive feedback on traffic concerns.
- Implement traffic impact assessment and adaptive management, allowing traffic controls to be adjusted based on real-time congestion levels and community feedback.

Residual Impact Significance

With the full implementation of the Traffic Management Plan, construction of the new segregated access road, enforcement of off-peak truck scheduling, and continuous coordination with local authorities and communities, traffic congestion attributable to the Project will be substantially reduced and managed within acceptable levels. While some localized delays may still occur during peak construction and peak cargo movement periods, these will be temporary and controlled.

Accordingly, the residual impact on traffic congestion is assessed as *Minor.*

8.5.6 Impacts of Gender-Related Risks

Impact Discussion

Approximately 2,035 workers will be engaged during the construction phase and 471 workers during the operational phase, many of whom are expected to be in-migrants and predominantly male. This influx may alter community dynamics and expose women, girls, and vulnerable groups to heightened risks of gender-based violence (GBV), sexual harassment, crime, and reduced access to services.

The influx of temporary workers has been identified in the Gender Risks and Vulnerabilities Matrix as a high-risk factor for GBV and harassment, particularly near port areas, transport routes, and emerging commercial spaces around construction zones.

Women and girls are especially vulnerable in areas with increased nighttime activity, congestion, and interaction with non-local workers.

Employment impacts also have a gender dimension. While women in Bauan slightly exceed men in tertiary education attainment, port and construction activities traditionally favor male labor. Without deliberate gender-inclusive hiring, women may be excluded from newly created employment opportunities in administration, logistics, technical, and community liaison roles, reinforcing structural inequalities.

Female-headed households are particularly vulnerable due to limited income buffers and caregiving responsibilities. Construction activities, land clearing within BIPI-owned areas, and service disruptions may disproportionately affect these households by increasing economic pressure and reducing livelihood security.

In addition, increased population and construction activity may place stress on water supply, health services, and transport systems, which disproportionately affects women as primary caregivers and household managers. Traffic

congestion and safety risks along access roads may further limit women's mobility and increase exposure to accidents and harassment.

During the operational phase, workforce levels decrease; however, workplace safety, harassment risks, and employment equity remain relevant if not managed through institutional policies and monitoring systems.

Impact Evaluation and Significance

The site mobilization process involves the movement of workers, materials, and equipment, which will create temporary in-migration and change socio-economic interactions in nearby barangays. The baseline data show that in-migration is expected to be high and predominantly male, creating elevated risks of GBV, harassment, crime, and pressure on services.

The impact will be experienced primarily by women, girls, female-headed households, youth, and elderly persons in barangays adjacent to the port and along transport routes. These groups are considered sensitive receptors because of their greater reliance on public services, caregiving roles, and exposure to mobility and safety risks.

The extent of the impact is Local, as it is concentrated in port-adjacent communities and worker transport corridors. The duration is Short- to Medium-Term, with highest risks during the construction phase (less than 6–7 months of peak mobilization), but with some risks continuing into operation if not managed.

Considering the high influx of male workers, existing vulnerabilities of women and female-headed households, and service constraints, the severity/magnitude of gender-related risks is assessed as Medium. The sensitivity of impact receptors is also assessed as Medium, given the identified vulnerabilities in the baseline.

With Medium severity and Medium sensitivity, the overall impact significance is assessed as Moderate.

Table 8-91 Impacts of Gender-Related Risks

Impact Description	Impact to Traffic Congestion							
Impact Nature		Positive			✓	Negative		
Impact Type	✓	Direct			✓	Indirect		
Severity/ Magnitude		Negligible		Low	✓	Medium		Large
Severity/ Vulnerability		Low	✓	Medium		High		
Significance		Negligible		Minor	✓	Moderate		Major

Proposed Mitigation Measures

It is expected that the following mitigation measures will be embedded in all activities such as port construction, expansion works, worker accommodation, and operational management.

- Implement a Zero-Tolerance Policy on Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and harassment, applicable to all workers;

- Conduct mandatory GBV, Code of Conduct, and Safe Spaces Act orientation for 100% of the 2,035 construction workers prior to deployment;
- Establish confidential and accessible grievance mechanisms, including a 24/7 hotline, gender desk, and anonymous reporting system;
- Integrate GBV and anti-harassment clauses into all contractor and subcontractor agreements;
- Set a minimum 30–40% female hiring target for administrative, logistics, finance, HR, and community liaison positions and include these targets in contractor hiring requirements;
- Maintain sex-disaggregated employment records and review compliance quarterly;
- Prioritize female-headed households in consultations, compensation, and any required livelihood or relocation support;
- Provide targeted livelihood and social assistance to women-led households affected by construction activities;
- Coordinate with LGU health units to deploy mobile clinics during peak construction periods and ensure the presence of trained female health personnel on site;
- Conduct information and education campaigns on maternal, reproductive, and stress-related health;
- Provide shuttle services for women workers, improve lighting along walkways and access roads, and coordinate traffic management with LGUs to enhance pedestrian safety;
- Conduct quarterly water quality monitoring and apply water-rationing protocols during peak construction to protect household water supply;
- Collect sex-disaggregated data on employment, training, grievances, health, and safety incidents and submit quarterly reports on Gender Responsive Mitigation Measures embedded into the ESMP. .

Residual Impact Significance

If the mitigation measures above are effectively implemented and regularly monitored through the Gender Responsive Mitigation Measures embedded into the ESMP, grievance systems, and LGU coordination, the risks related to GBV, employment inequality, service strain, and community safety will be substantially reduced.

With these controls in place, the residual impact of gender-related risks is assessed as *Minor.*

8.5.7 Impact of Occupational and Health and Safety Risks

Impact Discussion

The Bauan International Port Redevelopment Project involves construction, operation, and maintenance activities that inherently expose workers, contractors, and visitors to a range of occupational health and safety (OHS) risks typical of port and terminal environments. These risks arise from activities such as cargo handling, crane and forklift operations, working at heights, movement of heavy vehicles and equipment, electrical works, and routine maintenance of port infrastructure. In addition, workers may be exposed to physical hazards including dust, noise, vibration, and hazardous materials associated with fuel handling, equipment maintenance, and waste management.

During the construction phase, OHS risks are elevated due to simultaneous activities, high equipment density, temporary work areas, and the presence of multiple contractors. Potential impacts include occupational injuries, illnesses, and, in worst-case scenarios, fatalities resulting from falls, struck-by incidents, equipment malfunction, traffic accidents within the port area, electrical hazards, and prolonged exposure to noise and airborne particulates.

In the operational phase, although activities become more routine and controlled, OHS risks remain significant due to continuous cargo handling, vessel servicing, yard operations, and equipment maintenance. Without effective management systems, these risks could lead to recurrent accidents, chronic occupational illnesses, reduced worker productivity, and disruptions to port operations.

These occupational risks primarily affect workers and contractors within the port and terminal area, who are considered sensitive receptors due to the nature of their tasks and direct exposure to industrial hazards.

Impact Evaluation and Significance

The potential occurrence of occupational injuries and illnesses is assessed as Direct, as risks arise directly from Project-related activities. The spatial extent of the impact is Site-Specific, limited to the port and terminal facilities, while the duration is Long-Term, as OHS risks persist throughout construction, operation, and maintenance phases.

Considering the scale of port operations, the use of heavy equipment, and the multiplicity of concurrent activities, the severity/magnitude of unmitigated OHS risks is assessed as Medium, while the sensitivity of receptors (workers and contractors) is assessed as Medium. Based on these factors, the overall significance of OHS risks prior to mitigation is assessed as Moderate.

Table 8-92 *Impacts on Occupational Health and Safety Risks*

Impact Description	*Impacts on Occupational Health and Safety Risks*								
Impact Nature		Positive			✓	Negative			
Impact Type	✓	Direct			✓	Indirect			
Severity/ Magnitude		Negligible		Low	✓	Medium		Large	
Severity/ Vulnerability		Low	✓	Medium		High			
Significance		Negligible		Minor	✓	Moderate		Major	

Proposed Mitigation and Management Measures

To manage and reduce OHS risks, the Project will implement the BIPI Health and Safety Program, which serves as the primary mitigation and management instrument for occupational risks. The program establishes a structured and systematic approach to preventing accidents, injuries, and occupational illnesses across all Project phases.

Key measures include:

- Implementation of mandatory occupational health and safety policies applicable to all employees, contractors, and subcontractors;
- Comprehensive hazard identification and risk assessment for all port activities, including cargo handling, lifting operations, work at heights, electrical works, and vehicle movement;
- Mandatory health and safety induction and task-specific training for 100% of workers prior to deployment;
- Provision and strict enforcement of appropriate personal protective equipment (PPE);
- Development and implementation of safe work procedures, method statements, and permit-to-work systems for high-risk activities;
- Regular workplace inspections, toolbox meetings, and safety audits conducted by qualified safety personnel;

- Traffic management and equipment segregation measures within the port to reduce collision and struck-by risks;
- Occupational health monitoring for noise, dust, and other exposure pathways;
- Emergency preparedness and response procedures, including first aid, fire response, spill response, and evacuation drills; and
- Clear assignment of OHS responsibilities to managers, supervisors, safety officers, and workers, supported by incident reporting and corrective action mechanisms.

These measures are embedded in the Environmental and Social Management Plan (ESMP) and are aligned with national occupational safety regulations and international good practice for port operations.

Residual Impact Significance

With the effective implementation and continuous monitoring of the BIPI Health and Safety Program, the likelihood and severity of occupational accidents and illnesses will be substantially reduced. The structured management of hazards, combined with training, supervision, and enforcement, is expected to lower incident rates and improve overall workforce welfare and operational reliability.

Accordingly, the residual impact significance of occupational health and safety risks is assessed as Minor.

8.5.8 Enhancement of Employment and Livelihood Opportunities

Impact Discussion

The Proposed Bauan International Port Re-development Project is intended to modernize and expand port facilities within the existing property of Bauan International Port, Inc. (BIPI), in support of increased cargo handling, logistics efficiency, and regional economic growth. As part of this redevelopment, a substantial workforce will be mobilized during both the construction and operational phases.

BIPI and its third-party contractors plan to hire approximately 2,035 workers during the construction phase to undertake port infrastructure redevelopment activities. Once the project becomes operational, the workforce will stabilize at around 471 permanent employees to manage cargo handling, logistics, maintenance, and day-to-day port operations. To maximize local benefits and minimize social pressures associated with in-migration, BIPI has committed to prioritizing qualified local hiring, particularly from the host barangay and the Municipality of Bauan.

These employment opportunities are expected to enhance household incomes, strengthen local livelihoods, and stimulate secondary economic activities such as food services, transportation, accommodation, and small enterprises supporting port workers. In a municipality that is already experiencing increasing urbanization driven by industrial activity, the project's labor requirements are well aligned with the available working-age and highly literate population of Bauan.

Impact Evaluation and Significance

The port re-development will generate both short-term and long-term employment, making its contribution to employment and livelihoods sustained and meaningful. The construction phase will create a large number of temporary jobs (about 2,035 workers), while the operational phase will provide approximately 471 stable, long-term positions throughout the life of the port facilities.

Because these jobs are created directly by the project and because BIPI will prioritize local hiring to avoid in-migration and informal settlement pressures, the employment benefits will primarily accrue to residents of Bauan and nearby barangays. This strengthens the local economy, increases household purchasing power, and supports small and medium enterprises that supply goods and services to port workers.

Given the large scale of job creation, the long-term nature of operational employment, and the direct linkage between the project and local livelihoods, the enhancement of employment and livelihood opportunities is assessed as a Positive and Significant impact.

Table 8-93 Positive Impacts related to Employment and Livelihood Opportunities

Impact Description	Positive Impacts related to Employment and Livelihood Opportunities			
Impact Nature	✓	Positive		Negative
Impact Type	✓	Direct		Indirect

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8.6 Cumulative Impact Assessment (CIA)

8.6.1 Concept of Cumulative Impacts

Cumulative impacts refer to the incremental environmental and social effects that result from the Bauan International Port Redevelopment Project when considered together with past, present, and reasonably foreseeable future activities within the Bauan coastal and industrial zone. These impacts may occur through additive accumulation of similar stressors, interaction between different impact pathways, or repetition of temporary disturbances over time.

Consistent with the DENR EIS System (DAO 2003-30), IFC Good Practice Handbook on Cumulative Impact Assessment (2013), and IAIA CIA Principles, this assessment focuses on:

- Stressors that extend beyond the Project footprint;
- Receptors already exposed to multiple pressures; and
- Residual impacts following the application of Project-specific mitigation measures.

The CIA is informed by the impact assessment results where most Project-level impacts are assessed as Minor or Negligible after mitigation, reflecting the Project's location within an already industrialized and highly modified environment.

8.6.2 Cumulative Impact Drivers

Key cumulative impact drivers relevant to the Project include:

- Long-standing port operations within Batangas Bay;
- Other existing and approved port developments;
- Industrial facilities along the Bauan coastline;
- Increasing maritime traffic within Batangas Bay and the broader Verde Island Passage Marine Corridor (VIPMC);
- Urbanization and infrastructure growth within Bauan.

In the cumulative context, the Project does not introduce new impact pathways, but rather contributes incrementally to existing pressures typical of an industrial port landscape. Table 8-99summarizes the principal cumulative drivers and their relevance.

Importantly, Project dredging, construction, and operational activities are:

- Spatially confined;
- Time-bound (for construction-related impacts); and
- Implemented with mitigation measures consistent with IFC GIIP.

Accordingly, the Project's contribution to cumulative impacts is primarily additive, rather than synergistic or transformative.

8.6.3 Spatial and Temporal Boundaries of Cumulative Impacts

Spatial Boundary

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The cumulative impact area includes:

- The Bauan International Port site;
- Adjacent barangays and access corridors;
- Nearby creeks, coastal waters, and nearshore Batangas Bay; and
- Existing industrial and port-related developments within Bauan.

This boundary reflects the realistic zone of influence where Project-related stressors could interact with other activities.

Temporal Boundary

Cumulative impacts are assessed across:

- Construction, operation, and decommissioning phases; and
- Long-term residual effects that may persist beyond active construction.

Temporary construction-related effects are considered cumulative only where repetition or overlap with other activities could result in extended exposure.

8.6.4 Cumulative Impacts by Environmental Component

Land Resources

Cumulative Landform Alteration and Soil Stability

Incremental grading, compaction, and infrastructure development associated with the Project add to existing industrial land modification within the port estate. However, , these changes occur entirely within reclaimed and engineered land, are subject to reinstatement, and do not affect natural soils or undeveloped land.

Cumulatively, landform alteration is:

- **Additive**, not synergistic;
- Confined to industrial land already committed to port use; and
- Managed through engineering controls and waste management practices.

Residual cumulative significance is **Low**, consistent with Table 8-31.

Cumulative Solid and Hazardous Waste Generation

Construction, operational, and eventual decommissioning wastes add incrementally to existing waste streams in Bauan. However, Project waste volumes are typical of port developments and are managed through accredited disposal systems and segregation practices.

The cumulative effect is **manageable** and remains **low after mitigation**, with no exceedance of local waste handling capacity anticipated.

Water Resources and Aquatic Systems

Cumulative Water Demand

Project groundwater abstraction and operational water demand add incrementally to existing industrial and domestic water use. As established, abstraction volumes are regulated, monitored, and within sustainable yield limits.

Cumulative water demand stress is therefore:

- Additive;
- Long-term; but
- Low after mitigation

Cumulative Surface and Marine Water Quality Effects

Incremental sediment runoff, dredging-related turbidity, and vessel activity contribute to existing pressures on creeks, the Baliti River (Tabok River), and Batangas Bay. Individually, these effects are Minor, temporary, and localized; cumulatively, they may contribute to background variability in turbidity and suspended solids.

Given:

- Non-hazardous sediment quality;
- Controlled dredging methods;
- Absence of operational wastewater discharge; and
- Existing degraded baseline conditions,

cumulative water quality impacts are assessed as Moderate pre-mitigation, reducing to Low to Low–Moderate after mitigation, consistent with Table 8-32.

Dredging and Marine Construction

Cumulative dredging impacts arise from repeated seabed disturbance across multiple port developments in Batangas Bay. The Project contributes:

- A short-term, localized dredging episode;
- Within an already modified port basin; and
- With no encroachment into undeveloped seabed areas.

The Project's dredging activities are additive, not synergistic, and do not materially alter regional sediment transport or bathymetric regimes. Residual cumulative significance is Low.

Air Quality and Climate

Cumulative Air Emissions

Construction dust and operational vehicle emissions add incrementally to existing industrial emissions in Bauan. As demonstrated in Sections on air quality and noise, baseline levels are within standards, and mitigation measures effectively control emissions.

Cumulative air quality impacts are:

- Additive;
- Localized; and
- Low after mitigation.

Cumulative Greenhouse Gas Emissions

Project GHG emissions contribute incrementally to national and global totals but remain negligible relative to broader inventories. Cumulative climate impacts are therefore Minor and manageable, consistent with Table 8-33.

Noise and Vibration

Repeated construction activities and continuous port operations contribute to cumulative noise exposure in nearby barangays. However:

- Baseline noise levels are low for an industrial setting;
- Construction noise is temporary; and
- Operational controls are in place.

Cumulative noise impacts are Moderate pre-mitigation, reducing to Low after mitigation.

Socio-Economic Environment

Cumulative Employment and Economic Effects

The Project contributes positively to cumulative employment generation, income growth, and local economic activity. When combined with other industrial developments, these effects support sustained economic transformation.

Cumulative socio-economic impacts are net positive.

Cumulative Social Risks

Labor influx, traffic, and service demand may cumulatively increase pressure on infrastructure and social systems. However, Project-specific controls (traffic management, worker accommodation, gender action plans, and GRMs) significantly reduce residual risks.

Residual cumulative social risks are low and manageable.

8.6.5 Significance of Cumulative Impacts

Considering:

- The already industrialized baseline of Bauan;
- The localized, temporary, and controlled nature of most Project impacts;
- The absence of new or irreversible impact pathways; and
- The comprehensive mitigation and monitoring framework embedded in the EMP,

the cumulative impacts of the Bauan International Port Redevelopment Project are assessed as:

- Moderate but manageable for the physical and biological environment; and
- Net positive for the socio-economic environment.

Cumulative impacts are predominantly additive rather than synergistic, remain within regulatory and ecological thresholds, and are effectively managed through:

- Continuous environmental monitoring;

- Adaptive management; and
- Coordination with regulatory agencies and other port operators.

Accordingly, the Project is acceptable from a cumulative impact perspective under the DENR EIS System, AIIB ESF, and IFC Good International Industry Practice.

8.7 Cumulative Impact Matrix

The Cumulative Impact Matrix is a systematic tool used to identify, organize, and evaluate the incremental environmental and social effects of the proposed Bauan International Port Redevelopment Project when considered in combination with past, present, and reasonably foreseeable future activities within the project's area of influence. Unlike single-project impact assessments, the matrix captures impacts that may be additive, synergistic, or interactive, and that may accumulate over time or across multiple project phases.

The matrix integrates impacts across the construction, operation, and decommissioning phases, and assesses their nature, duration, and significance after the application of mitigation measures outlined in the Environmental Management Plan (EMP). This approach is consistent with the requirements of the Philippine Environmental Impact Statement (EIS) System under DENR Administrative Order 2003-30, and aligns with international best practices, including the IFC Good Practice Handbook on Cumulative Impact Assessment and the International Association for Impact Assessment (IAIA) principles.

The resulting Cumulative Impact Matrix provides a transparent and evidence-based framework for determining the overall significance and manageability of project-related impacts, thereby supporting informed decision-making and ensuring that environmental and social thresholds are not exceeded over the project lifecycle.

LEGEND	
Impact Nature	
A	Additive
S	Synergistic
I	Interactive
Duration	
ST	Short-Term
LT	Long-Term
P	Permanent
Significance	
L	Low
M	Medium
H	High
Residual Impact	**After Mitigation Measures**

Impact Nature

The Impact Nature describes how individual project impacts combine with other existing or foreseeable activities:

- Additive (A) – Impacts that accumulate incrementally over time or space, where each additional contribution increases the total effect without fundamentally changing its character (e.g., gradual increase in solid waste generation or air emissions).
- Synergistic (S) – Impacts that interact with other stressors in such a way that the combined effect is greater than the sum of individual impacts (e.g., sedimentation combined with coastal industrial activity leading to accelerated water quality degradation).
- Interactive (I) – Impacts that influence or modify other environmental or social processes, potentially altering system behavior or sensitivity (e.g., hazardous waste generation interacting with regional waste handling capacity).

This classification follows the IFC Good Practice Handbook on Cumulative Impact Assessment and IAIA guidelines.

Duration

The Duration criterion indicates the temporal extent of the cumulative impact:

- Short-Term (ST) – Impacts that occur over a limited period and are reversible once the activity ceases (e.g., construction dust and noise).
- Long-Term (LT) – Impacts that persist over an extended timeframe, potentially spanning multiple project phases or generations (e.g., landform modification, traffic-related emissions).
- Permanent (P) – Impacts that result in irreversible changes to environmental or social conditions (e.g., permanent land conversion).

This temporal classification aligns with DENR EIA impact duration descriptors and international EHS assessment standards.

Significance

Significance reflects the overall importance of a cumulative impact based on its magnitude, extent, duration, and sensitivity of the affected receptor, as well as regulatory thresholds:

- Low (L) – Minor impacts that are localized, within regulatory limits, and readily mitigated.
- Moderate (M) – Noticeable impacts that may affect sensitive receptors or require active management but do not exceed environmental standards.
- High (H) – Impacts that substantially affect environmental quality or social conditions, potentially exceeding thresholds or requiring strategic intervention.

Positive impacts are indicated where applicable (e.g., employment generation), in accordance with DENR and IFC guidance recognizing beneficial impacts.

Residual Impact

Residual Impact represents the remaining level of impact after implementation of mitigation and management measures specified in the Environmental Management Plan (EMP):

- Low (L) – Impact is effectively minimized and within acceptable limits.
- Low to Moderate (L–M) – Impact remains noticeable but controlled and monitored.
- High (H) – Impact remains significant and may require additional mitigation or adaptive management.

Residual impact evaluation reflects the mitigation hierarchy (avoid–minimize–restore–offset) and supports adaptive management consistent with ISO 14001 and IFC Performance Standard 1.

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Overall, the legend ensures a standardized and defensible framework for interpreting cumulative impacts, facilitates comparison across environmental components, and supports regulatory review and decision-making by clearly communicating how impacts were classified and assessed.

Table 8-31 Impact Matrix for Land Environment

Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Landform / Soil Stability	Construction, Operation	Additive modification of already reclaimed and engineered landforms due to grading, compaction, and infrastructure development, contributing incrementally to long-standing industrial land use within the port estate	A	LT	M	L
Vegetation Cover	Construction	Incremental loss of ornamental and ruderal vegetation from permitted tree cutting, adding to historical vegetation clearance associated with industrial development in Bauan	A	LT	M	L
Solid Waste Load	Construction, Operation, Decommissioning	Additive increase in construction, domestic, and dismantling wastes, contributing to existing municipal and industrial waste streams without exceeding management capacity	A	LT	M	L
Hazardous Waste	Decommissioning	Short-term interaction between project-generated hazardous wastes and existing regional hazardous waste management systems, without	I	ST	M	L

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Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
		creating new disposal pathways				
Terrestrial Biodiversity	Construction, Operation	Additive, localized disturbance to common and disturbance-tolerant terrestrial fauna within a highly modified industrial landscape, with no cumulative population-level effects	A	LT	L-M	L

Table 8-32 Impact Matrix for Water Resources and Aquatic Environment

Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Water Demand	Construction, Operation	Incremental project water demand added to existing industrial and domestic water use within the Bauan area	A	LT	M	L
Surface Water Quality	Construction, Operation	Additive contribution of construction runoff and stormwater discharge to existing baseline stress on creeks and the Baliti River (Tabok River), without introducing new pollution sources	S	LT	M	L–M
Coastal / Marine Water	Operation	Additive, short-term sediment disturbance and operational runoff contributing to background variability in Batangas Bay water quality within an already industrialized coastal system	S	LT	M	L
Aquatic Biodiversity	Operation	Indirect, additive ecological stress linked to cumulative water quality variability, occurring in a nearshore environment already modified by port and shipping activities	S	LT	M	L

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Table 8-33 Impact Matrix for Air Quality and Climate

Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Dust and Particulates	Construction	Temporary, additive dust emissions from construction activities contributing to existing industrial background levels	A	ST	L–M	L
Vehicle Emissions	Operation	Continuous but incremental exhaust emissions from port-related traffic added to existing industrial and transport emissions	A	LT	M	L
Greenhouse Gas Emissions	Construction, Operation	Marginal contribution to cumulative GHG emissions at the national and global scale	A	LT	M	L

Table 8-34 Impact Matrix for Noise and Vibration

Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Ambient Noise Levels	Construction, Operation	Additive exposure to construction and operational noise combined with existing port and industrial noise sources	A	LT	M	L

Table 8-35 Impact Matrix for Socio-Economic Environment

Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Employment and Livelihood	Construction, Operation	Cumulative employment generation and income opportunities contributing to sustained local and regional economic growth	S	LT	H (Positive)	H (Positive)
Local Economy	Operation	Additive stimulation of barangay, municipal, and provincial economies through port-related trade and services	S	LT	H (Positive)	H (Positive)

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Environmental Component	Project Phase(s)	Cumulative Impact Description	Impact Nature	Duration	Significance	Residual Impact
Population Dynamics	Construction, Operation	Incremental influx of workers increasing demand on housing and services	A	LT	M	L
Retrenchment and Job Loss	Decommissioning	Short-term livelihood impacts at project closure, interacting with other industrial transitions	A	ST	M	L

Table 8-99 Overall Cumulative Impact Evaluation

Environmental Domain	Overall Cumulative Impact	Manageability
Physical Environment	Moderate	Manageable through implementation of the ESMP including engineering controls, good construction practices, and routine monitoring
Biological Environment	Moderate	Manageable through targeted mitigation measures, environmental monitoring, and adaptive management within an already modified ecological setting
Air and Climate	Moderate	Manageable through application of best available practices, equipment maintenance, operational controls, and compliance monitoring
Socio-Economic	Net Positive	Sustainable with safeguards, including stakeholder engagement, grievance mechanisms, and continued implementation of community and worker protection measures

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9 Environmental and Social Management Plan

9.1 Environmental and Social Management Requirements

The ESIA process has identified the key environmental and social issues, impacts and risks associated with the Bauan International Port Re-Development Project requiring the implementation of a wide range of mitigation measures. The necessary actions required to manage these issues, impacts and risks are presented in this Environmental and Social Management Plan (ESMP); these include identification of all Project commitments, mitigation measures that have been identified from the impact assessment, and other best practice measures designed to avoid, minimize, or reduce negative impacts and enhance positive impacts.

The objectives of an Environmental and Social Management Plan (ESMP) are to:

- Identify the set of responses to potentially adverse impacts.
- Define the responsibilities for implementation and monitoring.
- Determine requirements for ensuring that mitigation and management measures are implemented effectively and in a timely manner; and
- Describe the means for meeting those requirements.

The purpose of this Chapter is to demonstrate how the mitigation commitments made through the impact assessment process will be put into practice, monitored, and upheld. This ESMP Chapter provides information and instructions on how Environmental and Social commitments of the Bauan International Port Re-Development Project will be managed from pre-construction through the construction and operation phases.

9.2 Mitigation Strategy Framework

Mitigation measures for the Bauan International Port Redevelopment Project have been developed and applied in accordance with the mitigation hierarchy, ensuring that environmental and social risks are managed in a systematic, proportionate, and effective manner throughout the project lifecycle. The mitigation hierarchy comprises the following sequential steps:

Avoidance – preventing impacts where feasible through project design and planning;
Minimization – reducing the magnitude, spatial extent, duration, or likelihood of impacts;
Restoration / Rehabilitation – restoring affected environmental or social conditions where impacts occur; and
Compensation / Offset – addressing residual impacts where avoidance, minimization, or restoration measures are insufficient.

This mitigation framework is applied to both project-specific impacts and cumulative impacts arising from the interaction of the Project with existing and reasonably foreseeable developments within the Bauan industrial and coastal area.

The approach is consistent with the Philippine Environmental Impact Statement (EIS) System under DENR DAO 2003-30 and aligned with internationally recognized environmental and social management good practice, including ISO 14001:2015 Environmental Management Systems and relevant international guidance. References to IFC Performance Standards and other international frameworks are used solely as sources of good practice and do not supersede the requirements of the AIIB Environmental and Social Framework.

9.3 Mitigation Measures for Identified E&S Risks and Impacts, including Cumulative Impacts

The mitigation measures for the Bauan International Port Redevelopment Project are designed to address both project-specific impacts and potential cumulative effects arising from the interaction of the Project with existing

industrial and port developments within the Bauan coastal area. Given the multi-phase nature of the Project, mitigation measures are applied across the construction, operation, and decommissioning phases, with emphasis on preventing incremental environmental degradation.

The mitigation framework follows the mitigation hierarchy of avoidance, minimization, restoration, and compensation, as prescribed under the Philippine Environmental Impact Statement (EIS) System (DENR DAO 2003-30) and reinforced by international good practice, including the International Finance Corporation Performance Standards, International Organization for Standardization ISO 14001 Environmental Management Systems, and International Association for Impact Assessment principles on cumulative impact management.

All dredging-related mitigation measures—covering sediment containment, dewatering controls, waste classification, spill prevention, and navigational safety—are integrated into the ESMP. Responsibilities are assigned to the Proponent and Contractors, with monitoring parameters and frequencies defined to ensure compliance throughout dredging and marine construction activities.

9.3.1 Effectiveness of Mitigation Measures in Managing Impacts

When implemented collectively and consistently, the mitigation measures reduce both individual and cumulative impacts to low or acceptable residual levels. Continuous environmental monitoring, reporting, and periodic review of mitigation effectiveness ensure that emerging cumulative effects are identified early and addressed through adaptive management.

The mitigation framework demonstrates compliance with DENR regulatory requirements and alignment with international environmental and social safeguards, ensuring that the Bauan International Port Redevelopment Project contributes to sustainable development while preventing long-term environmental degradation and social inequity.

9.4 Environmental & Social Management Plan

The mitigation and management measures take place throughout the Project lifetime, from pre-construction, construction, operation through decommissioning. In addition, there are common mitigation and monitoring requirements that apply to all phases of the Project.

The mitigation and monitoring measures specific to the environmental impact assessment conducted for the Bauan International Port Re-Development Project ESIA are detailed in Table 9-1.

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Table 9-1 Environmental and Social Management Plan

Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
Physical Environment								
Pre-construction, Construction, and Operation	Upgrading, expansion, and optimization of port infrastructure, cargo handling areas, warehouses, access roads, and utilities within the existing port estate	Intensification of Industrial Land Use within an Existing Project Footprint	- Restrict all redevelopment and operational activities to the legally approved port boundary and designated industrial zones; - Maintain clear functional zoning within the port estate to separate operational, storage, maintenance, and administrative areas and minimize land use conflicts; - Implement traffic management and circulation plans to optimize internal movement and reduce congestion within the port area; - Ensure adequate buffer distances and operational controls between intensified port activities and adjacent non-	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Detailed Engineering Design; Construction of Port Facilities; and Operation of the Port and Cargo-Handling Areas	▪ Compliance with approved port boundary and land-use zoning ▪ Internal port zoning and circulation plans ▪ Location of new facilities relative to existing footprint ▪ Any land-use complaints or conflicts with adjacent users ▪ Conformance with port master plan and development approvals	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction and once every six (6) months during Port Operations, or when changes to port layout or land-use plans are proposed.

Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			industrial land uses, where applicable; - Integrate land use efficiency considerations into port master planning to avoid unnecessary expansion beyond the existing footprint.					
Pre-construction, Construction, and Operation	Upgrading and extension of quay walls, revetments, berthing structures, reclamation refinements, and installation of associated port facilities along the existing port shoreline	Further Modification of an Already Developed Coastal-Industrial Frontage	- Confine all coastal frontage modifications strictly within the approved and existing port boundary; - Optimize the design of quay walls, revetments, and coastal structures to minimize additional land take while maintaining structural stability and safety; - Integrate new structures with existing coastal infrastructure to avoid unnecessary fragmentation or redundancy; - Implement construction management measures to maintain the integrity and	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Detailed Engineering Design; Construction of Quay Walls, Revetments, Berths, and Reclamation Works; and Operation of the Port Facilities	▪ Compliance with approved port boundary and coastal development permits ▪ Physical footprint and alignment of new coastal structures ▪ Structural condition and stability of quay walls and revetments ▪ Integration of new works with existing port infrastructure ▪ Any land-use or coastal access complaints	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction and once every six (6) months during Port Operations, or when new coastal works or design changes are introduced.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			stability of adjacent port structures during works; - Maintain clear delineation between industrial port frontage and any adjacent non-industrial coastal areas.					
Construction	Excavation, grading, compaction, reworking of reclaimed land, foundation preparation, operation of heavy equipment, and temporary stockpiling within the port estate	Temporary Disturbance of Reclaimed and Filled Land Surfaces during Earthworks	- Limit earthworks strictly to designated construction areas within the approved port footprint; - Implement phased construction sequencing to minimize the extent of disturbed land at any given time; - Apply appropriate compaction standards to reclaimed and filled surfaces following excavation or grading; - Stabilize exposed surfaces promptly through temporary surfacing or reinstatement to prevent degradation; - Restrict construction traffic to designated	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Earthworks, Excavation, Grading, and Foundation Works for Port Infrastructure and Facilities	▪ Area and location of disturbed and reinstated reclaimed land ▪ Ground stability and compaction test results ▪ Condition of exposed and reworked surfaces ▪ Compliance with designated haul routes and work zones ▪ Incidence of localized ground instability or settlement	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every two (2) weeks during active earthworks and once every month thereafter until all disturbed areas are fully reinstated.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			haul routes to avoid unnecessary disturbance of adjacent paved or compacted areas; - Conduct regular site inspections to identify and address localized ground instability during earthworks.					
Pre-construction, Construction, and Operation	Installation and operation of new port structures, cranes, warehouses, quay facilities, yards, and utilities along the existing industrial waterfront	Minor Change in Visual Character within an Industrial Waterfront Setting	- Integrate new structures with existing port architecture and layout; - Maintain orderly site layout and clear delineation of operational areas; - Implement good housekeeping and maintenance of structures to avoid visual clutter; - Use functional, non-reflective finishes where practicable.	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Detailed Engineering Design; Construction of Port Structures and Facilities; and Operation of the Port	▪ Compatibility of new structures with existing industrial waterfront character ▪ Site housekeeping and absence of visual clutter ▪ Condition and appearance of port buildings, yards, and equipment ▪ Any visual-related complaints from stakeholders	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction and once every six (6) months during Port Operations, or when major new structures are installed.
Pre-construction, Constructio	Generation, storage, handling, and disposal of solid and hazardous wastes	Potential Localized Soil Contamination from Improper Solid and	- Implement a solid and hazardous waste management plan consistent with regulatory	Bauan International Port, Inc. (BIPI) through the Project	During Mobilization; Construction Activities; and Operation of	▪ Implementation status of the Waste Management Plan (WMP)	Environmental and Social Safeguards Unit (ESSU) with support from the	Once every month during Construction and once every three (3) months during

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
n, and Operation	from construction works, equipment maintenance, fuel and chemical storage, and port operations	Hazardous Waste Management	requirements; - Store hazardous wastes in designated, impermeable, and bunded areas; - Ensure timely collection, transport, and disposal by accredited waste contractors; - Train workers in proper waste handling and spill response; - Conduct routine site inspections to identify and address improper waste practices.	Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Port Facilities, Maintenance Areas, and Waste Storage Areas	▪ Inventory of hazardous and non-hazardous wastes generated ▪ Condition and integrity of waste storage areas (bunds, liners, roofs, labeling) ▪ Waste manifests, hauling receipts, and disposal certificates from accredited haulers ▪ Records of spills, leaks, and corrective actions ▪ Results of housekeeping and waste-area inspections ▪ Worker training records on waste handling and spill response	Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Port Operations, and immediately after any spill, leak, or waste-related incident.
Pre-construction, Construction, and Operation	Earthworks, regrading of reclaimed land, foundation works, reconfiguration of paved yards, and operation of	Impact on Surface Hydrology and Drainage Patterns	- Maintain existing drainage alignments and discharge points throughout construction and operation; - Integrate surface	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT)	During Detailed Engineering Design; Earthworks and Construction	▪ Condition and capacity of drainage channels, culverts, and stormwater inlets ▪ Evidence of	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social	Once every three (3) months during Construction and once every six (6) months during Operation, and

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
	engineered stormwater drainage systems		drainage considerations into detailed engineering design to ensure post-construction runoff patterns remain consistent with baseline conditions; - Implement temporary drainage controls during earthworks to prevent ponding or unintended diversion of surface flows; - Prohibit obstruction, infilling, or unapproved modification of drainage channels, culverts, and stormwater inlets; - Conduct regular inspection, cleaning, and maintenance of drainage systems, particularly during the rainy season; - Reinstate and stabilize disturbed surfaces promptly following construction activities.	and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	of Port Facilities; and Operation and Maintenance of Drainage Systems	ponding, erosion, or unintended flow diversion ▪ Compliance with approved drainage design and discharge points ▪ Frequency and effectiveness of drainage system maintenance ▪ Stability of reinstated and regraded surfaces	Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	after major rainfall or storm events.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
Pre-construction, Construction, and Operation	Earthworks, material stockpiling, equipment staging, operation of stormwater drainage systems, and use of low-lying port areas within the coastal-industrial zone	Impact on Flood Risk and Flood Susceptibility	- Preserve existing surface runoff routes and avoid any alteration that may reduce drainage capacity; - Conduct regular clearing of drainage channels, culverts, and stormwater inlets to prevent sediment and debris accumulation; - Avoid stockpiling of materials or parking of equipment in low-lying areas that may impede surface runoff; - Integrate flood risk considerations into construction scheduling, particularly during peak rainfall periods; - Maintain emergency preparedness procedures for extreme rainfall events.	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Detailed Engineering Design; Earthworks and Construction Activities; and Operation and Maintenance of Drainage and Port Facilities	▪ Condition and capacity of drainage channels, culverts, and stormwater inlets ▪ Evidence of ponding, waterlogging, or flood-related disruption within the port ▪ Compliance with construction-phase flood control measures ▪ Records of drainage maintenance and clearing activities ▪ Emergency response readiness during extreme rainfall events	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction and once every six (6) months during Operation, and after any major rainfall or flooding event.
Pre-construction, Constructio	Handling and storage of fuels, oils, lubricants, chemicals,	Impact on Groundwater Quality	- Store fuels, oils, chemicals, and hazardous materials in designated,	Bauan International Port, Inc. (BIPI) through the	During Materials Storage and Handling;	▪ Condition of fuel, chemical, and waste storage areas	Environmental and Social Safeguards Unit (ESSU) with	Once every three (3) months during Construction and once every six (6)

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
n, and Operation	construction materials, solid and hazardous wastes, and operation of sanitation systems within the port estate		bunded, and impermeable areas; - Implement spill prevention, control, and emergency response procedures, including provision of spill kits; - Ensure proper segregation, storage, and disposal of solid and hazardous wastes by accredited service providers; - Provide sealed sanitation facilities and prevent seepage of wastewater into the subsurface; - Conduct routine site inspections to detect leaks, spills, or improper storage practices; - Undertake groundwater quality monitoring as required by regulatory approvals.	Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Construction Activities; and Operation of Port Facilities and Utilities	(bunding and impermeability) ▪ Records of spills, leaks, and corrective actions ▪ Groundwater quality results (physicochemical and bacteriological parameters, as required) ▪ Compliance with waste handling and sanitation controls ▪ Inspection and maintenance records	support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	months during Operation, and immediately after any spill or contamination incident.
Pre-construction, Constructio	Abstraction of groundwater from a permitted deep well for domestic and operational	Impact on Groundwater Quantity due to Abstraction	- Operate only permitted groundwater wells and comply strictly with approved	Bauan International Port, Inc. (BIPI) through the Project	During Installation of Water Supply Systems; Construction	▪ Groundwater abstraction volumes (m^3/day and m^3/month) ▪ Compliance with	Environmental and Social Safeguards Unit (ESSU) with support from the	Once every three (3) months during Construction and once every six (6) months during

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
n, and Operation	water use within the port estate		abstraction limits; - Install flow meters and maintain accurate abstraction records; - Implement water conservation and efficiency measures throughout port operations; - Periodically review groundwater demand relative to operational requirements; - Monitor groundwater levels where required by regulatory approvals.	Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Activities; and Operation of Port Facilities and Utilities	permitted abstraction limits ▪ Groundwater level trends in monitoring wells (where applicable) ▪ Water-use efficiency indicators ▪ Records of regulatory compliance and reporting	Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Operation, and in accordance with regulatory monitoring requirements.
Constructio n and Operation	Dredging, seabed disturbance, marine construction works, vessel and equipment operation, and management of wastewater and fuels within the port estate and adjacent waters	Impact on Marine Water Quality – Batangas Bay	- Prohibit discharge of untreated wastewater, fuels, oils, or chemicals into marine waters; - Implement controlled and phased dredging methods to minimize sediment disturbance. - Deploy silt curtains or other containment measures where practicable during dredging; - Implement spill prevention, control,	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors	During Dredging, Seabed Works, and Marine Construction Activities; and During Operation of Port Marine Facilities	▪ Turbidity and total suspended solids (TSS) in nearshore waters ▪ Visual evidence of sediment plumes or discoloration ▪ Records of dredging activities and silt curtain deployment ▪ Spill and wastewater management compliance ▪ Incident and	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and	Once every two (2) weeks during active dredging and marine works and once every six (6) months during port operations, or immediately following any spill or turbidity exceedance.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			and emergency response procedures for marine and nearshore works; - Schedule marine construction activities to avoid periods of severe weather where feasible; - Conduct visual and/or instrumental monitoring of turbidity during active dredging and marine works.	and Port Operators		corrective action reports	regulatory agencies	
Construction and Operation (Maintenance Dredging)	Capital and maintenance dredging within the port basin and approach channels to achieve and maintain design navigation depths	Impact on Bathymetry and Seabed Morphology due to Dredging	In accordance with IFC General EHS Guidelines and IFC EHS Guidelines for Ports, Harbors, and Terminals, the following measures will be implemented: - Restrict dredging activities strictly to approved footprints and design depths; - Apply precision dredging techniques to minimize over-dredging and unnecessary seabed disturbance; - Sequence dredging works to reduce	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Capital Dredging Works; Periodic Maintenance Dredging; and Operation of Navigational Channels and Port Basin	▪ Bathymetric profiles and seabed elevation changes within dredging footprint ▪ Compliance with approved dredging limits and design depths ▪ Volume of dredged material removed ▪ Evidence of over-dredging or unintended seabed disturbance ▪ Compliance with	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Before and after each dredging campaign, and once every six (6) months during maintenance dredging or as required by regulatory approvals.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			cumulative seabed modification; - Conduct pre- and post-dredging bathymetric surveys to verify compliance with design specifications; - Dispose of dredged materials only at approved disposal or reuse sites in accordance with regulatory requirements.			disposal and reuse approvals		
Design, Construction, and Operation	Port expansion works, construction activities, increased operational movements, equipment use, and long-term port operations within the existing footprint	Climatological Changes	- Design port infrastructure to be climate-resilient, including quays, berths, pavements, drainage systems, buildings, and foundations, to withstand increased rainfall intensity, flooding, storm surges, and stronger winds associated with climate change; - Provide adequate and well-maintained stormwater drainage systems and paved surfaces to prevent	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Detailed Engineering Design; Construction of Port Infrastructure; and Ongoing Port Operations and Maintenance	▪ Performance of drainage systems during heavy rainfall events ▪ Incidence of flooding, ponding, or erosion within the port area ▪ Fuel consumption and equipment operating hours ▪ Adoption rate of fuel-efficient or low-emission equipment ▪ Compliance of visiting vessels with emission and	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Design and Construction, and once every six (6) months during Operation, or after major extreme weather events.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			flooding, ponding, and erosion during heavy rainfall events; - Locate, elevate, or protect critical electrical and mechanical equipment to reduce vulnerability to flooding and extreme weather conditions; - Maintain and regularly service all construction and operational equipment, vehicles, and standby generators to ensure efficient fuel combustion and minimize greenhouse gas and air pollutant emissions; - Minimize unnecessary engine idling of trucks, cargo handling equipment, and other port vehicles through operational controls and traffic management; - Optimize port layout, internal traffic			fuel standards ▪ Records of climate-risk reviews and integration into operational planning		

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			circulation, and cargo handling logistics to reduce travel distances, congestion, and fuel consumption; - Gradually adopt fuel-efficient and low-emission equipment and vehicles, including electric or hybrid units where technically and economically feasible, as part of fleet upgrading; - Require or encourage visiting vessels to comply with international fuel and engine emission standards while operating within port waters; - Encourage reduced ship propulsion power within port areas where this can be safely implemented to lower fuel use and emissions; - Support the future provision of shore-based power (cold-					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			ironing) for vessels at berth, where technically feasible, to reduce engine use and emissions while docked; - Periodically review climate change risks (e.g., extreme rainfall, heat, strong winds, and storm surges) and integrate these into port operation, maintenance, and emergency response planning.					
Pre-construction, Construction, and Operation	Mobilization and operation of construction equipment, delivery trucks, port vehicles, cargo-handling equipment, and standby generators	Contribution to Greenhouse Gas Emissions	- Use fuel-efficient and low-emission construction equipment, cargo-handling equipment, and vehicles, including trucks, cranes, forklifts, and service vehicles, to reduce CO_2 and other greenhouse gas emissions from fuel combustion; - Optimize routing, scheduling, and logistics of construction vehicles, material deliveries,	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Prior to Construction; Construction Phase (mobilization and operation of heavy equipment and transport vehicles); and Operation Phase (port traffic and standby generator use)	▪ Fuel consumption of construction and port vehicles and equipment ▪ Equipment and vehicle operating hours and idling time ▪ Number and proportion of fuel-efficient, low-emission, hybrid, or electric units ▪ Standby generator run-time and fuel use ▪ Effectiveness of	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction, and once every six (6) months during Port Operations, or after significant changes in traffic levels or equipment fleet.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			and port traffic to minimize travel distances, congestion, and unnecessary fuel consumption and engine idling; - Ensure all construction equipment, port vehicles, and cargo-handling machinery switch off their engines when stationary and enforce strict idling control during loading, unloading, and queuing activities; - Conduct regular inspection, preventive maintenance, and emissions monitoring of construction equipment, transport units, and standby generators to maintain fuel efficiency and prevent excessive greenhouse gas emissions due to poor engine condition or incomplete			maintenance and emissions control measures		

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			combustion; - Upgrade or procure, where practicable, low-emission or alternative-energy vehicles and port equipment (e.g., electric, hybrid, or cleaner-fuel units) to progressively reduce greenhouse gas emissions from land-based port operations; - Design and manage port layout, cargo transfer routes, and internal traffic circulation to minimize re-handling, travel distances, and transfer points, thereby reducing energy consumption and associated greenhouse gas emissions; - Maintain and properly manage standby generators used during power interruptions to ensure efficient operation, limited					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			running hours, and minimal contribution to greenhouse gas emissions; and - Integrate greenhouse gas emission control measures into the Project's air quality and environmental management system, including record-keeping on fuel use, equipment operating hours, and maintenance activities to support continuous improvement in emissions performance.					
Pre-construction, Construction, and Operation	Land preparation, earthworks, material handling, operation of heavy equipment, delivery trucks, cargo-handling equipment, port vehicles, and standby generators	Impacts on Degradation of Air Quality	- Develop and implement an Air Quality Management Plan (AQMP) covering construction and operational phases, including dust control, emission management, and monitoring of PM, NO_x and SO_x, consistent with IFC Good International Industry Practice.	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation	Prior to Land Preparation; Construction of Port Infrastructure and Facilities; and Operation of Port and Cargo-Handling Activities	▪ Ambient air quality (TSP, PM_{10}, NO_x, SO_x) ▪ Dust levels on site and along access roads ▪ Equipment and vehicle maintenance and emission test records ▪ Effectiveness of dust suppression and idling control	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in	Once every three (3) months during Construction and once every six (6) months during Port Operations, or during prolonged dry and windy conditions or following air-quality-related complaints.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			- Apply dust suppression measures such as regular water spraying on exposed surfaces, unpaved roads, stockpiles, and active earthworks, particularly during the dry season and periods of high wind. - Provide wheel-washing and tire-cleaning facilities for all trucks exiting the construction site, and ensure that adequate paved road length is maintained between the wheel wash and site exit to prevent track-out of dust onto public roads. - Ensure all construction and port equipment is regularly maintained and inspected, including emission controls for generators, cranes, trucks, and cargo-handling equipment, to reduce exhaust - Require engines to	by Construction Contractors and Port Operators		measures ▪ Compliance with the Air Quality Management Plan and Philippine Clean Air Act standards	coordination with LGUs and regulatory agencies	

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			be switched off when vehicles or equipment are idle, and discourage unnecessary idling during loading, unloading, and queuing activities. - Optimize logistics, routing, and scheduling of deliveries to minimize traffic congestion, queuing, and cumulative exhaust emissions in and around the port. - Use fuel-efficient and low-emission vehicles and equipment, including where practicable the use of modern engines and cleaner fuels, consistent with IFC port air quality management practices. - Conduct emissions testing and monitoring for standby generators and key equipment, with maintenance and					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			operating records kept in accordance with Philippine environmental regulations. - During operations, maintain cargo-handling and port vehicles in good working condition and apply operational controls to minimize dust and exhaust emissions from routine port activities.					
Pre-construction and Constructio n	Site clearing, dredging, piling, reclamation, construction of port facilities, buildings, roads, utilities, and operation of heavy equipment, trucks, generators, and cargo-handling machinery	Impacts on Increase in Ambient Noise Level	- Develop and implement a Noise Management Plan that includes identification of major noise sources, establishment of noise control zones, and regular monitoring of sound levels at work areas and near sensitive receptors, in accordance with Philippine Ambient Noise Standards for Class C areas and IFC EHS Guidelines; - Install mufflers,	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Prior to and during Site Clearing, Dredging, Piling, Reclamation, and Construction of Port Facilities, Buildings, Roads, Utilities, and Equipment Installation	▪ Ambient noise levels (dBA) at work areas and nearby receptors ▪ Compliance with NPCC Class C noise standards (70 dBA daytime) ▪ Condition and maintenance records of noise-generating equipment ▪ Effectiveness of noise barriers, mufflers, and acoustic enclosures ▪ Worker	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during pre-construction and construction, and whenever high-noise activities (e.g., piling, dredging, demolition) are undertaken or noise-related complaints are received.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			silencers, and acoustic enclosures on all heavy equipment, generators, compressors, and construction machinery to reduce engine and mechanical noise at source; - Conduct regular preventive maintenance and inspection of all noise-generating equipment to ensure proper functioning and prevent excessive noise due to worn or faulty components; - Limit construction, piling, and demolition activities to daytime hours (9:00 AM to 6:00 PM) and avoid night-time and early-morning works, particularly near community and residential areas, to minimize disturbance; - Install temporary			exposure and use of hearing protection		

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			noise barriers, acoustic screens, or shielding around high-noise equipment and work areas, especially where construction activities are close to nearby communities or sensitive receptors; - Provide and enforce the use of appropriate personal protective equipment (PPE) such as earplugs and earmuffs for workers exposed to elevated noise levels, in compliance with occupational health and safety requirements; - Pave and level construction and port operation areas, where practicable, to minimize vibration and rattling noise from vehicles and cargo-handling equipment; - Use electrically powered equipment where feasible in place of diesel-driven					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			units to reduce operational noise and vibration; - Minimize noise from warning alarms, horns, and signal bells by using visual alarms or low-noise alternatives where safety is not compromised; - Monitor ambient noise levels periodically at representative locations within the port and at nearby sensitive receptors to verify compliance with NPCC noise standards and IFC guideline values, and implement corrective actions if exceedances are recorded.					
Biodiversity Environment								
Pre-construction, Construction, and Operation	Site clearing, vegetation trimming, tree removal, lighting, construction activities, and	Impact on Terrestrial Biodiversity	- Limit vegetation clearing strictly to the approved construction footprint and retain existing shade trees where feasible;	Bauan International Port, Inc. (BIPI) through the Project Management	Prior to Vegetation Clearing; During Construction Works; and	▪ Area and type of vegetation cleared and replanted ▪ Records of nest or roost checks	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental	Once every three (3) months during Construction and once every six (6) months during Operation, and

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
	routine port operations within the fenced port estate		- Conduct pre-construction checks for active bird nests or bat roosts in trees scheduled for trimming or removal, and avoid works where active nesting is confirmed until fledging is complete; - Implement replacement planting using non-invasive, site-appropriate native or ornamental species to maintain landscaped cover; - Use downward-shielded, task-focused lighting to minimize light spill into vegetated verges and quay edges; - Enforce good housekeeping, solid waste management, and spill-prevention measures to avoid attracting pest species and secondary ecological effects; - Maintain a simple wildlife observation	Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Operation of Port Facilities and Lighting Systems	and avoidance actions ▪ Condition and survival of replacement plantings ▪ Wildlife observation log (species sightings, incidents) ▪ Light spill and lighting control effectiveness	and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	whenever vegetation clearing or wildlife incidents occur.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			log for incidental sightings of protected species, with procedures for reporting and response if encountered.					
Pre-construction, Construction, and Operation	Earthworks, material stockpiling, runoff management, and handling of fuels, oils, and wastes near the Tabok River and port drainage outfalls	Impacts on Freshwater Biodiversity (Tabok River)	- Strict erosion and sediment control measures (silt fences, stabilized stockpiles, covered transport of materials); - Prohibition of direct wastewater or concrete washout discharge to the river; - Spill prevention and response procedures for fuels, oils, and hazardous materials; - Regular inspection of drainage systems, especially during the wet season; - Worker training on pollution prevention and emergency response.	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	During Earthworks and Construction Activities; and During Operation of Drainage and Material Handling Systems	▪ Turbidity and suspended solids in runoff to the Tabok River ▪ Condition of erosion and sediment control measures ▪ Records of spills, leaks, or pollution incidents ▪ Compliance with wastewater and washout prohibitions ▪ Observations of visible oil sheen, debris, or discoloration in the river	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every three (3) months during Construction and once every six (6) months during Operation, and after heavy rainfall or any spill or runoff incident.
Construction and Operation	Dredging, shoreline works, marine construction, vessel movements,	Impacts on Marine Biodiversity (Nearshore Batangas Bay /	- Spatial confinement and engineering control of backfilling works, ensuring that permanent seabed	Bauan International Port, Inc. (BIPI) through the Project	During Dredging, Shoreline Works, and Marine	▪ Turbidity and suspended solids in nearshore waters ▪ Spatial extent of	Environmental and Social Safeguards Unit (ESSU) with support from the	Once every two (2) weeks during active dredging and marine works and once every

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
	and port marine operations within nearshore Batangas Bay	Verde Island Passage Context)	modification is limited strictly to the approved design footprint and does not extend into adjacent nearshore areas; - Controlled and phased dredging, sequenced to minimize sediment disturbance and limit the extent of sediment plume dispersion; - Use of dredging and backfilling methods appropriate for sandy substrates, designed to promote material stability and minimize resuspension; - Implementation of dredging controls (including staged excavation, defined work zones, and direct loading of dredged material to barges) to limit sediment dispersion and ensure that suspended sediment plumes remain confined within the near-field zone,	Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Construction Activities; and During Operation of Port Marine Facilities and Vessel Movements	sediment plumes during dredging ▪ Compliance with dredging footprint and methods ▪ Records of vessel speed and navigational incidents ▪ Observations of marine fauna interactions or disturbance ▪ Records of marine mammal observations during dredging, piling, or intensive vessel operations ▪ Compliance with soft-start / ramp-up procedures for piling activities ▪ Location and enforcement of marine exclusion zones where applicable	Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	six (6) months during port operations, or immediately following any spill or turbidity exceedance.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			typically within a few hundred meters to approximately 1 kilometer from active dredging areas under conservative conditions; - Implementation of stormwater and runoff management measures within port and construction areas to prevent the transport of sediments and contaminants into nearshore waters; - Spill prevention, oil containment, and emergency response preparedness, including equipment availability and personnel training; - Vessel speed controls, defined navigation routes, and exclusion zones to reduce disturbance to marine fauna and avoid unnecessary seabed interaction; - Avoidance of marine works beyond					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			approved design limits, with strict adherence to construction boundaries; and - Routine water quality monitoring during marine construction activities, including turbidity and relevant physico-chemical parameters. - Implement marine mammal observation procedures during active piling, dredging, or intensive vessel operations, with trained observers monitoring the presence of marine fauna within the work area; - Apply soft-start (ramp-up) procedures for piling and other high-noise marine activities to allow marine fauna to move away from the immediate construction zone prior to full-intensity operations;					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			- Establish clearly marked marine exclusion zones around sensitive nearshore habitats where identified, and avoid disturbance of soft-bottom habitats (including potential seagrass patches) to the extent practicable;					
Socio-Economic and Cultural Environment								
Pre-construction, Construction, and Operation	Site clearing, earthworks, excavation, piling, dredging, foundation works, and construction of port infrastructure and ancillary facilities within the existing BIPI property	Impacts on Physical Cultural Resources	- Implement a Chance Find Procedure covering all earthworks, excavation, dredging, and piling activities. This procedure shall define actions to be taken if any archaeological, historical, or culturally significant materials are discovered, including immediate cessation of work, site protection, and notification of relevant authorities. - Train construction supervisors and site workers to recognize	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Prior to and during Site Clearing, Earthworks, Excavation, Piling, Dredging, and Construction of Port Facilities and Ancillary Infrastructure	▪ Presence or absence of chance finds during excavation and earthworks ▪ Compliance with the Chance Find Procedure ▪ Training records of workers and supervisors on PCR awareness ▪ Records of notifications, documentation, and clearances from the National Museum and LGUs	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Continuous monitoring during all ground-disturbing activities, with formal checks once every three (3) months during construction or immediately upon discovery of any potential physical cultural resource.

Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			potential physical cultural resources (e.g., artifacts, bones, old foundations, shells, pottery, or culturally significant materials) and to follow the chance-find procedure. - Restrict all construction and ground-disturbing activities strictly within the approved project footprint and existing BIPI property boundaries, where no PCR have been identified. - Coordinate with the National Museum of the Philippines and relevant LGUs should any chance finds be discovered, and resume works only after written clearance is issued. - Document and report any chance finds, including location, description, and actions taken, as part of the ESMP.					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
Pre-construction and Construction	Land repossession from informal settlers, acquisition from private landowners, development of Aplaya relocation site, relocation of households, and provision of compensation and assistance	Impacts associated with Land Acquisition and Resettlement	- Implement the approved Resettlement Plan in coordination with the LGU of Bauan and affected Barangays, ensuring compliance with due process, consultation, notice requirements, and humane relocation procedures; - Maintain a grievance redress mechanism and ongoing stakeholder engagement consistent with AIIB standards.	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators, Resettlement Team, Local Government Units	Prior to Site Clearing and Civil Works (including development of the container yard and quay); during Aplaya Site Development, Household Relocation, and Early Construction Activities	▪ Number of households relocated and provided with land titles and housing plots ▪ Payment and receipt of financial assistance and land compensation ▪ Completion and functionality of resettlement site and community facilities ▪ Continuity of access to livelihoods, fishing grounds, schools, markets, and health services ▪ Grievances received, resolved, and pending ▪ Status of vulnerable household support	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Once every month during resettlement site development, and household relocation. At least quarterly after relocation
Pre-construction	Mobilization of construction	Impacts to the availability of	- Use of independent utility systems for the	Bauan International	Prior to Mobilization of	▪ Water and power	Environmental and Social	Once every three (3) months during

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
, Constructio n, and Operation	workforce, operation of port facilities, and use of water, power, telecommunication s, and community services by the Project	the public services (Water supply, Power supply, Telecommunic ation, Education, and Recreational Facilities)	port, including on-site water supply, wastewater treatment, and power systems, to minimize reliance on municipal utilities and avoid competition with residential users; - Coordination with Aqua Data, Inc., barangay water cooperatives, and LGUs to monitor demand and ensure that construction and operation do not exceed local service capacities; - Water-use efficiency measures at the port (e.g., leak detection, low-flow fixtures, recycling of non-potable water for dust suppression and washing) to reduce abstraction from shared sources; - Emergency and backup systems for water, power, and telecommunications within the port to prevent service	Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Workforce; Construction of Port Facilities; and Operation of the Port and Support Systems	consumption at the port ▪ Use of independent water, power, and telecom systems ▪ Records of coordination with Aqua Data, Inc., barangay cooperatives, and LGUs ▪ Number and type of community service complaints or grievances ▪ Performance of backup and emergency utility systems	Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Construction and once every six (6) months during Port Operations, or when service-related complaints are received from nearby communities.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			interruptions affecting nearby communities; - Worker accommodation and camp management plans requiring contractors to provide dedicated water, power, and sanitation facilities for construction workers; - Community engagement and grievance mechanisms to allow residents to report any service disruptions and enable timely corrective action.					
Pre-construction, Construction, and Operation	Mobilization and operation of construction equipment, port machinery, cargo-handling activities, workforce movement, vessel operations, storage and handling of fuel and hazardous materials, and truck traffic	Threat to Public Health and Safety	- Develop and implement a Traffic and Transport Management Plan to regulate construction and operational vehicle movement, designate haul routes, enforce speed limits, and install safety signage and barriers near communities; - Establish controlled access, fencing, and	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation	Prior to Workforce Mobilization; During Construction of Port Facilities; and During Port Operations, Cargo Handling, and Vessel Movements	▪ Number of traffic accidents and near-miss incidents ▪ Number of safety and health complaints or GRM cases from communities ▪ Compliance with Traffic and Transport Management Plan	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in	Once every three (3) months during Construction and once every six (6) months during Port Operations, or immediately following any accident, spill, or safety-related community complaint.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			security systems within port facilities to prevent unauthorized entry and reduce community exposure to operational hazards; - Provide adequate worker accommodation, sanitation, potable water, and solid waste management facilities to prevent public health risks associated with labor influx; - Implement health screening, hygiene promotion, and communicable disease prevention programs for all workers; - Ensure safe storage, labeling, and handling of fuels, chemicals, and hazardous cargo, including bunded storage areas, spill kits, and fire protection systems; - Develop and implement an	by Construction Contractors and Port Operators, Health & Security Team		▪ Worker health and safety records, training, and drills ▪ Emergency preparedness, response readiness, and incident reports	coordination with LGUs and regulatory agencies	

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			Emergency Preparedness and Response Plan covering fire, explosion, spill, vessel collision, and medical emergencies, in coordination with local LGUs, hospitals, and disaster response units; - Conduct regular safety training, drills, and inspections for workers and security personnel; - Establish and maintain a Grievance Redress Mechanism (GRM) for communities to report safety, traffic, or health-related concerns.					
Pre-construction, Construction, and Operation	Mobilization of construction equipment and materials, movement of workers, cargo trucks, trailers, port vehicles, and use of port access roads and	Impact of Traffic Congestion	- Implement a Traffic Management Plan (TMP) in coordination with the Bauan LGU, DPWH, DOTR, and municipal traffic management office, including designated entry and exit points, traffic marshals, and	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social	Prior to Mobilization; During Construction of Port Facilities; and During Operation of Cargo Handling,	▪ Traffic volume and truck counts at port access points and along the National Road ▪ Level of service, queuing length, and travel time delays ▪ Compliance with	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent	Once every three (3) months during Construction and once every six (6) months during Port Operations, or when congestion complaints or

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
	surrounding public road network		continuous monitoring of traffic conditions. - Schedule delivery of construction materials, heavy equipment, and cargo trucks during off-peak hours to minimize interference with commuter, school, and commercial traffic in the town proper and CBD. - Use a dedicated new access road and junction perpendicular to the Bauan–Mabini Road to segregate port truck traffic from local and public traffic flows, thereby reducing congestion along the National Road. - Install appropriate traffic signage, warning lights, and pedestrian controls around port access points, haul routes, and nearby barangays to improve safety and manage vehicle–pedestrian	Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators	Truck Movements, and Port Access Roads	off-peak truck scheduling ▪ Number of traffic-related complaints from communities ▪ Effectiveness of new access road and TMP implementation	Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	traffic incidents are reported.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			interactions. - Provide designated parking and holding areas for cargo trucks and port vehicles within the port site to prevent roadside queuing and illegal parking that contributes to CBD congestion. - Coordinate regularly with barangays San Roque and San Andres I and affected communities to inform them of truck schedules, road works, and traffic changes, and to receive feedback on traffic concerns. - Implement traffic impact assessment and adaptive management, allowing traffic controls to be adjusted based on real-time congestion levels and community feedback.					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
Pre-construction, Construction, and Operation	Worker mobilization, in-migration, port construction and expansion works, worker accommodation, transport routes, port operations, and interaction with surrounding communities	Impacts of Gender-Related Risks	- Implement a Zero-Tolerance Policy on Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and harassment, applicable to all workers; - Conduct mandatory GBV, Code of Conduct, and Safe Spaces Act orientation for 100% of the 2,035 construction workers prior to deployment; - Establish confidential and accessible grievance mechanisms, including a 24/7 hotline, gender desk, and anonymous reporting system; - Integrate GBV and anti-harassment clauses into all contractor and subcontractor agreements; - Set a minimum 30–40% female hiring target for	Bauan International Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators, GAD Focal Team	Prior to Workforce Mobilization; During Construction, Worker Accommodation and Expansion Works; and During Port Operations	▪ Percentage of female workers in total workforce and in administrative, logistics, HR, finance, and community liaison positions ▪ Number and resolution status of GBV, SEA, harassment, and safety complaints (hotline, gender desk, GRM) ▪ Sex-disaggregated employment, training, and grievance records ▪ Participation of female-headed households in consultations, compensation, and support programs ▪ Utilization of health services by women and workers (RHUs and mobile clinics)	Environmental and Social Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	Monthly for GBV, SEA, and grievance monitoring; Quarterly for female employment, health services, female-headed household support, and GAP reporting; and Semi-annually for community FGDs and satisfaction surveys.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			administrative, logistics, finance, HR, and community liaison positions and include these targets in contractor hiring requirements; - Maintain sex-disaggregated employment records and review compliance quarterly; - Prioritize female-headed households in consultations, compensation, and any required livelihood or relocation support; - Provide targeted livelihood and social assistance to women-led households affected by construction activities; - Coordinate with LGU health units to deploy mobile clinics during peak construction periods and ensure the presence of trained female health personnel on site;			▪ Safety, lighting, shuttle, and pedestrian conditions along access roads and work areas ▪ Compliance with Gender Action Plan (GAP) commitments		

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			- Conduct information and education campaigns on maternal, reproductive, and stress-related health; - Provide shuttle services for women workers, improve lighting along walkways and access roads, and coordinate traffic management with LGUs to enhance pedestrian safety; - Conduct quarterly water quality monitoring and apply water-rationing protocols during peak construction to protect household water supply; - Collect sex-disaggregated data on employment, training, grievances, health, and safety incidents and submit quarterly Gender Action Plan (GAP) reports to regulators.					
Pre-construction	Cargo handling, crane and forklift	Occupational Health and	To manage and reduce OHS risks, the	Bauan International	Prior to mobilization;	▪ Number and severity of	Environmental and Social	Continuous monitoring, with

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
, Construction, Operation, and Maintenance	operations, working at heights, heavy vehicle movement, electrical works, equipment maintenance, exposure to dust, noise, vibration, and hazardous materials	Safety (OHS) Risks to workers and contractors	Project will implement the BIPI Health and Safety Program, which serves as the primary mitigation and management instrument for occupational risks. The program establishes a structured and systematic approach to preventing accidents, injuries, and occupational illnesses across all Project phases. Key measures include: - Implementation of mandatory occupational health and safety policies applicable to all employees, contractors, and subcontractors; - Comprehensive hazard identification and risk assessment for all port activities, including cargo handling, lifting operations, work at heights, electrical	Port, Inc. (BIPI) through the Project Management Team (PMT) and Environmental and Social Safeguards Unit (ESSU), with implementation by Construction Contractors and Port Operators, HSE Officer	Throughout Construction; and During Port Operation and Maintenance Activities	occupational accidents, injuries, and near-misses ▪ PPE availability and compliance rates ▪ Completion rate of OHS induction and task-specific training ▪ Results of hazard identification and risk assessments ▪ Noise and dust exposure monitoring results ▪ Safety inspection, audit, and corrective action records ▪ Emergency drill frequency and response performance	Safeguards Unit (ESSU) with support from the Environmental and Social Consultant (ESC), and Independent Monitoring Agent (if required by AIIB or DENR), in coordination with LGUs and regulatory agencies	monthly reporting during Construction and quarterly reporting during Operation, and immediate reporting of any serious incident or fatality.

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			works, and vehicle movement; - Mandatory health and safety induction and task-specific training for 100% of workers prior to deployment; - Provision and strict enforcement of appropriate personal protective equipment (PPE); - Development and implementation of safe work procedures, method statements, and permit-to-work systems for high-risk activities; - Regular workplace inspections, toolbox meetings, and safety audits conducted by qualified safety personnel; - Traffic management and equipment segregation measures within the port to reduce collision and struck-by risks; - Occupational health					

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Project Phase	Aspect or Project Activities	Potential Impact	Proposed Mitigation	Management Person-In-Charge	Timing	Monitoring Parameter	Monitoring Person-In-Charge	Monitoring Frequency
			monitoring for noise, dust, and other exposure pathways; - Emergency preparedness and response procedures, including first aid, fire response, spill response, and evacuation drills; and - Clear assignment of OHS responsibilities to managers, supervisors, safety officers, and workers, supported by incident reporting and corrective action mechanisms. These measures are embedded in the Environmental and Social Management Plan (ESMP) and are aligned with national occupational safety regulations and international good practice for port operations.					

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10 Institutional Mechanism for ESMP and RP Implementation and Monitoring

10.1 Introduction and Objectives

An effective institutional mechanism is essential to ensure the successful implementation, monitoring, and reporting of the ESMP and the RP for the Bauan International Port Redevelopment Project, including the Luzon International Container Terminal (LICT) development.

The Project entails physical displacement of informal settler households and land acquisition affecting private landowners within the Project Area. Accordingly, robust institutional arrangements are required to ensure that environmental and social safeguard commitments are implemented in a coordinated, transparent, and accountable manner; that unanticipated risks are promptly addressed; and that compliance with national laws and international safeguard standards is maintained throughout project implementation.

This institutional mechanism is designed to:

- Clearly define roles, responsibilities, and reporting lines of all agencies and entities involved in ESMP and RP implementation;
- Ensure effective coordination, oversight, and accountability across environmental, social, legal, and engineering functions;
- Assess and strengthen the institutional capacity of the Client and its implementing partners; and
- Establish a structured capacity-building framework for the Client, Consultants, and Contractors involved in Project execution.

The institutional framework is aligned with the following regulatory and policy instruments:

- ➢ DENR DAO 2003-30 (Philippine Environmental Impact Statement System);
- ➢ Republic Act No. 7279 (Urban Development and Housing Act of 1992);
- ➢ Philippine Labor Code and Republic Act No. 11058 (Occupational Safety and Health Law);
- ➢ IFC Performance Standards (PS1, PS2, and PS5);
- ➢ AIIB Environmental and Social Standards (ESS1, ESS2, and ESS3); and
- ➢ ISO 14001 and ISO 45001 management system principles.

10.2 Institutional Capacity Assessment of the Client

10.2.1 Existing Institutional Capacity

The Bauan International Port, Inc. (BIPI), as the Project Proponent, has demonstrated capacity in managing port operations and regulatory compliance, including:

- Experience in environmental permitting and reporting to DENR-EMB;
- Existing safety and operational management systems;
- Engagement of contractors with construction and port operation experience.

In addition, ICTSI has established corporate-level systems for legal compliance and stakeholder engagement. Social development and livelihood assistance for affected households are addressed through the Resettlement Plan.

10.2.2 Proposed Institutional Arrangement

The proposed institutional arrangement adopts a tiered and integrated approach, ensuring accountability from strategic to operational levels.

Key Institutional Actors:

1. Project Owner - Bauan International Port, Inc. (BIPI)
2. Environmental and Social Safeguards Unit (ESSU)
3. Project Management Team (PMT)
4. Environmental and Social Consultant (ESC)
5. Construction Contractors and Subcontractors
6. Regulatory Agencies and Local Government Units (LGUs)
7. Independent Monitoring (if required by AIIB or DENR)

Table 10-1 Roles and Responsibilities of Identified Key Institutional Actors

Key Institutional Actors	Roles and Responsibilities
1. Project Owner / Client - Bauan International Port, Inc. (BIPI)	BIPI holds overall responsibility for the implementation of the ESMP and RP. BIPI shall: ● Ensure compliance with ECC conditions, applicable Philippine laws, and AIIB ESF; ● Allocate sufficient financial, technical, and human resources for ESMP and RP implementation; ● Oversee land acquisition, resettlement, compensation, and relocation activities in accordance with the approved RP; ● Establish, maintain, and oversee the Grievance Redress Mechanism (GRM); ● Submit periodic environmental and social monitoring reports to DENR, LGUs, and financing institutions; and ● Ensure corrective actions are implemented in response to monitoring findings or grievances.
2. Environmental and Social Safeguards Unit (ESSU)	A dedicated Environmental and Social Safeguards Unit (ESSU) shall be established within BIPI. The ESSU shall be responsible for: ● Day-to-day oversight of ESMP and RP implementation ● Monitoring compliance with environmental, social, labor, and OSH requirements; ● Coordinating of environmental and social monitoring programs; ● Maintenance of safeguard documentation, records, and reporting systems; ● Coordinating with DENR, LGUs, AIIB, and other relevant agencies; and ● Serving as the focal point for grievance management and resolution. This structure is consistent with AIIB ESS1 requirements on institutional capacity for environmental and social risk management.
3. Project Management Team (PMT)	The PMT shall:

Key Institutional Actors	Roles and Responsibilities
	● Integrate ESMP and RP requirements into engineering design, construction scheduling, and procurement; ● Ensure environmental and social clauses are embedded in all contractor agreements; ● Coordinate implementation of corrective actions arising from monitoring and audit findings; and ● Provide implementation support to the ESSU, particularly in managing contractor environmental and social performance.
4. Environmental and Social Consultant (ESC)	The ESC shall provide technical assistance to BIPI by: ● Advising on the effective implementation of ESMP and RP; ● Conducting periodic site inspections, compliance checks, and safeguard audits; ● Supporting preparation of environmental and social monitoring and compliance reports; ● Providing technical input on corrective and preventive actions; and ● Supporting capacity-building and safeguard-related training activities for project staff and contractors.
5. Construction Contractors and Subcontractors	Contractors and subcontractors shall be responsible for site-level implementation of safeguard measures shall: ● Implement ESMP mitigation measures, OSH programs, and labor management procedures; ● Appoint qualified Environmental Officers and Safety Officers at the site level; ● Conduct worker inductions, toolbox meetings, and environmental, social, and safety awareness activities; ● Report incidents, non-compliances, and corrective actions to the ESSU in a timely manner; and ● Cooperate in grievance resolution and stakeholder engagement activities. Contractor accountability is consistent with AIIB ESS2 and IFC PS2.
6. Regulatory Agencies and Local Government Units (LGUs)	Relevant government authorities shall perform regulatory and coordination functions as follows: ● DENR-EMB: Regulatory oversight, ECC monitoring, compliance verification; ● DOLE: Monitoring of labor standards and OSH Compliance; and ● LGUs and Barangays: Community coordination, census validation, facilitation of consultations, temporary and permanent relocation site development, and local issue resolution.
7. Independent Monitoring (if required by AIIB or DENR)	An Independent Monitoring Agent (IMA), if required by AIIB and/or DENR, shall:

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Key Institutional Actors	Roles and Responsibilities
	● Conduct independent monitoring and verification of ESMP and RP implementation; ● Assess compliance with AIIB Environmental and Social Standards and ECC conditions; ● Validate monitoring data, grievance records, and corrective action implementation; and ● Submit independent monitoring reports to the Client, AIIB, and relevant regulatory agencies. This role is consistent with AIIB ESS1 and Philippine EIA system provisions on third-party monitoring for projects with significant environmental and social risks.

10.3 Institutional Mechanism for Resettlement Plan Implementation

Given the confirmed physical displacement of 131 informal settler households and the acquisition of land affecting 25 private landowners, a dedicated institutional mechanism is in place to ensure orderly, humane, and lawful resettlement implementation

The RP enumeratesspecific roles and responsibilities which include the following:
- Verification of affected households and landowners (ESSU, LGU, Barangay);
- Coordination of relocation site development and habitability requirements (LGU, BIPI);
- Management of compensation, assistance, and land donation processes (BIPI, GCLA, External Counsel);
- Monitoring of livelihood continuity and support measures (ESSU, ICTSI Foundation); and
- Documentation and reporting of RP implementation progress.

10.4 Institutional Capacity Building Strategy

10.4.1 Objectives

The capacity building strategy aims to:
- Strengthen E&S governance within BIPI;
- Ensure contractors fully understand safeguard obligations;
- Align project implementation with national and AIIB standards.

10.4.2 Capacity Building Measures

<u>For BIPI</u>
- Training on AIIB ESF, IFC Performance Standards, and DENR requirements;
- Development of internal E&S monitoring and reporting systems;
- Training on grievance handling and stakeholder engagement.

<u>For Consultants</u>
- Updates on AIIB safeguard compliance and reporting;
- Advanced training on cumulative impact management and adaptive ESMP implementation.

<u>For Contractors and Subcontractors</u>
- Mandatory induction on ESMP, OSHE, and labor standards;
- Toolbox talks and refresher training on site-specific risks;
- Training on incident reporting, emergency response, and GRM procedures.

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Table 10-2 Summary of the Institutional Capacity Building Matrix

Entity	Capacity Gap Identified	Capacity Building Measure	Frequency	Responsible Party
BIPI	Limited exposure to AIIB ESF	AIIB ESF and ESMP training	Annual / As needed	ESC / AIIB
ESSU	Monitoring and reporting systems	Hands-on monitoring and reporting workshops	Semi-annual	ESC
Contractors	Variable OSHE compliance	Mandatory ESMP and OSHE induction	Pre-mobilization	BIPI / ESC
Consultants	Safeguard integration	Advanced E&S risk management training	Annual	BIPI

10.5 Monitoring, Reporting, and Adaptive Management

Regular environmental and social monitoring shall be conducted throughout project implementation. Monitoring findings shall be documented in SMRs, CMRs, and AIIB safeguard reports. Corrective actions shall be tracked through a Corrective Action Plan (CAP), and the institutional mechanism shall be periodically reviewed and refined based on monitoring outcomes.

This adaptive management approach is consistent with ISO management systems and AIIB ESS1.

10.6 Conclusion

The proposed institutional mechanism ensures that the ESMP and RP are effectively implemented, monitored, and continuously improved, despite the absence of resettlement impacts. By clearly defining roles, strengthening institutional capacity, and aligning with national laws, international best practices, and AIIB ESS, the mechanism provides a robust governance framework that supports environmentally and socially responsible project implementation.

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11 Stakeholder Engagement Plan/ Public Consultation and Information Disclosure

This Stakeholder Analysis Report provides a systematic identification, characterization, and assessment of Individuals, groups, and institutions that may influence, or be directly or indirectly affected by, the proposed redevelopment of the Bauan International Port. The assessment forms an integral component of the Environmental and Social Impact Assessment (ESIA) process and serves as a critical input to the Environmental Management Plan (EMP), particularly in designing targeted engagement strategies, managing social and environmental risks, and ensuring compliance with national and international requirements.

In line with the regulatory framework of the Environmental Management Bureau of the Department of Environmental and Natural Resources (EMB-DENR), the analysis evaluated stakeholders' level of influence, interest, and potential concerns associated with the planned expansion and modernization of the port's facilities. The process also aligns with internationally recognized good practice, including IFC Performance Standard 1 on Assessment and Management of Environmental and Social Risks and Impacts and IFC Performance Standard 9 on Biodiversity Conservation and Sustainable Management of Living Resources – especially given the project's proximity to the ecologically critical Verde Island Passage (VIP) – especially given the project's proximity to the ecologically critical Verde Island Passage, known for its high biodiversity value and sensitivity to development pressures.

By mapping stakeholder relationships, assessing their expectations, and determining their engagement needs, this report provides a structured basis for proactive communication, conflict mitigation, and collaborative decision-making throughout Project Phases.

11.1 Stakeholder Identification and Mapping

Stakeholder identification and mapping constitute a critical step in understanding the network of parties that could influence, or be influenced by, the proposed redevelopment of the Bauan International Port. Stakeholders were systematically identified through an integrated approach considering geographic proximity to the project site, regulatory and governance responsibilities, socio-economic linkages, environmental relevance, and the potential magnitude and nature of impacts during the pre-construction, construction, and operational phases of the port redevelopment.

This approach ensures that stakeholders are not only recognized based on their formal authority but also by their informal influence, vested interests, and potential to affect or be affected by the project's outcomes. The process involved desk reviews of government records, industry databases, environmental reports, and consultations with local authorities and community representatives to ensure a comprehensive mapping of all relevant actors.

11.1.1 Stakeholder Categories

For clarity and strategic engagement, stakeholders have been classified into the following categories:

- **National Government Agencies** – These include departments and agencies with policymaking, regulatory, and permitting authority over maritime, environmental, labor, and infrastructure development. Their engagement is essential to ensure compliance with national regulations and alignment with broader developmental policies.

- **Local Government Units (Provincial, Municipal, Barangay)** – Local authorities provide critical oversight for community welfare, land use, and local development planning. Their participation ensures that the project aligns with local priorities, ordinances, and socio-economic development plans.

- **Regulatory and Enforcement Agencies** – Agencies responsible for monitoring compliance with environmental, safety, labor, and maritime regulations. Their involvement is necessary for risk mitigation and enforcement of statutory requirements.

- **Port Users (Shipping Lines, Logistics Companies, Truckers)** – Primary beneficiaries of port facilities whose operational feedback informs infrastructure planning, scheduling, and capacity optimization.

- **Local Communities** – Residents in surrounding areas who may experience direct or indirect socio-economic and environmental impacts. Engagement with communities supports social license to operate and facilitates proactive management of potential grievances.

- **Business and Industry Groups** – Chambers of commerce, trade associations, and industry stakeholders whose economic activities intersect with port operations. Their input informs the project's economic integration and stakeholder value creation.

- **Environmental and Academic Groups** – NGOs, research institutions, and advocacy organizations that provide insights into biodiversity conservation, ecosystem services, and environmental monitoring. Their participation ensures that sustainability considerations are incorporated into project planning and operations.

- **Vulnerable and Special Interest** Groups – Populations that may be disproportionately affected by port redevelopment, such as fisherfolk, indigenous communities, women, and persons with disabilities. Tailored engagement ensures equity, protection of rights, and inclusive development.

- **Internal Stakeholders (BIPI Management, Employees)** – Internal project teams and operational staff whose support is critical for project execution, adherence to safety protocols, and effective operationalization of stakeholder management strategies.

By systematically identifying, categorizing, and mapping these stakeholders, the project team can develop a targeted engagement plan that addresses both potential risks and opportunities, fostering collaboration, transparency, and long-term sustainability of the Bauan International Port Redevelopment Project.

11.1.2 Stakeholder Matrix

The Stakeholder Matrix outlines the various institutions, communities, and sectoral groups that may influence – or be influenced by – the proposed Bauan International Port Redevelopment Project, particularly the planned expansion of the container yard and associated operational upgrades. Stakeholders were identified based on their statutory mandates, functional roles, proximity to project activities, and potential socio-environmental interactions arising from construction and enhanced port operations. Table 12-1 presents the stakeholder mapping and characterization, emphasizing their interests, influence, potential impacts, and specific engagement requirements throughout the project lifecycle.

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Table 11-1 Stakeholder Mapping and Characteristics

Stakeholder	Category	Role / Interest in the Project	Potential Impact / Sensitivity	Engagement Needs
DENR-EMB Central Office & Region IV-A	National Government	Lead agency for EIA review, issuance of ECC, and oversight of EMP/CMR compliance; monitors potential air, water, and waste management impacts from port redevelopment.	High regulatory influence, high sensitivity due to EIA requirements.	Formal technical consultations; structured submission of the EIA/EMP/ESMMP; regular compliance reporting and site inspections.
DENR-BMB	Biodiversity & Protected Areas Authority	Ensures alignment with biodiversity conservation policies, especially given the project's proximity to the Verde Island Passage, a globally recognized marine biodiversity corridor.	Moderate influence, high ecological sensitivity.	Technical coordination regarding terrestrial and marine biodiversity assessments; review of mitigation and habitat management measures.
MARINA & Philippine Ports Authority (PPA)	Sectoral Agencies	Oversees maritime transport regulations, port safety, vessel movement standards, and navigational requirements that may be affected by facility upgrades.	High influence due to regulatory mandates linked to port operations.	Engineering-technical meetings, submission of port layout updates, alignment on navigational safety requirements.
LGU – Bauan Municipal Government	Local Government Unit	Local planning authority; concerned with socioeconomic impacts, traffic management, municipal revenues, disaster risk reduction, and land-use alignment.	High influence and medium sensitivity, especially on local traffic and economic effects.	Public consultations, barangay coordination, disclosure of project plans, integration with municipal DRRM and development plans.
Barangay San Andres Uno	Local Community	Host community and location of the Project; directly affected population subject to resettlement and relocation	High impact, medium influence; high social sensitivity due to full physical displacement and resettlement risk	Public scoping activities, barangay-wide community consultations, household-level consultations, grievance redress and feedback mechanisms, continuous information disclosure throughout resettlement plan implementation
Barangay San Roque I, Aplaya, and Adjacent Barangays	Local Communities	Directly affected communities concerned with livelihood access, noise, dust, traffic, and potential changes in coastal resource use.	High impact and medium influence, medium social sensitivity.	Public scoping, community dialogues, household-level consultations, grievance redress and feedback mechanisms.
Fisherfolk groups	Primary Resource Users	Depend on nearshore VIP waters for small-scale fisheries; concerned with	High impact, low to medium influence.	Focus group discussions, participatory mapping

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Stakeholder	Category	Role / Interest in the Project	Potential Impact / Sensitivity	Engagement Needs
		access restrictions during construction, berthing activities, turbidity, and potential impacts on fish habitats.		of fishing areas, livelihood mitigation strategies, and compensation/assistance (if applicable).
Transport Groups (Truckers, Freight Forwarders)	Industry Sector	Rely on port access and road capacity; concerned with gate queuing, scheduling, traffic congestion, and safety along road corridors.	Medium impact, moderate operational sensitivity.	Targeted stakeholder meetings; disclosure of traffic management plans; coordination on routing and staging improvements.
Shipping Lines & Terminal Operators	Port Users	Interested in improved turnaround time, berth availability, cargo-handling efficiency, and safety of vessel operations.	Low direct impact, high influence on operational standards and port competitiveness.	Coordination meetings on operational planning; sharing of redevelopment timelines; alignment on port protocols and safety systems.
Environmental NGOs (e.g., VIP-focused groups such as Center for Energy, Ecology and Development (CEED) and VIP CORALS BatStateU)	Environmental Advocates	Advocate for strict safeguards of the Verde Island Passage; monitor potential impacts on marine ecosystems and coastal habitats.	Medium influence, high environmental sensitivity.	Technical disclosure meetings; validation of biodiversity mitigation measures; transparent sharing of monitoring results.
Academe / Research Institutions (State Universities in Batangas)	Research and Technical Experts	Providers of baseline ecological data, scientific studies, and peer validation for marine and terrestrial assessments.	Low influence, low socio-political sensitivity.	Technical workshops, collaborative studies, validation meetings for ecological baseline and monitoring methods.
Local Business Establishments	Local Enterprises	Interested in economic spillover, employment opportunities, local procurement, and potential market growth due to port expansion.	Medium impact, moderate economic sensitivity.	Information sessions, business forums, updates on procurement opportunities.
BIPI Employees & Contractors	Internal Stakeholders	Directly involved in project execution; concerned with occupational health and safety, job security, and work conditions during construction and operation.	Medium impact, internal operational sensitivity.	Regular orientations, toolbox meetings, safety and compliance programs, internal communications.

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11.1.3 Influence–Interest Analysis

A structured influence–interest analysis was undertaken to systematically understand how each stakeholder group may affect, or be affected by, the Bauan International Port Redevelopment Project. Influence was defined as the stakeholder's capacity to shape project outcomes through regulatory authority, operational control, resource access, or strategic position in the port and logistics sector. Interest was assessed based on the extent to which stakeholders' livelihoods, mandates, socio-economic conditions, or environmental concerns are linked to project implementation.

This assessment informed a strategic engagement approach to ensure that communication, participation, and decision-making processes are proportionate to stakeholders' relative influence and interest levels.

11.1.4 Influence-Interest Matrix

The stakeholder was categorized into four (4) quadrants of the Influence-Interest Matrix, with corresponding engagement strategies aligned with the project planning, permitting, construction, and operational phases.

Table 11-2 Influence-Interest Matrix

Quadrant	Stakeholders	Recommended Engagement Strategy
High Influence – High Interest (Manage Closely)	• DENR–EMB, • Philippine Ports Authority (PPA), • MARINA, • LGU Bauan, • Shipping Lines and Terminal Users, • BIPI Management • Barangay San Andres Uno	Maintain frequent and structured coordination through technical meetings, regulatory consultations, and joint planning sessions. Provide detailed progress updates and ensure timely submission of environmental and engineering compliance documents. This group should be actively involved in decision-making for project phasing, operational adjustments, and mitigation planning, given their strong regulatory and operational roles in the port environment.
High Influence – Low Interest (Keep Satisfied)	• DENR–BMB, • Batangas Provincial Government, • National Government Agencies with indirect mandates (e.g., DPWH, DOTr, NEDA)	Ensure continued satisfaction by providing periodic briefings, compliance updates, and formal communications related to environmental safeguards, biodiversity management, and alignment with national policies. Maintain proactive coordination to avoid delays in potential secondary approvals or endorsements.
Low Influence – High Interest (Keep Informed)	• Fisherfolk groups • Nearby Barangay Residents (e.g., Aplaya, Lag-On), • Local Businesses, • Civil Society Organizations, • Environmental NGOs	Conduct regular public consultations, focused group discussions (FGDs), and community information sessions. Provide transparent disclosure of project impacts, particularly those related to marine access, coastal resource use, traffic management, employment opportunities, and environmental mitigation measures. Their high interest stems from potential social and economic impacts; hence sustained communication and grievance mechanisms should be in place.
Low Influence – Low Interest (Monitor)	• Academic Institutions, • Transient Users of Port-Adjacent Areas, • General Public	Maintain minimal but transparent engagement through information, education, and communication (IEC) materials, public advisories, and digital platforms. Engagement will be primarily observational unless issues or concerns arise that require project clarification or targeted outreach.

11.2 Stakeholder Analysis (per Group)

The Bauan International Port Redevelopment Project involves the expansion and modernization of existing port facilities to enhance cargo-handling capacity, operational efficiency, and maritime safety. Given the project's scale, coastal location, and interface with both terrestrial and marine environments – including the ecologically significant Verde Island Passage – multiple stakeholder groups hold varying degrees of influence and interest in project outcomes.

This Stakeholder Analysis identifies and evaluates the key stakeholder groups that may affect, or be affected by, the proposed redevelopment. The assessment examines their influence, interests, key concerns, and the potential risks associated with inadequate engagement or mitigation. Understanding these dynamics is essential for designing a responsive and inclusive Stakeholder Engagement Plan (SEP) that supports regulatory compliance, social acceptability, environmental stewardship, and long-term project sustainability.

National Government Agencies

- **Influence:** High
- **Interest:** High, primarily driven by statutory mandates and regulatory oversight
- **Narrative Analysis:** National government agencies – including the DENR-EMB, DOTr, MARINA, PPA, and BFAR – hold significant influence over the Bauan International Port Redevelopment Project due to their authority in environmental regulation, maritime operations, and fisheries management. Their interest is notably high as the project must demonstrate full compliance with the Environmental Impact Assessment (EIA) System, maritime safety guidelines, and national environmental quality standards during the pre-construction, construction, and operational phases.
- **Key Issues:**
  - EIA compliance and timely issuance of ECC and related permits
  - Protection of biodiversity, particularly within the ecologically sensitive Verde Island Passage
  - Management of marine water quality, sedimentation, and coastal processes
  - Control of air emissions, noise, and port-related operational pollution
  - Solid and hazardous waste management in accordance with RA 9003 and RA 6969
- **Risks if Not Addressed:** Failure to meet regulatory requirements may result in disapproval of permits, issuance of notices of violation, or work stoppage orders, all of which can significantly delay project timelines and increase compliance costs.

Local Government Units (LGUs)

- **Influence:** High
- **Interest:** High, linked to local development priorities and community welfare
- **Narrative Analysis:** The Bauan Municipal Government and the Provincial Government of Batangas have substantial influence on project decision-making due to their roles in land use planning, local permitting procedures, maintenance of public order, and community-level development initiatives. Their interest is considerable, as the port redevelopment will affect traffic flow, local livelihoods, economic opportunities, and environmental conditions within coastal barangays.
- **Key Issues:**
  - Traffic and mobility impacts from increased truck and cargo movement
  - Local employment generation and economic multiplier effects
  - Community safety, emergency response, and disaster preparedness
  - Management of potential coastal erosion or shoreline alterations

- **Risks if Not Addressed:** Poor coordination with LGUs may lead to community dissatisfaction, delays in securing local permits, and heightened social resistance, particularly if perceived impacts outweigh local benefits.

Project-Affected People (PAPs), including Informal Settler Families (ISFs) and Affected Private Owners

- **Influence:** Low to Medium
- **Interest:** Very High
- **Narrative Analysis:** Project-Affected People (PAPs), including informal settler families (ISFs) and any affected private land or structure owners, represent a key stakeholder group due to their direct exposure to project-related land acquisition, physical displacement, or economic impacts. While their institutional influence over project approvals is limited, their interest is extremely high as the redevelopment may affect housing security, access to livelihoods, and social networks. Ensuring fair treatment, timely information disclosure, and access to grievance redress is essential to maintaining social acceptability and compliance with national regulations and international safeguards.
- **Key Issues:**
    - Physical displacement and relocation arrangements (if applicable)
    - Compensation for loss of land, structures, or assets
    - Livelihood restoration and transitional support
    - Access to information on entitlements, schedules, and assistance programs
    - Fair and transparent grievance handling
- **Risks if Not Addressed:** Inadequate engagement or delayed resolution of PAP concerns may result in grievances, social tension, reputational risks, and non-compliance with resettlement and social safeguard requirements, potentially leading to project delays or regulatory intervention.

Fisherfolk and Coastal Resource Users

- **Influence:** Low to Medium
- **Interest:** Very High due to direct implications on livelihood and resource access
- **Narrative Analysis:** Fishing communities, small-scale boat operators, and other coastal resource users are among the most directly affected stakeholders. While their institutional influence is relatively limited, their interest is extremely high because construction activities (e.g., dredging, piling) and expanded port operations could temporarily or permanently affect fishing grounds, navigational routes, and water quality.
- **Key Issues:**
    - Navigational safety during construction and vessel movement
    - Potential reduction of fish catches due to turbidity and noise-related disturbance
    - Temporary exclusion zones or restricted nearshore access
    - Changes in coastal habitat conditions
- **Risks if Not Addressed:** Unaddressed livelihood impacts may lead to grievances, protests, or requests for compensation and livelihood support programs, affecting the project's social license to operate.

Environmental Groups and NGOs

- **Influence:** Medium
- **Interest:** High, particularly due to the Verde Island Passage being a global marine biodiversity hotspot
- **Narrative Analysis:** Environmental organizations – both local and national – maintain a strong interest in monitoring the ecological integrity of the Verde Island Passage (VIP). Their influence, while not regulatory, is substantial in terms of shaping public opinion, mobilizing community campaigns, and engaging in policy advocacy. They are likely to scrutinize the project's environmental safeguards, biodiversity conservation measures, and spill response capability.

- **Key Issues:**
  - Protection of marine biodiversity and critical habitats
  - Pollution control measures and prevention of accidental spills
  - Transparency in environmental monitoring results
  - Cumulative impacts associated with port expansion in VIP
- **Risks if Not Addressed:** Weak environmental safeguards may attract negative media coverage, public pressure, or NGO-led campaigns that could affect project reputation and investor confidence.

Port Users (Shipping Lines, Logistics Operators, Trucking Groups)

- **Influence:** High
- **Interest:** Moderate to High based on operational efficiency and port competitiveness
- **Narrative Analysis:** Port users are key stakeholders whose operational requirements directly shape port design and functionality. Their influence stems from commercial power, throughput volume, and their role in overall port performance. Their interest centers on the efficiency, reliability, and safety of port operations during and after redevelopment.
- **Key Issues:**
  - Access to berthing areas and navigational channels during construction
  - Optimization of container yard operations and cargo-handling systems
  - Implementation of safety protocols and traffic management inside the port
  - Minimizing disruptions to shipping schedules and logistics chains
- **Risks if Not Addressed:** Operational inefficiencies or prolonged disruptions may discourage port users, reduce cargo throughput, or shift traffic to competing ports.

11.3 Stakeholder Engagement Plan

This Stakeholder Engagement Plan (SEP) outlines the systematic framework for identifying, engaging, and managing the concerns of stakeholders that may be affected – positively or adversely – by the proposed Redevelopment of the Bauan International Port. The SEP is designed to guide proactive, inclusive, and culturally appropriate engagement activities throughout the project lifecycle, covering pre-construction, construction, and operational phases.

The Plan adheres to the principles and procedural requirements of the Philippine Environmental Impact Statement (EIS) System under DAO 2003-30, and integrates relevant provisions from AIIB ESF and IFC Performance Standards. It also aligns with national policies on participatory governance and reflects GIIP for stakeholder communication and environmental–social risk management.

Given the strategic importance of the Bauan International Port as a logistics hub within the Calabarzon industrial corridor, the redevelopment project introduces changes that may influence local communities, port users, commercial locators, government institutions, and resource-dependent groups (including those reliant on coastal and marine ecosystems within the Verde Island Passage). This SEP ensures that these stakeholders are informed, heard, and engaged in a manner that supports transparency, mutual respect, and sustained cooperation.

11.3.1 Objectives

The SEP has been developed to achieve the following objectives:

- Facilitate transparent and timely communication with affected communities, port users, partner agencies, and regulatory bodies regarding project impacts, timelines, and mitigation measures.

- Identify, understand, and address stakeholder concerns related to environmental quality, social welfare, economic displacement, community safety, biodiversity sensitivity, and potential impacts to coastal–marine resources associated with the port's expansion footprint.

- Integrate stakeholder insights into project decision-making, including environmental and social management planning, design refinements, mitigation development, and the implementation of the ESMP.
- Establish an accessible, predictable, and culturally appropriate grievance mechanism for receiving, documenting, and resolving stakeholder issues in a manner that promotes accountability and responsiveness.
- Strengthen partnerships and foster long-term trust with local government units (LGUs), national regulatory agencies, private sector partners, civil society organizations, and project-affected persons (PAPs), ensuring shared responsibility in maintaining environmental compliance, safety, and sustainable port operations.

11.3.2 Stakeholder Identification and Prioritization

Stakeholders for the proposed Bauan International Port Redevelopment Project were identified based on their statutory roles, proximity to the project site, dependence on coastal and marine resources within the Verde Island Passage (VIP), and potential to influence project decisions or be significantly affected by project impacts. The prioritization process considered two primary dimensions: (1) Influence – the stakeholder's authority or ability to affect project approvals, design, or implementation; and (2) Interest – the degree to which the stakeholder is likely to be affected by environmental, socio-economic, or operational changes arising from the port redevelopment.

Table 11-3 presents the stakeholder priority levels, categorizing each group to support tailored engagement strategies throughout the project cycle.

Table 11-3 Stakeholder Priority Levels

Stakeholder Category	Influence	Interest	Priority Level
DENR, PPA, MARINA	High	High	Priority 1
LGU – Bauan Municipal Government	High	High	Priority 1
Project-Affected People (ISFs and affected private owners)	Medium	Very High	Priority 1
Barangays (San Roque, Aplaya, etc.)	Medium	High	Priority 1
Fisherfolks	Low–Medium	Very High	Priority 1
NGOs / Environmental Groups	Medium	High	Priority 2
Port Users (shipping lines, logistics operators)	High	Medium	Priority 2
Local Businesses	Medium	Medium	Priority 3
Academia	Low	Medium	Priority 3
Internal Stakeholders (BIPI management, employees)	Medium	Medium	Priority 3

Interpretation

Priority 1 stakeholders include regulatory agencies, the host municipality, adjacent barangays, and fisherfolk associations and Project-Affected People (PAPs), including informal settler families and affected private owners.. These groups either (a) have regulatory authority critical to securing the project's environmental and operational clearances, or (b) are highly dependent on the coastal resources potentially affected by dredging, backfilling, increased vessel traffic, and shoreline modifications. Their concerns and inputs are integral to project design, environmental safeguards, and the ESMP.

Priority 2 stakeholders are those with sectoral influence – port users and environmental NGOs – who may not reside within the impact area but hold significant operational or advocacy importance. Their engagement helps

refine operational protocols, pollution control measures, and biodiversity protection strategies, particularly given the project's proximity to the Verde Island Passage, a globally recognized marine biodiversity corridor.

Priority 3 stakeholders include academic institutions, local enterprises, and internal staff. Although their influence and interest are moderate, they contribute valuable technical knowledge, economic linkage insights, and operational perspectives relevant to sustainable port redevelopment.

11.3.3 Engagement Strategy

The Engagement Strategy for the Bauan International Port Redevelopment Project outlines a structured approach to ensuring that all stakeholders – regulatory agencies, local government units, nearby communities, resource-dependent groups, port users, and civil society organizations – are meaningfully involved throughout the project cycle. The strategy is designed to facilitate transparent information exchange, strengthen stakeholder confidence, and integrate community and sectoral inputs into project planning, environmental management, and decision-making processes. Targeted and continuous engagement with Project-Affected People (PAPs), including informal settler families and affected private owners, will be prioritized to ensure timely disclosure of information, understanding of entitlements, and effective implementation of resettlement and livelihood measures, where applicable.

It emphasizes early and continuous engagement, beginning from project scoping through construction and operations, ensuring that potential issues are identified and addressed proactively. Engagement activities will be tailored based on stakeholder influence, interest, and vulnerability, using suitable methods such as public consultations, FGDs, key informant interviews, and technical meetings. All interactions will be guided by principles of inclusiveness, transparency, cultural sensitivity, and responsiveness, supported by proper documentation and a functioning grievance redress mechanism. Overall, the strategy aims to foster cooperative relationships and support regulatory compliance while promoting socially and environmentally responsible port redevelopment within the Bauan coastal area and the broader Verde Island Passage ecosystem.

11.3.4 Engagement Principles

The engagement approach for the Bauan International Port Redevelopment Project is anchored on internationally recognized stakeholder engagement standards (IFC, DENR DAO 2017-15) and local governance requirements. The following principles will guide all engagement efforts:

- **Inclusiveness** – Ensuring all affected and interested stakeholders, including vulnerable groups such as small-scale fisherfolk and women's associations, are given equitable opportunities to participate in discussions and consultations.
- **Transparency** – Providing complete, accurate, and timely information on project components, potential impacts, and proposed mitigation measures, enabling stakeholders to make informed decisions.
- **Cultural Sensitivity** – Conducting engagements in a manner that respects local customs, language preferences, community protocols, and existing socio-cultural dynamics of barangays surrounding the port.
- **Responsiveness** – Promptly addressing issues, grievances, and recommendations raised by stakeholders, and integrating relevant feedback into the project's design, ESMP, and monitoring programs.
- **Documentation** – Maintaining comprehensive records of meetings, consultations, key issues raised, commitments made, and follow-up actions to ensure accountability and traceability throughout the project cycle.

These principles will ensure that stakeholder participation remains meaningful, constructive, and aligned with the overall objectives of environmental compliance and socially responsible development.

11.3.5 Engagement Methods and Approaches

A combination of participatory tools and communication platforms will be used to ensure effective information flow, consultation, and feedback gathering. Engagement activities will be aligned with regulatory requirements under the EIA System and tailored to the characteristics and needs of each stakeholder group.

Table 11-4 Engagement Techniques

Method	Description	Appropriate For
Public Consultations	Large-scale, formal sessions conducted as part of EIA requirements; used to present project details, potential impacts, mitigation measures, and obtain broad community feedback.	LGUs, national agencies, NGOs, local communities
Focus Group Discussions (FGDs)	Structured, small-group dialogues used to explore specific issues, resource-use patterns, and community concerns in greater depth.	Project-Affected People (PAPs), including ISFs and affected private owners, Fisherfolk associations, women's groups, port workers, port users
Key Informant Interviews (KIIs)	One-on-one or small-group interviews with individuals who possess specialized knowledge, leadership roles, or unique insights relevant to the project.	Government agencies, barangay officials, sectoral leaders, PAP representatives
Technical Meetings	Detailed meetings involving engineering teams, port operators, and regulators to discuss design specifications, dredging protocols, marine traffic, environmental safeguards, and EMP alignment.	DENR, PPA, MARINA, BIPI operations group, port users
Information, Education, and Communication (IEC) Materials	Dissemination of printed and digital materials (posters, flyers, advisories) summarizing project information, schedules, safety measures, and environmental commitments.	General public, nearby barangays, on-site workers, PAPs
Digital Channels	Use of email, SMS notifications, official website postings, and online feedback mechanisms to reach stakeholders who prefer remote access or have operational constraints.	Port users, logistics firms, local businesses, affected private land owners
Grievance Desk / Mechanism	A structured platform for receiving, documenting, and resolving complaints or concerns throughout project implementation, ensuring that stakeholders have a clear avenue for redress.	All stakeholder groups

11.3.6 Engagement Schedule per Project Phase

Stakeholder engagement for the Bauan International Port Redevelopment Project is structured across the pre-construction, construction, and operations phases to ensure continuous communication, transparency, and responsiveness to stakeholder concerns. During the pre-construction phase, activities focus on information disclosure, gathering baseline inputs, and establishing formal channels for consultation – such as public scoping, FGDs with affected groups (including fisherfolk), and coordination meetings with LGUs. These preparatory engagements help refine impact assessments and integrate stakeholder expectations into project planning.

In the construction phase, engagement becomes more frequent, and issue driven. Regular barangay coordination meetings, construction advisories, OHS awareness programs, and on-site grievance handling are implemented to manage potential disruptions related to noise, traffic, safety, and environmental impacts. Environmental monitoring results are periodically shared with communities and regulators to maintain trust and compliance.

For the operations phase, stakeholder engagement supports long-term relationship building and sustainable port management. Annual assemblies, ongoing updates to LGUs and port users, community CSR initiatives, biodiversity monitoring dissemination (particularly due to the project's proximity to the Verde Island Passage), and marine safety advisories ensure that stakeholders remain informed and involved throughout the port's operational life cycle.

Pre-Construction Phase

During the pre-construction phase, stakeholder engagement activities will focus on ensuring transparency, gathering baseline information, and establishing an inclusive platform for meaningful participation. Engagements will be aligned with the Environmental and Social Impact Assessment (ESIA) procedural requirements and the preparation of the Environmental and Social Management Plan (ESMP). Key activities include:

Public Scoping and Public Hearing

The project proponent will conduct formal public scoping and the mandated public hearing to identify environmental and social issues, validate potential impacts, and gather recommendations from affected communities, local government units (LGUs), regulatory agencies, and civil society groups.

EIA Disclosure

Dissemination of accessible information materials - including the Project Description for Scoping (PDS), Initial Project Description (IPD), and relevant environmental baseline results – to ensure stakeholders clearly understand the project scope, potential impacts, and proposed mitigation measures.

Focus Group Discussions (FGDs) with fisherfolk and vulnerable groups

Targeted consultations with artisanal fisherfolk, women's groups, informal settlers (if any), and other vulnerable sectors to gather site-specific information on livelihood dependency, marine use patterns, safety concerns, and anticipated changes due to port redevelopment.

Courtesy meetings with LGUs

Coordination meetings with Bauan Municipal LGU, affected barangays (notably San Roque and nearby coastal barangays), and Batangas Provincial Government to align project timelines, secure local development support, and integrate local planning considerations.

Stakeholder Profiling and Baseline Consultations

Systematic profiling of institutional, community, and economic stakeholders to establish baseline socio-economic and environmental conditions. This includes interviews with port users, adjacent industries, transport groups, and coastal resource organizations.

Grievance Redress Mechanism (GRM) launch

Establishment and formal introduction of the project-specific GRM to provide accessible, transparent, and culturally appropriate channels for lodging concerns, complaints, or inquiries prior to the start of construction

Construction Phase

Stakeholder engagement during construction will focus on maintaining open communication, addressing emerging concerns, and ensuring compliance with environmental and social safeguards. Activities are structured to minimize disruptions to communities and port users.

Monthly Barangay Coordination Meetings

Regular coordination with affected barangays to discuss construction progress, upcoming high-impact activities, and any observed issues related to noise, dust, traffic, or community safety.

Traffic and Noise Advisories

Issuance of timely advisories on construction-related traffic rerouting, temporary road obstructions, and anticipated noise-generating works to help manage community expectations and reduce nuisance impacts.

Occupational Health and Safety (OHS) Awareness for Workers

Strengthening contractor-level OHS programs through daily toolbox meetings, monthly safety orientations, and awareness sessions compliant with DOLE standards to protect workers and minimize occupational risks.

On-site Grievance Desk

Deployment of a physical grievance desk within the construction site and barangay hall to ensure immediate response to complaints related to construction activities.

Quarterly Environmental Monitoring Disclosure

Presentation of monitoring results (water quality, air quality, noise/vibration, marine ecology observations, and waste management performance) to LGUs, EMB, community representatives, and port users to maintain transparency and compliance with ECC conditions.

Operation Phase

Stakeholder engagement during the operational phase will focus on sustaining long-term relationships, ensuring safe and efficient port operations, and supporting community development and environmental stewardship—particularly given the project's location within the influence area of the Verde Island Passage (VIP), a globally recognized marine biodiversity hotspot.

Annual Stakeholder Assembly

A yearly multi-stakeholder forum involving government agencies, port users, community leaders, fisherfolk associations, and NGOs to review operational performance, highlight improvements, and discuss upcoming initiatives.

Regular Updates to LGUs and Port Users

Periodic briefings on port throughput, operational adjustments, dredging schedules, security enhancements, and environmental compliance status to maintain institutional coordination and operational predictability.

Community CSR Programs

Implementation of CSR initiatives aligned with local development priorities, such as coastal cleanups, livelihood enhancement for fisherfolk, scholarship programs, and community health and safety activities.

Biodiversity Monitoring Dissemination (VIP-related)

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Sharing results of aquatic monitoring programs – such as marine water quality, benthic assessments, and fish productivity indicators – particularly in relation to the protection of the Verde Island Passage's ecological integrity.

Marine Safety Advisories

Regular issuance of navigation and safety advisories for local fisherfolk and small-scale operators, including updates on vessel traffic, restricted zones, and emergency procedures to ensure safe coexistence between port operations and traditional marine users.

Table 11-5 Sample Stakeholder Consultation Log Template

Date	Stakeholder Group	Venue / Platform	Participants	Discussion Points	Concerns Raised	Commitments Made	Responsible Unit	Status / Follow-up
YYYY-MM-DD	Barangay San Roque Fisherfolk	Barangay Hall	25 participants	Presentation of project updates	Livelihood, turbidity	Provide updated marine mitigation plan	EHS / CRO	Pending / Completed
YYYY-MM-DD	LGU Bauan	Municipal Hall	LGU officials	Traffic management measures	Congestion concerns	Provide TMP to MPDO	Project Manager	Completed
YYYY-MM-DD	Environmental NGO	Technical meeting	6 representatives	VIP biodiversity impacts	Marine ecology concerns	Share baseline studies	Biodiversity Specialist	On-going

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Table 11-6 Summary of Stakeholder Mapping, Influence, Interest, and Engagement Strategy

Stakeholder	Category	Influence	Interest	Key Issues / Concerns	Engagement Approach	Frequency
DENR-EMB	National Regulatory Agency	High	High	Compliance with Environmental Compliance Certificate (ECC) requirements, adherence to Philippine environmental regulations, pollution control, and monitoring obligations.	Formal technical meetings, submission of compliance reports, periodic project updates, and documentation to meet regulatory requirements.	Regular / Regulatory milestones
DENR-BMB	Biodiversity and Conservation Agency	Medium	Medium	Protection of critical habitats, biodiversity conservation particularly for the Verde Island Passage, species protection, and mitigation of impacts from port expansion.	Technical consultations, site inspections, submission of biodiversity management plans, and collaborative monitoring.	As needed, during pre-construction and construction phases
PPA & MARINA	Sectoral / Maritime Agencies	High	Medium	Safe navigation, vessel traffic management, berthing operations, port safety compliance, and integration with national maritime policies.	Coordination meetings, joint operational planning, and technical briefings to align port operations with regulatory standards.	Monthly or during operational planning cycles
LGU Bauan	Local Government Unit	High	High	Traffic congestion, socio-economic impacts, local employment, community safety, and integration with local development plans.	Formal consultations, project briefings, periodic updates, and participatory planning workshops.	Monthly during project development
Barangays	Local Communities	Medium	High	Construction noise, air and water quality impacts, safety risks, displacement, and potential disruption of daily activities.	Community consultations, information dissemination, grievance redress mechanisms, and local engagement initiatives.	Monthly or as needed during key project phases
Project-Affected People (PAPs), including Informal Settler Families (ISFs) and Affected Private Owners	Directly Affected / Vulnerable Groups	Medium	Very High	Physical or economic displacement, compensation for land and assets, relocation arrangements (if applicable), livelihood restoration, access to information on entitlements and schedules, grievance resolution	Targeted Focus Group Discussions (FGDs), household-level consultations, disclosure of resettlement information, livelihood planning sessions, and dedicated grievance redress mechanism (GRM)	Continuous during pre-construction and construction; as needed during operations

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Stakeholder	Category	Influence	Interest	Key Issues / Concerns	Engagement Approach	Frequency
Fisherfolk Associations	Resource User Groups	Low	Very High	Access to fishing grounds, turbidity impacts, livelihood disruptions, and potential impacts on fisheries resources.	Focus Group Discussions (FGDs), livelihood support programs, participatory monitoring, and awareness sessions on mitigation measures.	Every 2–3 months or as critical project milestones arise
Environmental NGOs	Civil Society / Environmental	Medium	High	Marine and terrestrial biodiversity, risk of oil spills or hazardous material releases, advocacy for environmental protection.	Technical workshops, stakeholder briefings, sharing of environmental monitoring data, and collaborative mitigation planning.	Semi-annual or aligned with key environmental reporting
Port Users	Industry / Logistics	Medium	Medium	Operational efficiency, safety of cargo handling, berthing availability, and potential delays from construction activities.	Regular coordination meetings, technical briefings, and updates on construction schedules affecting operations.	Monthly during operational and construction phases
Local Businesses	Commercial / Business	Medium	Medium	Access to port facilities, business opportunities, potential disruptions, and economic benefits from redevelopment.	Business forums, networking events, and periodic newsletters to provide updates on project developments and opportunities.	Quarterly
Academic Institutions	Research / Knowledge Partners	Low	Medium	Access to project data, opportunities for applied research, monitoring and evaluation studies, and collaborative environmental research.	Technical exchange sessions, data sharing agreements, and joint research activities.	As needed, particularly during environmental and biodiversity studies
Employees / Contractors	Internal / Workforce	Medium	Medium	Occupational health and safety, job security, training, work schedule impacts, and compliance with labor standards.	Toolbox meetings, safety briefings, training programs, and internal communication on project progress and risks.	Weekly during construction and operational phases

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11.4 Summary of Stakeholder Engagement, Key Issues Raised, and Integration into Project Design

11.4.1 Summary of the Conducted Public Scoping and Stakeholder Engagement for the Bauan International Port Re-Development Project on July 4, 2025

Stakeholder engagement for the Project has been undertaken through a combination of formal public participation activities under the Philippine Environmental Impact Statement (EIS) System, targeted consultations with affected stakeholders, and ongoing coordination with local government units (LGUs) and Barangay authorities. These activities were designed to ensure that stakeholder perspectives are systematically captured and integrated into the assessment of environmental and social risks and impacts, as well as into Project planning and decision-making.

A key milestone in the stakeholder engagement process was the Public Scoping conducted on 04 July 2025 at Barangay San Roque, Bauan, Batangas, undertaken as part of the Environmental Performance Report and Management Plan (EPRMP) process. The Public Scoping provided an early platform for disclosure of Project information, including anticipated environmental and social impacts and proposed mitigation measures, and enabled stakeholders to raise issues and concerns relevant to the ESIA scope . The activity was attended by representatives from national government agencies, LGUs, Barangay officials, local communities, and other interested stakeholders, consistent with the requirements of DAO 2017-15 and DAO 2022-02.

In addition to the Public Scoping, further stakeholder engagement activities were undertaken, including: (i) LGU- and Barangay-level consultations conducted in June 2025; (ii) focused meetings with private landowners held on 01 and 12 July 2025; and (iii) household-level engagements with Project-affected persons, particularly those subject to relocation under the Resettlement Plan (RP). These engagements were complemented by ongoing informal consultations and coordination meetings throughout the ESIA preparation process.

Stakeholder inputs obtained through these engagement activities focused on a range of environmental and social risks associated with the Project, particularly in relation to marine water quality, livelihoods, community health and safety, environmental management, and transparency of Project implementation. The key issues and concerns raised, together with corresponding Project responses and how these have been considered in Project design and decision-making, are summarized below.

Concerns were raised regarding the potential for increased turbidity and sediment dispersion associated with dredging and marine construction activities, and the possible implications of these changes on coastal water quality and fisheries resources. In response, the Project has adopted a suite of mitigation measures, including the use of controlled dredging methods, installation of silt curtains, and implementation of a marine water quality monitoring program during dredging activities. These measures have been integrated into the Project design and are formalized within the Environmental and Social Management Plan (ESMP), including provisions for real-time monitoring and adaptive management to ensure that sediment dispersion remains within acceptable limits.

Livelihood-related concerns were also prominent, particularly among fisherfolk and informal settler households, who expressed apprehension regarding potential disruption to fishing activities and the implications of displacement on income sources and access to marine resources. In response, the Project has incorporated livelihood restoration measures and priority employment opportunities within both the construction and operational phases. The selection of the relocation site at Barangay Aplaya, located approximately 1.3 kilometers from the existing community, reflects stakeholder preferences for maintaining proximity to existing fishing grounds, markets, and social networks. These considerations have been embedded in the design of the Resettlement Plan, including provisions for livelihood continuity and targeted support for vulnerable households.

Stakeholders likewise raised concerns related to increased traffic, road safety risks, and construction-related disturbances such as noise and dust emissions. The Project has addressed these concerns through the development of a traffic management plan, including the designation of haul routes, scheduling of truck

movements, and coordination with LGUs to manage local traffic conditions. In addition, standard mitigation measures such as dust suppression, equipment maintenance, and noise control have been incorporated into construction planning. These measures have informed the design of gate operations, internal circulation, and logistics management within the terminal layout, and are reflected in the ESMP under community health and safety provisions.

Broader concerns regarding environmental protection and regulatory compliance were also expressed, including the need to ensure that Project activities do not adversely affect nearby sensitive marine environments within Batangas Bay and the wider Verde Island Passage. The Project has addressed these concerns by confirming that all redevelopment activities are confined within an existing industrial port footprint and by applying the mitigation hierarchy to avoid, minimize, and manage environmental impacts. Environmental monitoring programs, including marine water quality and ecological monitoring, have been incorporated into the ESMP to ensure compliance with national standards and international good practice.

Stakeholders emphasized the importance of transparency, continuous engagement, and accessible mechanisms for raising concerns. In response, the Project has established a Grievance Redress Mechanism (GRM) that provides multiple entry points for stakeholders, including LGUs, Barangay offices, and the Project proponent. The GRM includes defined procedures for receipt, assessment, resolution, and monitoring of grievances within specified timeframes. Stakeholder engagement has been institutionalized as an ongoing process throughout the Project lifecycle, with commitments for continued information disclosure and periodic consultations during construction and operation.

Overall, stakeholder engagement has played a critical role in informing Project design, impact assessment, and the development of management measures. Inputs from stakeholders have directly contributed to the refinement of dredging methodologies, the selection and planning of the relocation site, the design of traffic and safety management measures, and the strengthening of environmental monitoring and grievance mechanisms. These inputs have been systematically incorporated into the ESMP and RP, ensuring that stakeholder concerns are not only documented but translated into actionable measures and management commitments.

The Project will continue to implement stakeholder engagement activities throughout its lifecycle, in accordance with the Stakeholder Engagement Plan, to ensure that emerging issues are promptly identified and addressed, and that stakeholder feedback continues to inform adaptive management and decision-making.

11.4.2 Summary of the Conducted Public Consultation for the Bauan International Port Re-Development Project on April 22, 2026

A public consultation was conducted on April 22, 2026 at the Barangay San Roque Covered Court in the Municipality of Bauan, Batangas as part of the Environmental and Social Impact Assessment (ESIA) process for the proposed Bauan International Port Re-Development Project. The consultation aimed to provide stakeholders with information regarding the Project scope, proposed redevelopment activities, anticipated environmental and social impacts, and proposed mitigation measures. The activity also served as a venue for stakeholders to raise concerns, provide recommendations, and seek clarification regarding the Project and its potential impacts on surrounding communities.

The consultation program commenced at approximately 9:00 AM with an opening prayer and singing of the National Anthem, followed by acknowledgement of participants and opening remarks from the company's General Manager, Mr. Ferdinand S. Magtalas. A message was also delivered by Hon. Froilan Salcedo, Barangay Chairman of Barangay San Roque. Engr. Mariwen L. Ilao facilitated the briefing and orientation on the purpose of the public consultation for the ESIA. The project presentation was delivered by the EIA Preparers, with Ms. Nadia P. Conde discussing the project details and Engr. Emerson Darroles presenting the Environmental Impact Assessment. Engr. Christian Grace M. Sales, Project Manager for Global Engineering of the ICTSI Group, also provided updates

regarding the ongoing construction activities of the port. The consultation concluded with closing remarks from Hon. Froilan Salcedo.

The public consultation was attended by a total of 75 participants representing various stakeholder groups, including government agencies, local government units, barangay officials, people's organizations, senior citizens, women's organizations, and residents from Barangays San Andres I and San Roque. Representatives from the Department of Environment and Natural Resources (DENR), Environmental Management Bureau (EMB) Region IV-A, Municipal Environment and Natural Resources Office (MENRO), Philippine Ports Authority (PPA), Philippine Coast Guard, and other concerned institutions were also invited to participate in the consultation.

During the open forum, stakeholders raised concerns related to relocation, flooding, drainage, traffic, employment opportunities, and operational impacts of the proposed Project. Residents from Barangay San Andres I raised concerns regarding the relocation process and the current condition of affected residents, noting that many residents are temporarily staying in boarding houses while awaiting turnover of the relocation site. Stakeholders also raised concerns regarding flooding susceptibility, drainage conditions, and the status of facilities such as the barangay hall, chapel, court, and health services within the relocation area in Sto. Domingo. Concerns regarding impacts on livelihood were likewise raised during the consultation. In response, BIPI representatives stated that the relocation site had already been fenced and filled, that road development activities were ongoing, and that turnover of the relocation area was targeted in May. Project representatives also stated that the relocation area would not be turned over unless the area is considered safe and that community facilities and health services are planned within the site.

Stakeholders from Barangay San Roque also raised broader community concerns regarding flooding, drainage conditions, and the condition of the Tabuk River and surrounding waterways. Concerns were likewise raised regarding the absence of local flood control rehabilitation measures and the previous removal of a canal in the area during previous developments of another company. In response, BIPI representatives clarified that these concerns pertain to area-wide drainage and flood control conditions beyond the direct scope of the Project. The representatives further stated that the Project scope is limited to the drainage system within the Project area and that no excavation works are planned for the Tabuk River. Project representatives also stated that a River Protection Study is being conducted and that coordination with relevant government agencies regarding flooding concerns outside the Project area would be undertaken.

Concerns regarding operational traffic, truck movements, and community safety were also raised during the consultation. Stakeholders sought clarification regarding the operating hours of trucks and the potential impacts on students and local residents. In response, BIPI representatives stated that the projected truck volume is approximately 1,000 trucks per day by 2028 and clarified that trucks will utilize a new access road and intersection near the Phoenix gasoline station rather than the existing residential road network. Project representatives further stated that a traffic light and a new road parallel to the existing road are planned as part of the development.

Questions were also raised regarding employment opportunities for local residents. Stakeholders noted that many workers currently observed on-site were from outside Bauan and recommended that local residents be provided with information and training opportunities related to future employment requirements and qualifications. In response, BIPI representatives stated that coordination regarding hiring activities would be undertaken with project operations and that plans to begin the hiring process are targeted by 2027.

Concerns regarding operational noise were likewise discussed during the consultation. In response to stakeholder comments regarding noise from container handling activities, project representatives stated that the terminal would be operated using proper equipment.

Overall, stakeholders generally expressed support for the proposed Project, particularly with respect to its anticipated economic benefits and employment opportunities for local communities. While several concerns and

requests for clarification were raised during the consultation, no major objections or opposition from stakeholders, including civil society organizations or non-government organizations, were recorded during the activity.

Stakeholders requesting additional Project-related information, including environmental baseline data and monitoring results, may also access relevant disclosed documents through the Project's publicly available ESIA disclosure materials, in addition to formal information request channels and stakeholder engagement activities to be conducted by the Project. Information regarding the Project-level Grievance Redress Mechanism (GRM) and the Asian Infrastructure Investment Bank's (AIIB) Project-affected People's Mechanism (PPM) will likewise be disseminated to stakeholders through subsequent stakeholder engagement and Project information disclosure activities.

The issues, concerns, and recommendations raised during the consultation were documented as part of the Public Consultation Report. Photo documentation of the public consultation is presented below.

Figure 11-1: Registration

Figure 11-2: Participants

Figure 11-3. Open Forum

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12 Grievance Redress Mechanism

The Grievance Redress Mechanism (GRM) for the Bauan International Port Redevelopment Project establishes a formalized, transparent, and accountable process for receiving, assessing, and resolving concerns or complaints from a diverse range of stakeholders, including local communities, project-affected individuals, employees, contractors, business partners, and regulatory authorities. The GRM serves as a key instrument to uphold social responsibility, foster trust, and ensure compliance with both Philippine environmental and social regulations and internationally recognized standards for environmental and social safeguards, including those outlined by multilateral development banks and best practice frameworks.

This mechanism is designed to provide stakeholders with accessible channels to submit grievances concerning potential or actual impacts arising from Project activities, including environmental, social, occupational, and operational aspects. The GRM emphasizes timely, transparent, and equitable resolution of grievances, ensuring that issues are not only addressed at the earliest opportunity but are also documented, monitored, and analyzed to inform adaptive management strategies and continuous improvement of Project operations.

The GRM is embedded within the Project's overarching ESMP and RP, and other Project governance instruments. By integrating grievance handling into the broader environmental and social management system, the Project ensures that stakeholder concerns are systematically considered in decision-making processes, thereby reinforcing accountability, minimizing potential conflicts, and promoting sustainable operational practices throughout the redevelopment phases.

12.1 Purpose and Objectives of the Grievance Redress Mechanism (GRM)

The GRM for the proposed redevelopment of the Bauan International Port is designed to establish a structured and transparent framework through which stakeholders – including local communities, government agencies, employees, contractors, and other interested parties – can voice concerns or complaints related to the Project. The GRM serves multiple interrelated objectives that align with both national regulations and international best practices:

12.2 Provision of a Formal, Accessible, and Transparent Channel for Stakeholder Concerns

The GRM ensures that all stakeholders have a clearly defined avenue to submit grievances regarding any aspect of the Project. This includes concerns related to environmental impacts, social disruptions, safety and operational practices, or project-related activities that may affect livelihoods or community well-being. By providing accessible submission mechanisms – such as in-person reporting, hotline services, email, or digital platforms – the Project ensures that stakeholders can raise issues without fear of discrimination, retaliation, or procedural barriers.

12.2.1 Promotion of Accountability, Trust, and Open Communication

The GRM strengthens the relationship between the Project proponent and stakeholders by fostering transparency and mutual understanding. By systematically recording, tracking, and responding to grievances, the Project demonstrates accountability for its actions, reinforcing stakeholder trust and encouraging constructive dialogue. Open communication channels also help to align expectations, clarify project objectives, and prevent misunderstandings that could lead to disputes.

12.2.2 Facilitation of Timely Identification and Resolution of Potential Issues

By capturing grievances promptly, the GRM allows for early detection of social, environmental, or operational concerns. Rapid assessment and resolution of grievances prevent the escalation of conflicts and contribute to smoother project implementation. The mechanism is designed to ensure that all complaints are acknowledged, investigated, and resolved within a defined timeline, with documented follow-up and feedback provided to

stakeholders. This proactive approach reduces risks associated with project delays, reputational impacts, and community dissatisfaction.

12.2.3 Support for Regulatory and International Compliance

The GRM reinforces compliance with Philippine laws, including the Environmental Impact Assessment (EIA) requirements under the Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB), as well as other relevant statutory and local regulations. Additionally, it aligns with international environmental and social standards, such as the AIIB ESF and IFC Performance Standards on Environmental and Social Sustainability, which emphasize stakeholder engagement, risk management, and grievance resolution as critical components of sustainable development projects. By integrating these standards, the GRM contributes to ethical, responsible, and sustainable port redevelopment practices.

12.3 Scope and Applicability of the Grievance Redress Mechanism (GRM)

12.3.1 Scope

The GRM for the Bauan International Port Redevelopment Project is designed to systematically receive, assess, and resolve complaints and concerns from stakeholders in a timely, transparent, and accountable manner. The GRM encompasses grievances arising from the project's environmental, social, health, safety, and operational dimensions, ensuring that stakeholders have a clear and accessible avenue to express concerns while protecting their rights.

Specifically, the GRM covers grievances related to:

- **Environmental Impacts** – Complaints arising from potential or actual environmental effects due to project activities, including but not limited to:
  - Noise and vibration generated by construction activities, piling, vessel movements, or port operations that may cause disturbance to nearby communities or sensitive receptors.
  - Dust emissions and air quality concerns associated with earthworks, material handling, vehicle movements, and equipment operation during construction and routine port activities.
  - Water quality impacts, including concerns related to stormwater runoff, sedimentation, wastewater discharge, and potential contamination of surface freshwater, coastal waters, or groundwater resources.
  - Terrestrial and aquatic biodiversity disturbance, including concerns related to habitat alteration, wildlife disturbance, or marine species interactions within Batangas Bay and the broader Verde Island Passage Marine Corridor (VIPMC), particularly in relation to dredging, vessel traffic, and nearshore activities.
- **Social Impacts** – Issues associated with the socio-economic implications of the project, such as:
  - Land acquisition and resettlement processes, including the adequacy and fairness of compensation or relocation support.
  - Disruption of livelihoods, particularly for local fishers, transport operators, and small-scale businesses affected by construction or operational changes.
  - Traffic and access impacts, including temporary road closures, rerouting, or congestion affecting community mobility.

- **Gender-Related Concerns (Including GBV and SEAH)** - Grievances related to gender-specific or sensitive issues, including allegations of gender-based violence (GBV) or sexual exploitation, abuse, and harassment (SEAH), arising in connection with project activities or project-associated personnel.

Such grievances may be submitted through the Grievance Redress Mechanism (GRM) and are handled with heightened confidentiality and sensitivity, consistent with international good practice. Information related to these grievances is restricted to authorized personnel to protect privacy and dignity, and access to the GRM does not preclude complainants from pursuing judicial or other formal remedies.

- **Health and Safety Concerns** – Grievances concerning the well-being of workers, contractors, and the surrounding communities, including occupational health risks, exposure to hazardous materials, safety incidents on-site, and measures implemented to mitigate accidents or injuries.

- **Project Operations** – Complaints related to the functioning and management of the port, including:
  - Delays in project implementation or service delivery.
  - Disruptions to port access, cargo handling, and logistical operations affecting stakeholders.
  - Concerns regarding adherence to operational standards, service quality, or port facility management.

- **Compliance with Commitments and Policies** – Grievances reflecting perceived or actual breaches of project commitments, including compliance with environmental, social, and labor standards, corporate policies, or contractual obligations undertaken by the project proponents.

Exclusions:

- The GRM does not address matters beyond the project's statutory scope. Specifically:
- Criminal offenses, including theft, fraud, or other unlawful activities, will be referred to law enforcement authorities.
- Labor disputes falling under formal labor legislation or collective bargaining agreements will be handled through appropriate labor authorities or unions.
- Third-party disputes or grievances unrelated to project activities will be redirected to relevant entities or agencies.

By clearly defining the scope of the GRM, the Bauan International Port Redevelopment Project ensures that stakeholders can raise concerns directly related to the project's impacts and operations while maintaining alignment with regulatory and legal frameworks. This approach facilitates accountability, strengthens community trust, and promotes proactive risk management throughout the project lifecycle.

12.3.2 Application

The GRM established for the Bauan International Port Redevelopment Project is designed to provide a structured, transparent, and accessible process for addressing concerns, complaints, or feedback from all stakeholders who may be affected by, or have an interest in, the Project. This mechanism ensures that potential social, environmental, or operational impacts are identified and addressed in a timely and systematic manner, in accordance with national regulations, international best practices, and corporate social responsibility principles.

The GRM applies to a broad range of stakeholders, including, but not limited to:

- Local Communities, Households, and Businesses
  - Residents and community members in Bauan and adjacent municipalities who may experience direct or indirect impacts from construction, operational activities, or port expansion.

  - Small and medium-sized enterprises, local suppliers, and informal businesses whose operations or livelihoods may be affected by changes in land use, traffic patterns, or port-related economic activities.
- Port Users, Shipping Operators, and Logistics Providers
  - Entities utilizing the port facilities for cargo handling, vessel docking, and freight operations.

- Logistics and transport service providers whose operational schedules, safety, or efficiency could be impacted by construction or redevelopment works.

- Employees, Contractors, and Subcontractors

  - All personnel directly engaged in the Project, including permanent staff, contract workers, and subcontracted service providers.

  - Concerns related to occupational health and safety, working conditions, and employment practices fall under the GRM to ensure compliance with labour laws and safety standards.

- Government Agencies, Non-Governmental Organizations (NGOs), and Civil Society Organizations (CSOs)

  - Regulatory authorities monitor compliance with environmental, social, and safety standards.

  - NGOs and CSOs with an interest in environmental conservation, community welfare, and sustainable port development.

To ensure inclusivity and accessibility, stakeholders are provided with multiple channels for submitting grievances (as detailed in Section 13.4.7), including in-person submissions, digital platforms, hotline services, and written correspondence. Special consideration is given to vulnerable or marginalized groups, such as low-income households, persons with disabilities, and women-headed households, to ensure that barriers to accessing the GRM are minimized.

By establishing this broad and inclusive application, the GRM ensures that all affected parties can raise concerns, receive timely responses, and contribute to the Project's sustainable and socially responsible implementation.

12.4 Definitions and Guiding Principles

The GRM operates within a structured framework of terms and principles that ensure clarity, transparency, and equitable treatment of all stakeholders. These definitions and guiding principles establish a common understanding among project personnel, affected communities, regulatory agencies, and other stakeholders regarding how grievances are identified, processed, and resolved throughout the Bauan International Port Redevelopment Project.

12.4.1 Definitions

Grievance

A grievance refers to any concern, complaint, claim, or expression of dissatisfaction raised by an individual, group, organization, or community regarding actual or perceived adverse impacts resulting from the project's activities. These impacts may be environmental (e.g., noise, dust, water quality), social (e.g., community disturbance, livelihood interference), operational (e.g., traffic congestion, port access restrictions), or related to labor, safety, or community health and security.

Gender-Related Grievance

A grievance involving gender-specific or sensitive concerns, including allegations of gender-based violence (GBV) or sexual exploitation, abuse, and harassment (SEAH), arising in connection with project activities or personnel.

Complainant

A complainant is any stakeholder – individual, household, community representative, fisherfolk association, business operator, port user, or CSO – who submits a grievance to the project. A complainant may also choose to remain anonymous. In such cases, the grievance is still processed with the same level of diligence and confidentiality.

Project-Affected Person (PAP)

A PAP is any individual, household, business, or community that may experience direct or indirect impacts (positive or negative) from project activities during pre-construction, construction, or operational phases, including environmental, economic, and social impacts.

GRM Officer

The GRM Officer is the designated focal person under BIPI's Environmental Unit responsible for receiving, recording, assessing, and managing grievances. This officer coordinates investigations, communicates with complainants, ensures proper documentation, and reports grievance-related activities to the EHS Manager and Senior Management.

Environmental, Health, and Safety (EHS) Manager

The EHS Manager provides technical oversight in addressing environmental, health, and safety-related grievances. This includes verifying compliance with the Environmental Management Plan (EMP) and Construction EMP (CEMP), supervising corrective actions, and ensuring adherence to regulatory and industry standards.

Community Relations Unit (CRU)

The CRU supports stakeholder engagement activities and acts as the bridge between the project and communities. The unit may assist in receiving grievances, validating local concerns, facilitating dialogues, and disseminating updates regarding grievance resolution.

Corrective Action

A corrective action is any remedial measure undertaken to address the root cause of a grievance. This may include operational adjustments, enhanced mitigation measures, additional monitoring, engineering interventions, or changes to project schedules or methods.

Resolution

Resolution refers to the outcome of a grievance case, including actions taken, timelines met, agreements reached, and documentation completed. A case is considered resolved when corrective actions have been implemented and the complainant (if identifiable) confirms satisfaction or when adequate technical justification is provided.

12.4.2 Guiding Principles

The design and operation of the GRM for the Bauan International Port Redevelopment Project are anchored on the following guiding principles, which reflect both international good practice and locally appropriate approaches:

Accessibility

The mechanism must be easy to access for all stakeholders, regardless of socioeconomic status, literacy level, or familiarity with formal processes. Multiple reporting channels – verbal, written, electronic, and community-based – ensure that no stakeholder is disadvantaged. Materials are disseminated in Filipino and English, and assistance in completing forms is provided when needed.

Transparency and Accountability

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Grievances are logged, tracked, and processed following clear procedures and defined timelines. Stakeholders are informed of their grievance status, investigation steps, and expected resolution periods. Regular reporting to management, communities, and regulatory agencies ensures accountability and reinforces trust.

Confidentiality and Non-Retaliation

Complainants may report anonymously. Personal information is protected and only accessible to authorized personnel. The project commits to ensuring that no complainant faces retaliation, intimidation, or adverse treatment for raising concerns – particularly crucial for workers, fisherfolk, and marginalized groups. This principle applies with heightened sensitivity to gender-related grievances, including GBV and SEAH.

Timeliness

The efficiency of the GRM hinges on prompt action. Acknowledgment of grievances is issued within defined timeframes, and investigations and resolutions follow established deadlines. Timely responses prevent escalation of issues and enhance stakeholder confidence.

Fairness and Impartiality

Grievances are reviewed objectively, without bias or preferential treatment. Decisions are based on verified information, established standards, and technical assessments. The GRM Officer, EHS Manager, and involved technical teams ensure that all complainants – regardless of social standing or influence – receive equitable consideration.

Cultural Appropriateness and Sensitivity

Community norms, cultural practices, and local dynamics within Bauan and neighboring barangays are respected in handling grievances. This includes communication approaches, meeting practices, community protocols, and engagement with fisherfolk and coastal resource users who may have traditional rights or practices linked to the Verde Island Passage.

Inclusiveness

The GRM ensures that vulnerable groups such as low-income households, women, elderly persons, informal workers, and small-scale fisherfolk have equal opportunity to access and utilize the mechanism. This includes targeted outreach and simplified explanations during consultations.

Proportionality

The level of investigation and response corresponds to the severity and potential impact of the grievance. Minor operational issues may require administrative action, whereas high-severity concerns – such as environmental contamination, health and safety risks, or alleged violations of regulations – trigger immediate and elevated responses.

Continuous Improvement

The GRM is not static. Data from grievances, trends observed, and lessons learned inform updates to project mitigation measures, construction practices, environmental safeguards, and community outreach strategies. Regular review ensures the mechanism remains effective and responsive to evolving project needs and stakeholder expectations.

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12.5 GRM Structure and Institutional Arrangements

The GRM structure described in Sections 13.4 and 13.6 reflects a coordinated institutional system in which oversight, operational grievance handling, technical support, community engagement, and contractor responsibilities are clearly delineated and mutually reinforcing. To avoid duplication, roles described in this section focus on institutional functions, while Section 13.6 elaborates on operational responsibilities and resources supporting GRM implementation.

The effectiveness of the Grievance Redress Mechanism (GRM) relies on a clear, well-defined institutional structure that outlines the roles, responsibilities, reporting lines, and coordination pathways among project implementers. For the Bauan International Port Redevelopment Project, the GRM structure is organized to ensure timely response, transparent decision-making, and efficient resolution of grievances that may arise during pre-construction, construction, and operational phases of the redevelopment works.

The institutional arrangement adopts a multi-tiered approach, ensuring that complaints are addressed at the lowest appropriate level, while allowing for escalation to higher authorities when needed.

Table 12-1 Grievance Redress Mechanism - Institutional Structure

GRM Component	Role and Function	Composition	Key Responsibilities
GRM Oversight Committee (GOC)	The GOC serves as the highest decision-making authority for grievance resolution within the project and ensures alignment with BIPI corporate policies, DENR requirements, and international good practices.	• Bauan International Port Inc. (BIPI) Senior Management Representative • Project Manager / Construction Manager • Environmental Specialist • Social and Community Relations (ComRel) Lead • Health, Safety, and Security (HSS) Officer • Legal/Compliance Officer (as needed)	• Policy direction and oversight of GRM implementation • Review of quarterly and annual GRM performance reports • Resolution of complex, sensitive, or high-risk grievances escalated to management level • Endorsement of systemic corrective actions and resource allocation
Grievance Redress Unit (GRU)	A dedicated Grievance Redress Unit operates as the primary body responsible for day-to-day implementation of the GRM. The GRU functions as the operational hub of the GRM and ensures that all grievances move through the established workflow efficiently.	• GRM/Community Relations Officer (Lead) • Environmental and Social Safeguards Assistant • Administrative Support Staff • Data Management and Documentation Assistant	• Overall coordination of grievance management • Accountability for maintaining the grievance registry • Reporting to the GOC

BIPI–Contractor Interface Team (Environmental, Social, and Engineering Support)	Since the redevelopment involves construction contractors, O&M teams, and technical consultants, inter-agency coordination is critical. This team ensures cross-functional collaboration, enabling rapid and technically sound resolution of issues.	• Contractor's Environmental, Health, and Safety (EHS) Officer • Contractor's Community Liaison Officer • BIPI Engineering & O&M Representatives • Third-Party Specialists (as needed, e.g., marine ecologists, structural engineers)	• Technical coordination for grievance verification • Oversight of corrective action implementation within contractor scope
Community Liaison Network (CLN)	To ensure that stakeholders have accessible channels, BIPI designates trained focal persons who serve as community interfaces. The CLN strengthens accessibility and inclusivity, ensuring the GRM reaches marginalized and affected groups.	• Barangay Liaison Officers • Port Security Representatives • Local Government Unit (LGU) Social Development Office Contacts • Fisherfolk Representatives or Barangay Environmental Officers (for marine-related concerns)	• Community-level access points for grievance submission • Support for vulnerable and marginalized groups
External and Regulatory Interface	Certain grievances may require coordination with regulatory bodies or third-party institutions. This ensures that the GRM remains compliant with Government of the Philippines (GOP) regulatory processes.	• DENR-EMB for environmental violations or issues involving ECC conditions. • PCG and BFAR for marine-related concerns affecting fisheries or navigation safety. • LGU Bauan for community-level disputes, land-based impacts, or traffic management concerns. • DOTr/MARINA for port operations-related regulatory matters.	• Receive escalated grievances that cannot be resolved internally. • Provide technical or legal guidance on compliance issues. • Participate in joint resolution dialogues if mandated. •

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12.5.1 Reporting and Accountability Arrangements

To maintain transparency and accountability:

The GRU submits:

- Monthly Grievance Status Report to BIPI Management
- Quarterly Consolidated GRM Performance Report to the GOC
- Compliance Reports aligned with ECC conditions and required environmental monitoring
- Annual summary reports for stakeholder disclosure

The GOC reviews:

- Trends, recurring issues, and systemic risks
- Effectiveness of mitigation measures
- Stakeholder relations performance
- Recommendations for improving environmental, social, and operational management

All records are stored in a centralized GRM Management Information System (GRM-MIS) to ensure traceability and data integrity.

12.5.2 Resource Requirements for Effective GRM Implementation

The successful operation of the Grievance Redress Mechanism (GRM) relies not only on well-defined procedures and institutional arrangements but also on the allocation of adequate human, technical, and financial resources. For the Bauan International Port Redevelopment Project, the following resources are critical to ensure the GRM functions efficiently, transparently, and inclusively throughout all phases of the project.

To ensure sustainability of the GRM throughout the project lifecycle, the following resources are allocated:

Dedicated staffing for GRU operations

A fully functional Grievance Redress Unit (GRU) requires dedicated personnel to manage all aspects of grievance handling. This includes:

- **GRM Officer (Lead):** Responsible for receiving, assessing, and coordinating grievance resolution; maintaining records; and liaising with stakeholders and management.
- **Assistant Officers / Data Clerks:** Support documentation, case tracking, and report preparation.
- **Community Liaison Support:** Ensures that vulnerable or marginalized groups have access to the GRM and assists in community consultations.

Dedicated staffing ensures continuity and accountability in grievance management. Staff must be trained in communication, conflict resolution, documentation, and technical assessment of environmental and social issues. Adequate staffing prevents backlog, reduces resolution times, and allows for proactive engagement with stakeholders.

Office/desk space for grievance handling

The GRU requires a physical workspace within the BIPI premises or nearby community-accessible office to receive in-person complaints, conduct consultations, and manage administrative tasks.

- Serves as a visible and accessible point of contact for complainants.
- Supports confidential discussions with stakeholders and documentation of sensitive cases.
- Provides a controlled environment for coordination with other project teams (EHS, engineering, community relations).

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Proper office design, including private meeting spaces and secure storage for grievance records, enhances stakeholder confidence in the integrity of the mechanism.

Hotline, SMS, email, and social media platforms

Multiple communication channels ensure accessibility and convenience for all stakeholders:

- **Telephone Hotline / SMS:** Allows real-time reporting of grievances, including urgent issues such as safety hazards or environmental incidents.
- **Email:** Provides a documented trail for more formal or complex grievances.
- **Social Media Channels:** Engages tech-savvy stakeholders, informs the public, and facilitates rapid outreach for general queries or updates.

These channels must be monitored by trained personnel during working hours, with clear procedures for acknowledgment and initial assessment. Multi-channel accessibility ensures inclusivity, allowing even geographically dispersed or vulnerable populations to submit grievances easily.

Budget for field investigations and community meetings

Effective grievance resolution often requires on-site verification and stakeholder engagement. A dedicated budget allocation is necessary for:

- Travel to project sites or affected communities
- Logistics for meetings and consultations (venue, refreshments, translation services)
- Engagement of third-party experts when technical verification is needed (e.g., marine ecologists, structural engineers)

A well-funded GRM ensures that investigations are thorough, evidence-based, and participatory. Field presence builds trust among stakeholders, demonstrates commitment to addressing grievances, and supports accurate documentation for monitoring and reporting.

Data management software and secure storage

The GRU must implement a centralized and secure grievance management system, which includes:

- Digital logging of grievances, categorization, investigation status, and resolution actions
- Secure storage of sensitive documents, including complainant information and evidence
- Access controls to maintain confidentiality and integrity of data

A robust data management system allows for systematic tracking of grievances, trend analysis, and reporting to senior management and regulatory authorities. It also supports audits, annual reviews, and continuous improvement of the GRM by providing accurate, real-time data.

Communication materials, brochures, and signage

To ensure stakeholders are aware of the GRM and its procedures, BIPI must produce and distribute information materials such as:

- Brochures and flyers explaining the GRM process and submission channels
- Posters and banners at port entrances, barangays, and public areas
- Community handouts during consultations and meetings
- Digital content for social media and the project website

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These materials increase awareness, accessibility, and transparency of the GRM. Clear, culturally appropriate, and visually understandable materials help ensure that all stakeholders – including non-literate or marginalized groups – understand their rights and the steps to submit grievances. Signage and outreach reinforce the visibility and credibility of the GRM.

Allocating these resources – staffing, office space, multi-channel communication, budget for fieldwork, secure data management, and outreach materials – is essential for establishing a responsive, inclusive, and credible GRM. Together, they enable BIPI to manage grievances effectively, ensure regulatory compliance, foster trust with communities, and enhance the environmental and social performance of the port redevelopment project.

12.6 Notification and Accessibility Measures

To ensure transparency, accessibility, and responsiveness in addressing concerns arising from the Bauan International Port Redevelopment Project, the Project proponent will actively communicate the availability and procedures of the Grievance Redress Mechanism (GRM) to all relevant stakeholders, including local communities, port users, government agencies, and other affected parties. This multi-channel notification strategy is designed to maximize reach, ensure timely dissemination of information, and facilitate easy reporting of grievances.

12.6.1 Channels for GRM Disclosure:

Information Boards at Port Facilities and Public Offices:

Clear, prominently displayed information boards will be installed at strategic locations within the port premises and in local barangay halls or municipal offices. These boards will provide concise instructions on submitting grievances, contact details of GRM personnel, and visual guides to the grievance process, ensuring accessibility for stakeholders who may have limited digital access.

12.6.2 Project Website and Social Media Channels:

The GRM will be publicly accessible through the official Bauan International Port website and designated social media platforms. This approach leverages digital tools to reach a wider audience, including port users, suppliers, and civil society organizations. The online portals will feature downloadable forms, submission guidelines, frequently asked questions, and regular updates on grievance handling status.

12.6.3 Pamphlets, Newsletters, and Community Meetings:

Printed materials, such as pamphlets and newsletters, will be distributed to local communities and stakeholders to provide straightforward guidance on the GRM process. Additionally, periodic community consultations or meetings will be conducted to present the GRM framework in person, allowing stakeholders to ask questions and clarify procedures directly with Project representatives.

12.6.4 Dedicated GRM Hotlines and Email Addresses:

To ensure direct, real-time communication, dedicated telephone hotlines and email addresses will be established. These channels will enable stakeholders to submit grievances conveniently, seek clarification, or follow up on existing concerns. Hotline staff will be trained to record and categorize grievances accurately, providing initial responses within specified timelines.

12.6.5 Contents of GRM Notifications:

All notification materials will include:

- **Contact Information for Grievance Submission:** Clear, updated phone numbers, email addresses, and physical submission points where grievances can be lodged.

- **Step-by-Step Guidance on Grievance Handling:** A transparent outline of the grievance process, including acknowledgment of receipt, investigation procedures, timelines for response, and resolution measures. This ensures stakeholders understand how their concerns will be addressed at each stage.
- **Assurances of Confidentiality, Non-Retaliation, and Fair Treatment:** Explicit statements guaranteeing that all grievances will be treated confidentially, that no retaliation will occur against individuals raising concerns, and that all submissions will be considered fairly and objectively. These fosters trust in the GRM and encourages open communication from affected parties.

The notification strategy integrates both traditional and digital communication methods to ensure inclusivity, considering the diverse demographic and literacy levels of stakeholders. By combining visual, print, and digital communication channels, the GRM becomes a proactive tool for stakeholder engagement, conflict prevention, and mitigation of social and environmental impacts during the redevelopment of the Bauan International Port.

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12.7 Roles, Responsibilities, and Resources

The roles, responsibilities, and resource requirements for the Grievance Redress Mechanism (GRM) are established under the institutional arrangements described in Section 12.5. This section provides a consolidated summary of responsibilities across key entities involved in GRM implementation, without duplicating the detailed institutional descriptions and resource allocations already presented.

Overall accountability for GRM performance rests with Bauan International Port, Inc. (BIPI), supported by a dedicated GRM Team, technical Environmental and Social Safeguards personnel, Community Liaison Officers, and Contractors. These entities work in a coordinated manner to ensure grievances are received, investigated, resolved, documented, and reported in a timely and transparent manner throughout the project lifecycle.

Table 12-2 summarizes the key roles, responsibilities, and resources supporting GRM implementation, consistent with the institutional framework described in Section 12.5

Table 12-2 Summary of Role, Responsibilities, and Resources

Role	Responsibilities	Resources
Project Proponent (BIP Management)	Overall responsibility for GRM implementation, allocation of budget and human resources, approval of resolution measures.	Dedicated GRM team, budget allocation for grievance resolution.
GRM Officer / Team	Receive, log, and track grievances; conduct initial assessment; coordinate investigation and response; maintain records.	GRM management software/logbook, reporting templates.
Environmental & Social Safeguards Team	Provide technical support in investigating environmental or social issues raised; propose mitigation actions.	Technical expertise, field monitoring equipment, legal guidance.
Community Liaison / Stakeholder Engagement Officer	Communicate with stakeholders; facilitate meetings; ensure grievance submission is accessible and culturally appropriate.	Community meeting venues, communication materials, local interpreters if needed.
Contractors / Subcontractors	Implement mitigation measures; report grievances linked to their operations.	On-site monitoring staff, internal reporting mechanisms.

12.8 Grievance Process

The grievance process for the Bauan International Port Redevelopment Project is designed as a structured, transparent, and rights-based mechanism that allows individuals, groups, and institutions to raise concerns regarding actual or potential environmental, social, safety, and operational impacts arising from project activities. The process supports early issue resolution, fosters constructive dialogue with affected communities, and ensures that concerns are addressed in accordance with Philippine regulatory frameworks, international environmental and social safeguards, and industry best practices for port redevelopment and maritime infrastructure projects.

The mechanism is intended to operate continuously throughout the pre-construction, construction, and operational phases, recognizing that port redevelopment activities often generate dynamic impacts related to construction noise, marine traffic, dredging, worker influx, traffic management, and livelihood interactions – especially for fisherfolk, shoreline users, adjacent industries, and transport operators.

Step 1: Submission of Grievance

Stakeholders may file grievances through a variety of accessible, culturally appropriate, and community-friendly channels. These mechanisms ensure that persons with limited literacy, limited internet access, or mobility challenges can still communicate their concerns effectively.

Available reporting channels include:

- Written submissions through formal letters, printed grievance forms, or electronic mail sent to the GRM Secretariat or designated project address.
- Walk-in submissions, where individuals may lodge concerns directly with the GRM Officer, Community Liaison Officer, or barangay focal persons who have been oriented on the GRM protocol.
- Dedicated hotline, SMS number, or social media platforms managed by the project, enabling real-time reporting of urgent or location-specific concerns such as traffic congestion, safety hazards, or accidental releases.
- Anonymous submissions via secure drop boxes located in barangays near the port or through digital forms where identity disclosure is optional. The project safeguards anonymity and will not attempt to identify anonymous complainants.

  Information typically requested includes:

- Complainant's name, contact number, organizational affiliation (optional for anonymous reports).
- A precise description of the concern, indicating:
  - Date and time of incident or observation
  - Location (e.g., port gate, shoreline, barangay roads)
  - Nature of concern (environmental, social, livelihood, safety, nuisance, marine disturbance)
- Any supporting evidence, such as photographs, videos, medical reports, or witness statements.
- Expected or preferred resolution where applicable (e.g., restoration, compensation, clarification, removal of hazard).

This step ensures full documentation and proper routing of concerns to appropriate technical teams (environmental, construction management, engineering, community relations, and safety personnel).

Step 2: Acknowledgment

Within five (5) working days, the GRM Secretariat formally acknowledges receipt of the grievance. The acknowledgment includes:

- The reference or tracking number, allowing the complainant to follow up and track progress.
- A summary of the reported concern as understood by the team.
- Expected processing timelines, depending on complexity and type of grievance.
- Contact details of the assigned GRM Officer or case handler.
- This step establishes trust, demonstrates transparency, and ensures the complainant feels heard early in the process.

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Step 3: Assessment and Categorization

To ensure systematic management and prioritization of complaints, all grievances received under the GRM are categorized into four levels based on their severity, scope, impact, and urgency. This categorization guides the investigation approach, resolution timeline, and escalation procedures.

Level 1 – Low / Minor Grievances

Definition: Grievances that are minor in scale, affect a limited number of stakeholders, and have low or negligible environmental, social, or operational impacts. Typically, these are localized complaints that can be resolved at the GRM Officer or Community Liaison level without extensive investigation.

Examples:

- Minor noise or dust complaints from nearby residents during construction.
- Temporary inconvenience due to a single-day road closure within port premises.
- Small delays in administrative processes or document requests.

Resolution Approach:

- Addressed by the GRM Officer within 5–10 working days.
- Simple corrective actions applied (e.g., dust suppression, signage, or minor schedule adjustments).
- Documented in GRM log; monitored for recurrence.

Level 2 – Moderate Grievances

Definition: Grievances with moderate impact, affecting multiple stakeholders or requiring intervention from project technical teams. These grievances may involve operational, environmental, or social issues that require verification, technical assessment, or corrective measures but are not immediately critical or legally sensitive.

Examples:

- Recurring noise or vibration affecting multiple neighboring households.
- Minor traffic congestion affecting port access routes.
- Complaints from port workers regarding non-compliance with safety PPE requirements.

Resolution Approach:

- Investigated jointly by GRM Officers and relevant technical units (EHS, Engineering, or Contractors).
- Corrective measures implemented within 10–20 working days.
- Escalation to EHS Manager if unresolved or if recurring patterns are identified.

Level 3 – Significant / High Impact Grievances

Definition: Grievances that have significant environmental, social, or operational consequences, affect larger stakeholder groups, or pose substantial risk to health, safety, or project compliance. These require formal investigation, involvement of senior management, and potential engagement with local authorities.

Examples:

- Pollution of port waters or nearby coastal areas affecting multiple fisherfolk.
- Unsafe construction practices causing injury or risk to workers or visitors.
- Major disruption to barangay traffic, trade, or community services.
- Allegations of labor rights violations (e.g., unsafe working hours, lack of safety measures).

Resolution Approach:

- Investigated by GRM Officer with EHS Manager and Contractor teams.
- Resolution implemented within 15–30 working days depending on complexity.
- Escalation to Senior Management and, where necessary, LGU or DENR-EMB.
- Continuous communication with affected stakeholders to monitor resolution effectiveness.

Level 4 – Critical / Severe Grievances

Definition: Grievances with critical or potentially irreversible impacts, involve legal or regulatory violations, or pose serious threats to human health, safety, or the environment. Level 4 grievances are immediately escalated to senior management and, if required, regulatory authorities.

Examples:

- Breach of Philippine environmental laws or ECC conditions (e.g., unauthorized land reclamation or discharge into marine waters).
- Accidents causing serious injury or death of workers, port users, or community members.
- Significant destruction or degradation of sensitive habitats, such as coral reefs in the Verde Island Passage.
- Violations of international maritime safety, labor, or human rights standards.

Resolution Approach:

- Immediate notification to Senior Management and relevant regulatory bodies (DENR-EMB, MARINA, LGU, or third-party oversight).
- Formation of an investigation team, including technical specialists, to verify facts and recommend corrective measures.
- Rapid implementation of mitigation measures, emergency response, or suspension of activities if necessary.
- Full documentation and reporting in quarterly and annual GRM reports.
- Engagement with affected parties throughout the process to ensure transparency and trust.

Isolated / One-Off Grievances

A one-off grievance is defined as a complaint arising from a specific incident, typically affecting a single complainant or a very small group, and is localized in nature. Examples include minor inconvenience during a single day of construction or an isolated operational issue affecting one port user.

Note: Even one-off grievances may be escalated to Level 4 if they involve serious legal, environmental, or safety violations, such as breaches of ECC conditions, national environmental laws, or incidents causing potential harm to human life or biodiversity.

Resolution Approach:

- Documented, assessed, and addressed following the same GRM workflow.
- Escalated to Senior Management and/or regulatory authorities if Level 4 criteria are met.

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Table 12-3 Summary Table - Grievance Level

Level	Severity / Impact	Scope	Examples	Response Time	Escalation
1	Low / Minor	Single stakeholder	Minor noise, temporary inconvenience	5–10 days	GRM Officer
2	Moderate	Multiple stakeholders	Recurring noise, minor traffic issues, worker complaints	10–20 days	EHS Manager if unresolved
3	Significant	Larger groups / project-wide	Water pollution, unsafe construction, labor rights concerns	15–30 days	Senior Management / LGU / DENR
4	Critical / Severe	Project-wide / regulatory	ECC violations, accidents, serious environmental damage	Immediate	Senior Management + Regulators

This categorization ensures that all grievances – whether minor, recurring, or critical – are appropriately assessed, documented, and addressed, and that high-risk issues are escalated without delay, maintaining compliance with regulations and safeguarding stakeholder trust

Type of Grievance:

- Environmental: Water quality concerns, dredging impacts, sedimentation, marine ecology disturbance, waste disposal.
- Social: Livelihood disruptions, fisherfolk navigation interference, land access, community safety, employment practices.
- Construction/Operational: Heavy vehicle movements, temporary road closures, noise/vibration, lighting, worker conduct.
- Health and Safety: Accidents, unsafe work practices, public safety risks.

Urgency

Issues affecting health, safety, or environmental integrity are prioritized for immediate investigation.

The assessment phase includes:

- Review of supporting documents and prior complaints.
- Site inspection and direct observation.
- Consultation with technical specialists (EHS, engineering, biodiversity experts, etc.).
- Verification against monitoring records (e.g., turbidity readings, noise monitoring logs).
- Coordination with barangay officials or community representatives when needed.

- This step ensures objectivity in evaluating concerns and determining accountability.

Step 4: Resolution and Response

After assessment, the GRM Officer convenes the necessary technical teams to identify feasible, context-appropriate corrective actions. The resolution process must align with the Environmental Management Plan (EMP), Construction Environmental Management Plan (CEMP), and commitments under the project's ESIA.

Examples of possible corrective measures:

- Adjusting construction schedules to avoid nighttime noise.
- Deploying silt curtains or increasing turbidity monitoring during dredging.
- Improving traffic management plans to better control heavy equipment movement.
- Conducting community consultations to clarify project boundaries or timelines.
- Implementing additional safety barriers or signage near public access areas.
- Providing livelihood support or transitional assistance for affected fisherfolk if impacts are validated.

Timelines:

- Standard grievances: 15–30 working days to resolution.
- Complex grievances requiring third-party validation or regulatory coordination may exceed this timeframe, but the complainant is regularly updated.

A written response is issued to the complainant, outlining:

- Investigation findings
- Actions taken or planned
- Expected timelines for full resolution
- Contact person for follow-up inquiries

This step ensures transparency and demonstrates the project's commitment to responsible and ethical operations.

Step 5: Escalation

If the complainant is not satisfied with the initial resolution or if a grievance involves high-stake issues, it may be escalated.

Escalation pathways include:

- Project Management Team (PMT) for more complex technical or managerial decisions.
- Independent Review Panel, if impartiality is needed or requested by the complainant.
- Regulatory agencies such as DENR-EMB, MARINA, LGU Bauan, or the Philippine Ports Authority for grievances involving potential legal violations, environmental threats, or port safety risks.
- Judicial/administrative remedies, should stakeholders wish to pursue formal legal channels (which the project respects and does not impede).

Immediate escalation applies in cases involving:

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- Community safety risks
- Environmental hazards near the Verde Island Passage
- Pollution incidents with potential off-site impacts
- Accidents or fatalities
- Alleged misconduct by project personnel

Step 6: Closure

The grievance is closed once:

- Corrective actions have been implemented and verified.
- The complainant confirms that the resolution is satisfactory.
- For anonymous complaints, closure is based on the completion of corrective measures.

A closure report is prepared documenting:

- The resolution process
- Technical inputs and assessments
- Verification activities
- Preventive measures to avoid recurrence

Closure records contribute to continuous improvement of project practices and compliance reporting.

Step 7: Monitoring and Reporting

All grievances are recorded in a centralized GRM Database that tracks the life cycle of each case – from submission to final closure.

Routine reporting includes:

- Monthly internal updates to the Project Management Team
- Quarterly summaries shared with key stakeholders, regulatory agencies, or during multi-stakeholder meetings
- Annual consolidated reporting as part of the Environmental Monitoring and Compliance Report

Reports are analyzed using:

- Type of grievance
- Affected sectors/groups (e.g., fisherfolk, residents, transport operators)
- Geographic area
- Recurrence or frequency

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- Resolution timelines

These analyses support:

- Adaptation of mitigation measures in the EMP
- Adjustment of construction or operational plans
- Enhanced stakeholder engagement strategies
- Identification of systemic issues requiring long-term corrective action

Ultimately, the monitoring and reporting process reinforces accountability and ensures that grievance trends inform ongoing environmental and social risk management throughout the lifecycle of the Bauan International Port Redevelopment Project.

12.9 Monitoring, Reporting, and Continuous Improvement

The Grievance Redress Mechanism (GRM) for the Bauan International Port Redevelopment Project is designed not only as a reactive tool for addressing complaints but also as a proactive instrument for continuous learning and adaptive management. To ensure its long-term effectiveness and relevance, the GRM will be subject to periodic review and evaluation throughout the project lifecycle.

12.9.1 Objectives of Periodic GRM Review

- **Improve Responsiveness**
  - Review timelines for acknowledgment, investigation, and resolution of grievances to ensure that stakeholders receive timely feedback.
  - Identify bottlenecks in the grievance process and implement procedural or technological enhancements (e.g., faster data entry, digital tracking, hotline efficiency).
  - Assess staff capacity and training needs to ensure that GRM officers and community liaison personnel can manage grievances promptly and professionally.
- **Integrate Lessons Learned**
  - Analyze trends from grievance data, including the type, frequency, severity, and geographic distribution of complaints.
  - Identify recurring issues that indicate gaps in project planning, construction methodology, operational practices, or stakeholder communication.
  - Use insights to update mitigation measures in the Environmental and Social Management Plan (ESMP) and Construction Environmental Management Plan (CEMP).
  - Ensure that knowledge gained from previous grievances informs preventive measures to reduce future complaints.
- **Enhance Communication Pathways**
  - Evaluate the effectiveness and accessibility of all grievance submission channels (hotline, email, in-person, social media, anonymous submissions).
  - Ensure that vulnerable and marginalized groups – including fisherfolk, informal workers, elderly residents, and women – can access the GRM without barriers.

- Update outreach and awareness campaigns to improve stakeholder understanding of GRM procedures, rights, and reporting options.

- **Strengthen Environmental and Social Safeguards**
  - Verify that grievance handling is aligned with national regulations (DENR-EMB, PPA, MARINA), international good practice, and ESIA commitments.
  - Assess whether grievances reveal gaps in safeguards such as erosion control, marine biodiversity protection, traffic management, dust suppression, or community safety measures.
  - Introduce corrective actions or additional mitigation measures where patterns of grievances indicate environmental or social risks are not fully controlled.

- **Address Emerging Risks Associated with Evolving Port Operations**
  - Adapt the GRM to account for new operational or technological changes, such as increased container throughput, changes in vessel schedules, automation of cargo-handling equipment, or modifications to access routes.
  - Anticipate and respond to potential environmental and social risks arising from these operational changes, ensuring the GRM remains relevant and capable of addressing new types of complaints.

12.9.2 Annual Stakeholder Review Meetings

At least once per year, the GRM will be evaluated in consultation with key stakeholders, including representatives from affected communities, barangay officials, fisherfolk associations, port users, and contractor representatives.

- The review meetings will:
  - Present consolidated grievance data, trends, and resolution outcomes.
  - Gather feedback on the effectiveness of grievance handling and stakeholder satisfaction.
  - Identify areas for procedural improvements, resource allocation, and training needs.
  - Facilitate adaptive management, ensuring the GRM evolves in line with stakeholder expectations, regulatory requirements, and project operational realities.

12.9.4 Expected Outcomes of Periodic Review

- **Enhanced transparency, trust, and confidence among stakeholders**

A well-structured GRM promotes open, accessible, and responsive grievance handling, ensuring stakeholders see that their concerns are heard and addressed objectively. Clear procedures, timely communication, and proper documentation build stakeholder confidence in BIPI's commitment to responsible port redevelopment and foster constructive relationships with communities, workers, and port users.

- **Reduction in recurring complaints through targeted preventive measures**

By systematically analysing grievance trends and root causes, the GRM enables proactive mitigation of recurring issues. For example, repeated complaints about dust or noise can be addressed through engineering controls, scheduling adjustments, or operational improvements. This prevents repeat grievances, improves project efficiency, and reduces potential community tensions.

- **Improved alignment between grievance management and environmental/social safeguards**

The GRM functions as a feedback loop to verify the effectiveness of mitigation measures in the ESMP and CEMP. Grievances provide real-time insight into environmental and social performance, allowing BIPI to adjust safeguards, optimize monitoring, and ensure impacts on marine ecosystems, local communities, and port operations are minimized.

- **Strengthened institutional capacity for adaptive management of project impacts**

Regular GRM reviews, trend analyses, and lessons learned contribute to adaptive management, enabling BIPI to respond dynamically to emerging risks. This strengthens institutional capacity, supports decision-making, and ensures that project teams are prepared to address unexpected environmental or social challenges efficiently and effectively.

- **Demonstrated compliance with national regulations, ECC conditions, and international best practice**

A robust GRM provides documented evidence that grievances are systematically tracked, investigated, and resolved in line with national laws, ECC requirements, and internationally recognized standards. This demonstrates regulatory compliance, corporate responsibility, and adherence to best practice, reducing legal risk and reinforcing the project's credibility with stakeholders and regulators.

Note: Detailed GRM operational tools and templates are included in the Appendices as implementation-ready forms to be used by the GRM team, contractors, and community liaison personnel.

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13 Gender Analysis

The Bauan International Port, situated in the Municipality of Bauan, Batangas, is a key maritime facility that plays a crucial role in the region's economic and trade activities. The port, which is already operational, is now slated for significant redevelopment aimed at expanding its capacity, improving the efficiency of logistics and cargo handling, and modernizing operational systems to meet growing demand.

With the scale of this redevelopment comes a considerable increase in workforce requirements. During the construction phase, approximately 2,035 workers are expected to be engaged, while the operational phase will require around 471 employees to manage daily port activities, including cargo handling, logistics, and maintenance. This expansion will have direct and indirect effect on the surrounding communities, influencing the lives of men and women, youth, the elderly, and other vulnerable groups in multiple ways. For instance, the influx of workers may change local dynamics, including housing, mobility, access to public services, and opportunities for livelihood. Similarly, the project could affect women differently from men due to pre-existing socio-cultural roles, caregiving responsibilities, and economic participation patterns.

In recognition of these potential impacts, this Gender Analysis Report provides a comprehensive understanding of the local socio-economic and demographic context through gender-differentiated baseline data. It examines the specific risks and vulnerabilities faced by different groups, identifies opportunities to promote gender equity and responsiveness, and proposes mitigation measures to minimize adverse effects. Furthermore, the report outlines monitoring strategies to ensure accountability and continuous improvement.

This approach is firmly grounded in Philippine laws, particularly the Magna Carta of Women, as well as the DENR Administrative Order on Gender Mainstreaming. It also draws on internationally recognized frameworks for integrating gender considerations into infrastructure development, ensuring that the port's redevelopment benefits are equitable and inclusive. By systematically addressing the unique needs and capabilities of women, men, and vulnerable groups, the project aims not only to modernize port operations but also to support sustainable and inclusive community development.

13.1 Objectives of the Gender Analysis

Identify Gender-Differentiated Impacts

The Gender Analysis aims to systematically examine how the proposed redevelopment of Bauan International Port may affect women, men, and vulnerable groups differently. This includes assessing potential disparities in access to employment, income, mobility, safety, social services, and participation in decision-making processes. By recognizing these differences, the project can anticipate challenges that may disproportionately affect certain groups and ensure that interventions are tailored to address these specific needs.

Prevent and Mitigate Adverse Impacts

One of the core objectives is to ensure that potential negative consequences of the project are proactively managed. For example, women or vulnerable groups may face greater exposure to occupational hazards, disruption of livelihoods, or limited access to infrastructure and resources. The analysis identifies such risks and recommends mitigation strategies, ensuring that no group bears an undue burden as a result of the redevelopment.

Promote Gender-Equitable Opportunities

Beyond minimizing negative impacts, the analysis seeks to uncover ways the project can actively promote fairness and inclusivity. This includes creating equitable access to jobs, skill development programs, leadership roles, and project benefits. For instance, targeted training for women in port operations or logistics can help close gaps in participation and provide meaningful opportunities for economic empowerment.

Support Evidence-Based Decision-Making

Gender Analysis provides a foundation of data and insights that inform project planning, design, and implementation. By integrating gender considerations into decision-making, the project ensures that all strategies are guided by evidence rather than assumptions. This approach strengthens transparency, accountability, and the social sustainability of the port redevelopment

Enhance Social Inclusion and Empowerment
The analysis seeks to strengthen the active participation of women and vulnerable groups in project-related processes, from consultations to community engagement and benefit-sharing mechanisms. By empowering these groups to voice their concerns and contribute to decisions, the project fosters a more inclusive and representative approach that enhances social cohesion and community ownership.

Monitoring and Evaluation Mechanisms
A key objective is to develop practical tools, indicators, and procedures to track gender outcomes throughout the project lifecycle. This ensures that gender-inclusive initiatives and mitigation measures are effectively implemented, and that adjustments can be made based on monitoring results. The goal is to maintain accountability and continuously improve the project's social performance.

Strengthens Community Resilience and Well-Being
Ultimately, the Gender Analysis seeks to ensure that the port redevelopment contributes to sustainable and inclusive development. By integrating gender-responsive planning and interventions, the project supports equitable social and economic outcomes, helping communities – including women and vulnerable groups – become more resilient, empowered, and capable of benefiting from the port's operations.

13.2 Purpose of the Gender Analysis

The primary purpose of conducting this Gender Analysis is to ensure that the Bauan International Port Redevelopment Project is not only sensitive to the needs of different groups in the community but also actively promotes gender equality throughout its lifecycle. This means taking deliberate steps to identify and address how the project may differently affect women, men, and other vulnerable populations, including the elderly, persons with disabilities, and marginalized groups. By understanding these differences, the project can prevent or minimize any negative impacts that may arise, ensuring that no one is disproportionately burdened or left behind as the port is redeveloped.

At the same time, the analysis seeks to highlight opportunities where the project can actively promote fairness and inclusivity. This includes creating pathways for equitable employment, ensuring women and men have equal opportunities to participate in decision-making, and supporting access to skills development and other project benefits. For example, women may be underrepresented in construction or port management roles, so targeted interventions such as training programs or local hiring policies can help balance participation. Similarly, providing platforms for women and vulnerable groups to contribute to planning and community consultations ensures that their voices are heard and considered in project decisions.

Finally, this Gender Analysis serves as a foundation for evidence-based recommendations that integrate Gender and Development (GAD) considerations into every stage of the project – from initial planning and design to implementation and monitoring. By doing so, the project aligns with best practices for social responsibility and sustainable development, ensuring that it benefits the entire community, promotes equality, and fosters an inclusive environment where all stakeholders, regardless of gender or social status, can thrive.

13.3 Methodology

The Gender Analysis (GA) for the Redevelopment of the Bauan International Port applies a structured, multi-source analytical approach consistent with Philippine environmental regulations, PSA standards, and international gender mainstreaming frameworks (UN Women, ADB, IFC Performance Standards). The methodology integrates secondary quantitative data, spatial planning information, environmental assessment documents, and qualitative inference to identify gender-differentiated impacts, risks, and opportunities associated with port redevelopment.

13.3.1 Secondary Data Review

2021-2030 Comprehensive Land Use Plan (CLUP), Municipality of Bauan

The Comprehensive Land Use Plan (CLUP) functions as the foundational demographic and socio-economic reference for this Gender Analysis, with the People Chapter providing critical sex-disaggregated baseline indicators

necessary for understanding differentiated conditions, roles, and vulnerabilities within the study area. The assessment utilizes several key datasets, including:

- **Total Population and Household Distribution**

  Barangay-level demographic figures – specifically the 606 individuals across 113 households in Barangay San Andres Uno and the 6,365 individuals across 1,481 households in Barangay San Roque – offer an initial quantitative portrait of community size, density, and household composition. These parameters are essential for estimating gender-differentiated service needs, resource access, and social support dynamics at the micro-spatial scale.

- **Age–Sex Population Structure and Dependency Ratios**

  Disaggregated age cohorts by sex enable the characterization of population balance, reproductive-age distribution, labour force participation potential, and care burdens. Dependency ratios further highlight the proportional weight placed on economically active men and women, influencing time allocation, household responsibilities, and participation in livelihood or community decision-making spaces.

- **Sectoral Information on Employment, Education, Household Composition, Land Use, and Settlement Patterns**

  These datasets provide insights into how gender roles and opportunities are shaped by broader socio-economic structures. Employment and education indicators help identify gender gaps in skills, labour force integration, and income sources. Meanwhile, household typologies, urban land use zones, and settlement configurations indicate how men and women differentially experience mobility, safety, exposure to environmental stressors, and access to basic services and public spaces – particularly in rapidly evolving coastal and port-adjacent environments.

- **Identification of Vulnerable Population Clusters**

  Although not always explicitly labelled, demographic patterns help infer the presence of vulnerable groups such as children, senior citizens, solo female-headed households, and persons with disabilities (PWDs). Recognizing these clusters is vital for gender-responsive planning, as these groups face heightened risks related to poverty, displacement, climate-induced hazards, and limited access to social protection mechanisms.

  Altogether, the CLUP-derived information grounds the Gender Analysis within the municipality's development priorities and spatial planning context. By situating gender dynamics within existing and planned land uses, urban expansion trajectories, and socio-economic conditions, the analysis becomes responsive not only to current realities but also to future pressures on port-linked coastal communities. This ensures that gender considerations are integrated into local development pathways, risk management strategies, and policy interventions in a manner that is evidence-based and contextually aligned.

13.3.2 Review of the People Module in the Environmental Performance Report and Management Plan (EPRMP)

To ensure strong methodological alignment with the ongoing environmental and socio-economic assessment, the Gender Analysis (GA) integrates key information from the Socio-Economic and Cultural Environment Section of ESIA. This approach situates gender considerations within the broader operational realities of port redevelopment and helps contextualize how social dynamics and port functions interact at the community level. The ESIA provides foundational socio-economic and operational data, which – although not gender-specific – offer critical entry points for gender-responsive interpretation.

Specifically, the GA references the following dimensions documented in the baseline section:

- Existing workforce composition within the current port operations, including the distribution of permanent, contractual, and outsourced personnel. This data allows a preliminary understanding of gender patterns in employment and potential disparities in job roles, job security, and exposure to occupational risks.

- Occupational categories and sex-differentiated labor participation, noting the type of work commonly undertaken by men and women in port settings – such as cargo handling, security, clerical work, and cleaning services. These patterns serve as indicators of gender norms influencing labor segmentation.

- Livelihood systems linked to port activities, covering ancillary and informal sectors such as small-scale suppliers, transport workers (e.g., tricycle and jeepney operators), and microenterprises providing food, retail, and manual services. Understanding these interactions helps identify gendered livelihood dependencies and opportunities for inclusive value chain engagement.

- Community health, safety, and security conditions associated with port operations, including reported concerns on traffic hazards, noise exposure, waste management, access control, and proximity to industrial facilities. These variables influence women's and men's daily mobility, caregiving responsibilities, and exposure to risks.

- Impact pathways identified in the ESIA that bear gender relevance, such as potential worker influx during construction, congestion and accident risks along access roads, increased noise and dust, and shifts in coastal resource use. These pathways allow assessment of how redevelopment may differentially affect various population groups.

While the EPRMP does not provide explicit gender-disaggregated metrics, it offers essential operational and socio-spatial context. This enables a gender-sensitive interpretation of potential impacts and informs the formulation of mitigation and enhancement measures tailored to the unique conditions of port redevelopment.

13.3.3 Sectoral Standards and International Framework Review

To ensure analytical rigor and alignment with global good practice, the GA incorporates established gender mainstreaming and safeguard standards. These frameworks help categorize risks, identify entry points for inclusive benefits, and shape the Gender-Responsive Mitigation Measures.

Key reference frameworks include:

- IFC Performance Standards, especially PS1 (risk management), PS2 (labor and working conditions), PS4 (community health and safety), and PS5 (land acquisition), which collectively guide gender-sensitive assessment of labor systems, community interactions, and vulnerability to displacement or livelihood disruption.

- Asian Development Bank (ADB) Gender Mainstreaming Guidelines, which provide tools for gender categorization, risk screening, and infrastructure-inclusion strategies.

- UN Women Gender Analysis Framework, offering conceptual structure for examining gender roles, access to and control over resources, participation, and decision-making.

- ILO standards on equal employment opportunity and non-discrimination, which shape the analysis of workplace dynamics, recruitment practices, and occupational safety.

- EU Gender Action Plans, which emphasize gender-inclusive strategies in infrastructure, transport, and logistics sectors.

These frameworks collectively establish the conceptual basis for determining gender-responsive measures appropriate for a port redevelopment context.

13.3.4 Gendered Impact Pathway Analysis

Using municipal socio-economic data, CLUP information, and project operational insights, the GA reconstructs gendered impact pathways across the project life cycle. This enables understanding of how redevelopment may uniquely shape the experiences of women, men, youth, and other population segments even without barangay-specific datasets.

Key pathway themes include:

- Shifts in land and resource access, particularly where redevelopment activities modify coastal use patterns, informal vending areas, or community-port interactions.
- Employment opportunities and labor participation barriers, such as potentially unequal access to construction employment, technical roles, or supplier engagement for women and marginalized groups.
- Safety, mobility, and security risks, encompassing increased heavy vehicle activity, altered commuting patterns, possible interactions with external workers, and increased reliance on safe public or private transport options.
- Access to information, participation, and decision-making, noting that differences in time availability, digital access, and social expectations may influence who participates in consultations or receives project information.
- Health outcomes, covering both occupational exposure (e.g., noise, ergonomic strain, chemical hazards) and community exposure (air quality, stress, traffic hazards).
- Distribution of economic benefits, identifying who gains access to jobs, training, supply chain opportunities, and livelihood enhancement programs.

This impact pathway assessment highlights points of differential vulnerability and opportunity across gender and social groups.

13.3.5 Development of Gender Indicators and Matrices

Drawing from demographic trends, operational data, and project impact pathways, the GA develops a set of gender-responsive tools and indicators designed to guide environmental planning and operational management:

- Gender-differentiated baseline, focusing on available municipal-level socio-economic indicators and workforce patterns.
- Gender Risk Matrix, identifying potential inequalities, safety risks, labor-related concerns, and barriers to participation.
- Gender Opportunities Matrix, outlining inclusive entry points for employment, skills development, supplier participation, community programs, and grievance management.
- Mitigation Measures and Monitoring Plan, providing structured actions for managing gender risks and enhancing positive outcomes throughout construction and operation.
- Templates for data collection and GAP monitoring, facilitating systematic tracking of outcomes to ensure sustained gender responsiveness in project implementation.

These tools serve as core instruments for integrating gender considerations into the EIS and operational planning for the port redevelopment.

13.4 Limitations of the Study

The Gender Analysis adopts a methodical and evidence-informed approach, drawing from multiple data sources to construct a baseline understanding of gender dynamics within the project's area of influence. Nonetheless, several data constraints shape the depth, granularity, and interpretive precision of the assessment:

- **Absence of Barangay-Level Gender-Disaggregated Data**

  Although barangay-level records were reviewed, they did not contain sufficiently detailed sex-disaggregated demographic, socio-economic, or sectoral datasets. This gap limits the ability to perform micro-scale analysis that is critical for understanding gendered vulnerabilities in daily mobility, household labor burden, livelihood strategies, and differential exposure to port-related environmental or socio-economic pressures. Micro-level data would have allowed more accurate mapping of gender-specific roles, access to resources, and adaptation capacities among women, men, and gender-diverse individuals in each barangay.

- **No Primary Data Collection (Surveys, KIIs, or FGDs)**

  The analysis depends entirely on secondary sources because no field-based data collection activities – such as household surveys, key informant interviews, or focus group discussions – were undertaken. This absence of primary data restricts the capacity to capture the lived experiences and tacit knowledge of community members. Qualitative insights are particularly important for understanding intra-household decision-making,

power relations, informal labor participation, unpaid care work, safety and mobility concerns, and the differentiated perceptions of port operations or redevelopment activities. Without such data, the analysis cannot fully account for subtle but significant gender norms and intersectional inequalities that shape everyday realities.

- **Lack of Updated Population Data**

  The demographic information available for analysis is limited to the Philippine Statistics Authority (PSA) census years 2015 and 2020. No more recent or interim demographic updates were accessible. This poses challenges in modeling current population characteristics, especially considering the dynamic changes that coastal and port-adjacent communities may experience – such as migration driven by employment opportunities, shifts in labor force participation, or evolving age and dependency structures. Outdated population data can obscure emerging gendered trends relevant to health, livelihoods, and access to social services.

- **Dependence on Municipal-Level CLUP and Secondary Data**

  Municipal-level data from the Comprehensive Land Use Plan (CLUP) and other secondary documents provide a valuable overview but may mask the intra-municipal differences that shape gender-differentiated experiences within barangays directly influenced by port operations. Municipal averages often smooth out local disparities in poverty incidence, livelihood diversity, exposure to environmental risks, or access to basic services. This can limit the precision of gender analysis for communities where the effects of port activities are more pronounced and spatially uneven.

- **Limited Sex-Disaggregated Operational Data for the Existing Port Workforce and Supply Chain**

  Operational records for the existing port facility lack comprehensive sex-disaggregated information across employment categories, contractual arrangements, supplier networks, and logistics chains. Without detailed workforce data, it becomes difficult to examine gender gaps in recruitment, occupational segregation, wage disparities, training access, career progression, or occupational health and safety risks. This limitation constrains the assessment of how the port's redevelopment may reinforce or mitigate gender inequalities within its labor ecosystem.

Overall Reliability of the Analysis

Despite these limitations, the study employs systematic triangulation among multiple credible datasets – including the EPRMP, available demographic and socio-economic indicators, and operational information provided by the project proponent. This integrative approach ensures that the Gender Analysis remains analytically robust, contextually grounded, and aligned with the requirements of environmental impact assessment processes. The resulting assessment is therefore considered sufficient and fit-for-purpose to support the environmental impact evaluation for an ECC Amendment related to the non-ECP port redevelopment project.

13.5 Legal and Policy Framework

The implementation of the project is guided by a comprehensive set of national laws, local policies, and international standards that ensure compliance with environmental, social, and gender-related requirements. The legal and policy framework serves as a foundation for promoting sustainable development, social inclusion, and protection of vulnerable groups, including women, children, and persons with disabilities.

13.5.1 National Law

RA 9710 – Magna Carta of Women

The Magna Carta of Women guarantees women's rights in the workplace and society, promoting equality, protection from discrimination, and access to opportunities. Under the Department of Labor and Employment (DOLE) implementation, this law requires workplaces to ensure equal pay, maternity benefits, protection against harassment, and safe working conditions. For the project, RA 9710 is applicable to labour assessments, human resource policies, workplace safety programs, and employment planning, ensuring that women employees can participate equitably in project activities. Gender analysis under this law helps identify gender gaps in decision-making, access to resources, participation in employment, and benefits, guiding strategies to promote inclusion and equity throughout the project.

Labor Code of the Philippines (PD 442)

The Labor Code prohibits gender-based discrimination in employment, promotions, and training opportunities, ensuring fair treatment of all workers. It is directly relevant to the project for staffing, workforce development, and human resource planning, providing a framework for equitable labor practices. Requirements include non-discriminatory recruitment, promotions, training, and compensation. Project considerations involve conducting gender-disaggregated workforce analysis, ensuring fair access to employment and development opportunities for women, men, and vulnerable groups. Gender analysis under the Labor Code assesses workforce composition, wage equity, and opportunities for advancement, helping to identify structural inequalities.

Occupational Safety and Health Standards (DOLE DO 13, s. 1998)

The Occupational Safety and Health (OSH) Standards mandate safe working conditions that consider gender-specific occupational risks. For the project, this law is applicable to the design of workplace safety programs, facilities, protective equipment, and emergency response plans. Requirements include ergonomic considerations, gender-sensitive restrooms and nursing stations, and protective measures tailored to both men and women. Project considerations involve assessing gendered differences in exposure to risks and designing appropriate safety measures. Gender analysis ensures that workplace safety protocols account for the unique needs of women, men, and PWDs, promoting a safe and inclusive working environment.

RA 7877 – Anti-Sexual Harassment Act

The Anti-Sexual Harassment Act mandates workplaces to prevent sexual harassment, establish grievance mechanisms, and protect victims. It is relevant to the project in developing gender-sensitive policies, training programs, and monitoring systems to protect workers from harassment. Requirements include establishing reporting procedures, awareness campaigns, and preventive measures. Project considerations include embedding these measures in workplace protocols and ensuring accessibility of grievance mechanisms. Gender analysis identifies potential vulnerabilities to harassment, guiding interventions to enhance workplace safety and equity.

RA 7192 – Women in Development and Nation-Building Act

RA 7192 promotes equal participation of women in workforce training, capacity-building, and employment opportunities. For the project, this law informs gender-responsive training programs, livelihood initiatives, and community engagement efforts. Requirements include ensuring women's inclusion in all development and training activities. Project considerations involve tracking participation rates of women, identifying barriers to engagement, and promoting equitable outcomes. Gender analysis uses this framework to assess opportunities for women's empowerment, skills development, and economic participation within the project.

RA 11210 – Expanded Maternity Leave Law

The Expanded Maternity Leave Law provides maternity leave benefits and workplace protections for women, ensuring their health, well-being, and economic security. In the project context, it is applicable to human resource policies, employment planning, and workforce management, particularly for women employees. Requirements include paid maternity leave of 105 days (or more in special cases), workplace accommodations, and job security. Project considerations involve planning workforce coverage, integrating support systems, and adjusting schedules. Gender analysis evaluates the differential impact of maternity leave on workforce participation and economic opportunities for women.

DOLE Department Orders on Equal Opportunity Employment

DOLE mandates require workplaces to promote equal employment opportunities for men and women, preventing discrimination in hiring, promotions, and benefits. For the project, this applies to workforce planning, recruitment, training, and career development programs. Requirements include establishing policies for equitable recruitment, promotions, and access to benefits. Project considerations involve gender analysis of staffing patterns, career progression, and workforce diversity, ensuring that women and marginalized groups have equal opportunities. This law guides identification of structural barriers to equitable participation in project employment.

Social Protection and Benefits Programs (SSS, PhilHealth, Pag-IBIG, Livelihood Projects)

DOLE-administered social protection programs provide health coverage, livelihood support, and financial security for workers, with particular relevance for women, solo parents, and marginalized groups. For the project, these programs inform employee benefits planning, workforce support systems, and community livelihood initiatives. Requirements include ensuring eligible employees are enrolled and have access to benefits. Project considerations involve integrating these programs into labour and community development plans, tracking participation, and supporting vulnerable groups. Gender analysis identifies differential vulnerabilities and barriers to social protection for women and marginalized populations.

RA 11313 – Safe Spaces Act

The Safe Spaces Act ensures harassment-free environments in workplaces and public areas. For the project, this applies to designing safe work sites, community consultation spaces, and public facilities. Requirements include implementing preventive measures, establishing reporting mechanisms, and conducting awareness campaigns. Project considerations involve monitoring compliance, training staff, and integrating safety measures into project infrastructure. Gender analysis identifies potential risks to women and vulnerable populations, ensuring their safety and inclusion.

RA 10121 – Disaster Risk Reduction and Management (DRRM) Act

The Disaster Risk Reduction and Management Act integrates risk assessment, hazard mitigation, and emergency preparedness, recognizing that vulnerable groups face disproportionate impacts. For the project, this law is applicable to emergency planning, coastal and offshore risk assessments, and resilience strategies. Requirements include coordinating with local DRRM offices and implementing gender-responsive disaster plans. Project considerations involve identifying differential vulnerabilities, ensuring inclusive evacuation plans, and protecting women, children, elderly, and PWDs. Gender analysis highlights variations in risk exposure and adaptive capacity across gender and age groups.

RA 7277 – Magna Carta for Persons with Disabilities (PWDs)

This law ensures accessibility, inclusion, and participation of PWDs. For the project, it applies to design of facilities, infrastructure, and engagement strategies. Requirements include barrier-free access, reasonable accommodations, and consultation with PWD organizations. Project considerations involve designing inclusive facilities, ensuring participation in consultations, and adapting programs for PWDs. Gender analysis recognizes intersectional vulnerabilities, especially women with disabilities, ensuring equitable inclusion in project benefits and decision-making.

RA 11032 – Ease of Doing Business Act

This law ensures equitable access to permits, licenses, and regulatory services. For the project, it applies to project approvals, permitting processes, and regulatory compliance, ensuring no group is disproportionately affected. Requirements include transparent procedures, electronic submissions, and adherence to service standards. Project considerations involve early engagement with authorities and streamlining documentation. Gender analysis identifies potential procedural barriers affecting women, marginalized groups, or vulnerable communities.

DENR DAO 2017-15 – Revised EIA Guidelines

These guidelines govern environmental and social impact assessments, requiring projects to assess impacts on communities, ecosystems, and vulnerable populations. For the project, this includes baseline studies, scoping, public consultations, and ECC submissions. Requirements involve inclusive stakeholder engagement and integration of mitigation measures. Project considerations include ensuring participation of women, PWDs, and other marginalized groups in consultations. Gender analysis uses these guidelines to collect disaggregated data and assess gender-specific impacts.

13.5.2 Local Policies

Municipal and Barangay GAD Plans

Local GAD plans provide community-specific guidance for gender-responsive development. For the project, they inform stakeholder engagement, community development, and inclusion strategies. Requirements include alignment with local GAD priorities and regular reporting on gender outcomes. Project considerations involve identifying priority areas for women, children, elderly, and PWDs, and tailoring interventions accordingly. Gender analysis uses these plans to establish baseline data on local gender roles, vulnerabilities, and participation.

CLUP – Gender-Sensitive Development Directions

Comprehensive Land Use Plans with gender-sensitive directions guide inclusive infrastructure, spatial, and urban/coastal planning. For the project, they inform site selection, facility design, and accessibility considerations. Requirements include alignment with zoning, public space, and service accessibility standards. Project considerations involve ensuring safe, inclusive pathways, public facilities, and equitable access. Gender analysis evaluates spatial and mobility constraints, access to services, and safety concerns differentiated by gender.

13.5.3 International Standards and Best Practices

CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women)

The Convention on the Elimination of All Forms of Discrimination Against Women provides an international benchmark for gender equality and non-discrimination. For the project, it is applicable to policy design, stakeholder engagement, and equitable distribution of benefits. Requirements include promoting equal access, participation, and protection for women. Project considerations involve embedding international gender principles into project policies, HR practices, and community programs. Gender analysis uses CEDAW to assess systemic gender inequalities and identify strategies for women's empowerment.

Sustainable Development Goals (SDGs) #5, #8, #9, and #11

The Sustainable Development Goals promote gender equality, decent work, inclusive infrastructure, and resilient communities. For the project, they are applicable to monitoring gender outcomes and integrating equity in project benefits. Requirements include tracking SDG-aligned indicators for employment, access, and participation. Project considerations involve ensuring equitable economic opportunities, safe infrastructure, and inclusive services. Gender analysis uses SDGs to identify gaps in opportunities, safety, and empowerment by gender.

IFC Performance Standards (PS1, PS2, PS4, PS5)

These standards provide guidance on environmental and social risk management, labour practices, community safety, and resettlement safeguards. For the project, they inform ESMP development, stakeholder engagement, grievance mechanisms, and monitoring plans. Requirements include risk assessments, mitigation measures, and inclusive consultations. Project considerations involve assessing gender-differentiated impacts and ensuring equitable participation of women, PWDs, and marginalized groups. Gender analysis evaluates vulnerabilities, access to resources, and impacts across different genders.

ADB Safeguard Policy Statement (2009)

The ADB SPS establishes standards for environmental and social sustainability, guiding projects on impact assessments, mitigation, and inclusion of vulnerable populations. For the project, it informs social and environmental assessment, consultation, and monitoring. Requirements include public engagement and documentation of gender-specific impacts. Project considerations involve ensuring women and marginalized groups are considered in mitigation plans. Gender analysis uses this framework to assess and address differential social impacts by gender.

Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (ESF)

The AIIB ESF provides a comprehensive framework for managing environmental and social risks, explicitly integrating gender equality, women's participation, and PWD inclusion. For the project, it is applicable to ES assessment, stakeholder engagement, land acquisition, resettlement, and grievance mechanisms. Requirements include gender-responsive assessment, inclusive consultation, and monitoring of social outcomes. Project considerations involve embedding gender measures in all project phases and ensuring participation of vulnerable groups. Gender analysis uses the AIIB ESF to systematically identify gender-differentiated risks, opportunities, and mitigation measures, ensuring socially inclusive and equitable project outcomes.

13.6 Gender-Differentiated Baseline Profile

The gender-differentiated baseline profile forms a critical foundation for understanding the social dynamics of the host community and for anticipating the potential differential impacts of the Bauan International Port Redevelopment Project on men, women, and vulnerable groups. Drawing from the People Chapter dataset, several key indicators – population, education, household structure, public health, and labour dynamics – were analysed in a sex-disaggregated manner. These data provide insight into existing gender patterns and inform strategies for inclusive project planning, risk mitigation, and benefit maximization.

13.6.1 Population Distributed by Sex

The demographic profile of Bauan indicates a relatively balanced sex ratio, with only minor variations across specific age cohorts, particularly within the working-age population [1]. This demographic structure presents nuanced implications for the Bauan International Port Redevelopment Project. From a labour perspective, the relatively high proportion of working-age males suggests the availability of a substantial workforce for construction and operational activities. However, such a profile may inadvertently create gendered competition for employment opportunities if proactive measures are not undertaken to ensure the inclusion of women in both skilled and semi-skilled roles. Conversely, the slight underrepresentation of females within the same age cohort underscores the need for deliberate gender-inclusive employment policies to prevent inequitable labour outcomes. Beyond labour considerations, age and sex distribution are critical for estimating service requirements, particularly in healthcare, transport, and childcare systems. For instance, women often carry primary caregiving responsibilities; thus, their participation in the workforce may require flexible scheduling or access to supportive social infrastructure [2]. Project activities may also influence local demographics, as the in-migration of predominantly male construction workers could temporarily skew the sex ratio, potentially affecting social cohesion, household dynamics, and community interactions. These dynamics necessitate the integration of gender-sensitive planning into community engagement, social service provisioning, and monitoring frameworks to anticipate and mitigate potential tensions.

Table 13-1 Population Distribution by Sex (2015)

Age Group	Male	Female	Implications for Project
Under 1	974	837	Future dependency; minor immediate labor impact
1–4	3,841	3,498	Childcare and early education services may require gender-sensitive planning
5–9	4,255	4,056	School access; potential future workforce
10–14	3,969	3,816	Adolescent support services, gendered safety considerations
15–19	4,273	4,089	Entry into labor market; training programs
20–24	4,338	4,101	Working-age population; employment potential
25–29	4,212	3,891	Employment and skill development; slightly more males available for construction
30–34	3,768	3,528	Workforce planning; training and inclusion of women

Age Group	Male	Female	Implications for Project
35–39	3,331	3,239	Workforce stability; planning for mid-career employment
40–44	2,900	2,796	Community service needs; labor participation
45–49	2,727	2,621	Senior working population; social support considerations
50–54	2,153	2,319	Older workforce; health and care considerations
55–59	1,893	1,861	Retirement planning; community health needs
60–64	1,296	1,423	Vulnerable populations; social safety nets
65–69	841	1,207	Elderly support; vulnerability during construction
70–74	488	800	Senior care; healthcare access
75–79	341	634	Increased vulnerability; social support needed
80+	248	733	High-dependency elderly; require targeted health and social interventions

13.6.2 Education Levels by Sex

Education in Bauan demonstrates near parity between males (49.92%) and females (50.08%), with notable trends in higher education attainment favoring females. Women slightly outnumber men among college and post-baccalaureate graduates, indicating a capable pool of skilled professionals suitable for administrative, technical, and management positions. In contrast, males slightly dominate among individuals with incomplete basic education, reflecting early labor market entry and potential vulnerability to low-skill employment. For the project, these trends highlight opportunities and obligations: implementing inclusive hiring policies can leverage women's higher educational attainment for technical and managerial roles, while targeted skills development programs can enhance women's capacity to engage in traditionally male-dominated sectors, such as construction and port operations [4]. Failure to integrate gender-sensitive recruitment or training mechanisms could reinforce existing disparities, limiting women's economic participation and potentially widening gender gaps in local labor markets. Conversely, the project's interventions could generate positive outcomes, enhancing women's access to education-linked employment and contributing to broader social empowerment.

Table 13-2 Educational Attainment by Sex

Education Level	Male	Female	Implications for Project
Elementary & High School (Incomplete)	15,000	14,500	Early labor entry; may affect skill availability
Elementary & High School Graduates	12,000	12,500	Balanced literacy supports workforce engagement
College Degree	5,615	7,455	Women can be recruited for administrative, technical, and management roles
Post-Baccalaureate	24	31	Women have slightly higher advanced education; opportunity for leadership roles

13.6.3 Household Characteristics

Household composition analysis reveals that male-headed households predominate, particularly among individuals aged 40 – 49, while female-headed households represent a smaller yet significant subset. Female-headed households often exhibit heightened vulnerability to economic shocks, displacement, and social stressors associated with large-scale infrastructure projects, including resettlement and in-migration. These households may face restricted access to information, financial assistance, and livelihood opportunities, necessitating deliberate, gender-responsive project interventions. Inclusive resettlement planning, livelihood restoration programs, and targeted support services can mitigate these risks, enhance the resilience of women-headed households and

promote equitable distribution of project benefits [5]. Conversely, neglecting the specific needs of female-headed households risks exacerbating social inequities and marginalization within the host community.

Table 13-3 Household Characteristics

Household Head Age Group	Male	Female	Implications for Project
40–49	4,436	585	Majority male-headed; female-headed households more vulnerable to economic shocks and displacement
50–59	1,800	300	Female-headed households require targeted support during construction
60–69	600	185	Older women heads more vulnerable; need access to social and health services

13.6.4 Public Health Concerns

Although sex-disaggregated morbidity and mortality data are limited, prevalent health issues in the municipality – hypertension, diabetes, respiratory diseases, and asthma – pose differentiated risks across genders, particularly for women who often serve as primary caregivers. Project-related construction activities may amplify exposure to environmental hazards such as dust, noise, and congestion, potentially affecting female and child populations more acutely [6]. Effective mitigation measures require gender-sensitive occupational health and safety programs, robust public health planning, and community-oriented interventions to maintain equitable access to healthcare services during both construction and operational phases.

Table 13-4 Public Health Concerns

Health Issue	Potential Female Impact	Project Implications
Hypertension	Access barriers during construction	Healthcare planning needed for women
Diabetes	Higher risk if caregiving responsibilities limit service use	Include gender-sensitive health outreach
Respiratory Diseases	Exacerbated by air pollution	Mitigation of dust & pollution during construction
Asthma	Similar to respiratory diseases	Health monitoring and preventive interventions

13.6.5 In-Migration and Labor Dynamics

The employment of approximately 2,035 construction workers, including in-migrants, introduces gendered social dynamics. Predominantly male influxes have been associated with heightened risks of gender-based violence (GBV) and increased pressure on essential services such as water, sanitation, and healthcare, which disproportionately impact women due to traditional caregiving responsibilities [7]. In-migration may also alter local crime patterns, necessitating proactive community safety strategies. Gender-sensitive policies, inclusive recruitment, and supportive social services can transform these challenges into opportunities for equitable socio-economic development.

Table 13-5 Labor and In-Migration Dynamics

Labor Aspect	Male	Female	Project Implications
Construction Workforce	2,035	0	Male-dominated workforce; need gender-inclusive hiring to promote equity
Operations Workforce	235	236	Female participation in operations possible; can leverage educated female labor pool

In-Migration Effects	High proportion likely male	Potential risk of GBV, strain on services; mitigation strategies needed	

13.7 Gender Risks and Vulnerabilities Matrix

The development of the Bauan International Port is expected to bring significant economic activity, workforce movement, and infrastructure improvements to the municipality. However, these changes also introduce a set of gender-differentiated risks that stem from demographic shifts, labor dynamics, service demands, and evolving community interactions. By examining baseline conditions – such as existing social vulnerabilities, patterns of mobility, and the roles women and other groups play in household and community life – it becomes clear that certain populations may experience disproportionate impacts. The following assessment outlines the key gender-related risks associated with the project, highlighting where careful planning and targeted safeguards will be essential to ensure that the port redevelopment supports not only economic growth but also social inclusion, safety, and equity.

Table 13-6 Gender Risks and Vulnerabilities Matrix

Potential Gender Risk	Affected Group	Evidence from Baseline	Risk Level	Description of Concern
Increased Gender-Based Violence (GBV) / harassment due to influx of 2,035 workers	Women, girls	High in-migration expected.	High	Temporary populations often increase GBV risks near ports and construction zones.
Employment inequality	Women	Women have higher tertiary education but may face bias in port-related hiring.	Medium	Construction/port operations typically favor male labor.
Female-headed households' vulnerability to displacement	Female-headed HHs	They represent a small yet vulnerable share.	Medium	Redevelopment may disrupt properties within BIPI-owned land.
Increased stress on water/health systems	Women, children	Women are primary caregivers; water systems are stressed in some barangays.	Medium	Added workers may strain services dominated by women's roles.
Traffic congestion affecting mobility and safety	Women, elderly	Baseline notes severe congestion.	Medium	Women rely more on public transport and walking; safety concerns arise.
Crime risk due to in-migration	Women, youth	Baseline indicates crime linked to outsiders.	Medium	Potential for increases in theft, substance abuse, or harassment.

The introduction of approximately 2,035 construction workers into Bauan is expected to create significant demographic shifts, and one of the most immediate concerns relates to the heightened risk of gender-based violence (GBV) and harassment. Experiences from port communities, temporary labor camps, and large-scale construction sites consistently show that a sudden influx of predominantly male, transient workers can amplify risks

for women and girls, particularly in areas with limited monitoring systems or insufficient community protections. For Bauan, where in-migration is anticipated to be high, this presents a serious social protection challenge. The risk is not merely hypothetical; it aligns with global and local patterns observed near industrial zones, where informal interactions between outsiders and local residents can increase vulnerability, especially at night, in transit areas, or around commercial spaces that grow around project sites.

Employment inequality represents another key concern, despite the impressive educational achievements of women in the municipality. The baseline data show that women slightly surpass men in tertiary education, signaling strong potential for their participation in administrative, technical, and supervisory roles. Yet, port redevelopment and construction remain sectors traditionally dominated by men, often due to gender stereotypes and hiring biases that shape recruitment pathways. Without intentional inclusion strategies, women may find themselves overlooked for opportunities in site operations, engineering assistance, logistics, or environmental monitoring – roles they are academically qualified to fill. As a result, the project risks reinforcing structural inequalities rather than serving as a platform for inclusive local development.

Female-headed households also emerge as a group requiring special attention. Although they account for a smaller proportion of total households, their vulnerability is well-documented: these households often have fewer economic buffers, more caregiving responsibilities, and reduced access to information or compensation mechanisms. In the context of the Bauan International Port redevelopment - where land transformation or clearing may occur within BIPI-owned areas - female household heads could face disproportionate disruption. Displacement, even when temporary, can intensify economic pressure, erode social support systems, and complicate livelihood continuity for families reliant on a single income or caregiving parent.

Pressure on essential services such as water supply and healthcare is another gendered risk tied to the project's construction phase. Women and children bear a large portion of household care work, including managing water for cooking, washing, and family hygiene. Baseline information already points to barangays experiencing stress in water access and health service availability. A sudden increase in population – driven by the incoming workforce – can further strain these systems. This, in turn, increases the caregiving burden on women, who may need to spend more time securing water, seeking medical care, or addressing the health impacts of congestion, pollution, and household overcrowding.

Traffic congestion also poses a notable risk for women, the elderly, and other mobility-dependent groups. The baseline already describes significant congestion along key access roads. During construction, increased truck movements, equipment transport, and worker shuttles may further constrict mobility. Women, who more frequently use public transport, walk to nearby facilities, or accompany children and elderly relatives, may face heightened safety concerns. Congestion can increase exposure to road accidents, harassment in crowded transit spaces, and longer travel times that limit access to workplaces, markets, schools, or healthcare.

Finally, crime risks associated with in-migration must be acknowledged. Baseline data show that existing incidents in Bauan are often linked to outsiders, suggesting a preexisting sensitivity to non-local movements. While not all in-migration leads to crime, increased population density and unfamiliarity between groups have been associated with rises in petty theft, substance abuse, and occasional harassment in similar project environments. Women and youth are particularly vulnerable in these contexts, especially if community safety measures do not adapt to the increased population.

Altogether, these gender-related risks underscore the need for proactive planning, strong safeguards, and continuous community engagement. Addressing these concerns early – through policies, training, infrastructure design, and inclusive hiring – provides a pathway for the project to minimize harm and contribute to a more equitable and resilient local environment.

13.8 Gender Opportunities Matrix

The gender analysis and socio-economic baseline of Bauan highlight several opportunities for the Bauan International Port Redevelopment Project to create meaningful, inclusive, and equitable benefits for the local community. These opportunities build on existing demographic strengths – such as the strong educational profile of women, the presence of active community groups, and the municipality's commitment to local employment. When strategically integrated into project design, these interventions can reduce vulnerabilities, enhance local capacities,

and support a more socially sustainable development process. The following table and discussion elaborate on each opportunity, describing its relevance, feasibility, and potential benefits for different sectors of the population.

Table 13-7 Gender Opportunities Matrix

Opportunity	Target Group	Feasibility Basis	Potential Benefits
Local hiring prioritization	Women, youth	BIPI policy to hire locally.	Reduces GBV risk, improves household income.
Promoting women in administrative, logistics, and technical roles	Women graduates	Female college degree holders exceed males.	Gender-balanced workforce, empowers women.
Capacity-building programs (technical training, TESDA alignment)	Women, unemployed youth	The educated female population is strong.	Increases job readiness and employability.
Women-led microenterprise development	Women, coop groups	Port redevelopment boosts economic traffic.	Supporting women vendors, suppliers, and cooperatives.
Community health and safety programs	Women caregivers	Public health baseline identifies existing support gaps.	Strengthens community resilience and wellbeing.

Local Hiring Prioritization (Target: Women, Youth)

The commitment of Bauan International Port, Inc. (BIPI) to prioritize local hiring creates an immediate avenue to strengthen community participation in the redevelopment project. Women and young people – who often stand at the margins of large-scale employment cycles – can significantly benefit from structured recruitment pathways that favor residents of host barangays. This approach is not only feasible because it aligns with existing company policy, but it also promotes safer and more cohesive communities. By providing local women and youth with stable job opportunities, the project helps lessen the risks associated with in-migration of outside workers, including potential gender-based violence (GBV). Moreover, increased household income contributes to improved food security, education access, and long-term economic resilience.

Promoting Women in Administrative, Logistics, and Technical Roles (Target: Women Graduates)

The baseline indicates that women in Bauan slightly outperform men in tertiary and post-baccalaureate education attainment. This strengthens the case for creating pathways for women to take on administrative, logistics, and technical positions within the port redevelopment project. These roles traditionally skew male in similar infrastructure activities, but the availability of qualified local women provides a compelling reason to rebalance participation. Encouraging women to take on leadership and skilled roles can reshape workplace norms, foster greater gender equality, and enhance organizational performance through diversity in perspectives and decision-making. Ultimately, this contributes to a gender-balanced workforce that mirrors the community's real capacity, not outdated stereotypes about "suitable" roles.

Capacity-Building Programs (Technical Training, TESDA-Aligned) (Target: Women, Unemployed Youth)

Given the strong educational profile of the female population and the number of out-of-school or unemployed youth in the municipality, capacity-building initiatives aligned with TESDA standards can significantly enhance employability. Training in construction safety, port logistics, equipment handling, and digital competencies can prepare women and youth to take advantage of both short-term construction jobs and long-term operational roles. This strategy is highly feasible because local education levels provide a solid foundation for skills upgrading. Beyond employment, these programs build confidence, strengthen local human capital, and allow community members to actively participate in the economic transformation associated with the port's redevelopment.

Women-Led Microenterprise Development (Target: Women's Groups, Cooperatives)

The expected increase in commercial activity surrounding the port creates fertile ground for entrepreneurship. Women's groups and cooperatives – many of which already operate small-scale retail, food services, and cooperative ventures – stand to benefit from increased foot traffic and logistical demand. Supporting women-led microenterprises through access to capital, business development services, market linkages, and vendor accreditation within the port can diversify income streams and increase household resilience. In many communities, women reinvest a larger share of their income back into the family, multiplying social and economic benefits. By harnessing local entrepreneurial potential, the project helps ensure that economic growth radiates beyond the port itself and into the broader community.

Community Health and Safety Programs (Target: Women Caregivers)

Women, particularly those responsible for caregiving, often bear the brunt of health and safety challenges during major construction activities. The baseline underscores existing health service gaps and the prevalence of chronic illnesses that may be aggravated by construction-related congestion, dust, or restricted mobility. Strengthening community health and safety programs – including health outreach, GBV prevention, emergency response training, and environmental health monitoring – directly supports women caretakers who manage household well-being. These programs improve resilience by ensuring that families remain healthy, informed, and prepared for environmental or social stressors associated with the redevelopment. Ultimately, this enhances community stability and safeguards the social fabric during periods of rapid change.

13.9 Gender Responsive Mitigation Measures and Monitoring Plan

The gender-responsive mitigation measures for the project are designed to address both anticipated and emerging risks that often accompany large infrastructure developments, especially those involving a substantial influx of male construction workers. The strategies aim to protect vulnerable groups, promote equitable participation, and ensure that project benefits are shared across genders. Each measure is grounded in practical implementation mechanisms and aligns with the broader goals of social inclusion, community safety, and gender equality.

13.9.1 Mitigation Measures

One of the foremost concerns in large construction activities is the potential increase in gender-based violence (GBV), sexual exploitation, and harassment. With over 2,000 workers expected on-site, the project adopts a rigorous approach by instituting a Zero-Tolerance Policy on GBV and Sexual Exploitation and Abuse (SEA). This will be reinforced through mandatory GBV orientation sessions for all workers prior to deployment, ensuring that personnel understand workplace conduct standards and community expectations. Complementing this are confidential and accessible grievance channels – including hotlines and designated gender desks – that allow community members and workers to report incidents safely and without fear of retaliation.

To address inequitable hiring trends that typically marginalize women in construction-related employment, the project commits to a minimum 30–40% female hiring target for administrative, logistics, finance, HR, and community liaison functions. Integrating this into contractor agreements ensures that gender inclusion is not optional but built into procurement and labor planning. Such targets help counter the common bias of hiring predominantly male workers and broaden women's access to project-created economic opportunities.

Female-headed households often face disproportionate impacts during periods of land acquisition, relocation, and construction-related disruptions. To safeguard their welfare, the project emphasizes prioritizing these households in stakeholder consultations and ensuring they receive targeted livelihood assistance, relocation support (if needed), and compensation arrangements that reflect their heightened vulnerability. This approach acknowledges the unique constraints women-led households may experience, such as limited mobility, reduced income security, and caregiving burdens.

Strain on local health facilities is another anticipated risk, particularly affecting women who typically rely on – and manage – household health-seeking behaviors. To mitigate this, the project plans to coordinate with municipal health units to deploy mobile clinics during peak construction periods and ensure the presence of trained female health personnel in on-site first-aid stations. Information campaigns on maternal health, reproductive health, and stress-related illnesses will also be implemented to support both workers and surrounding communities.

Mobility and traffic safety concerns, especially for women, are addressed through the provision of dedicated shuttle services for female workers, improved lighting in project-affected pathways, and tighter coordination with the local traffic office to manage congestion and enhance pedestrian safety. These measures recognize that women are more likely to experience mobility restrictions and feelings of insecurity in poorly lit or heavily trafficked areas.

Finally, the project acknowledges the potential pressure on community water systems caused by increased water demand during construction. To prevent disruption of domestic water use – which disproportionately affects women responsible for water collection and household management – quarterly water quality testing will be conducted, and water rationing protocols will be implemented during peak usage periods to ensure that households are not deprived of essential supply.

Table 13-8 Mitigation Measures Summary

Gender Risk	Mitigation Strategy
GBV and sexual harassment	Implement a Zero-Tolerance Policy on GBV/SEA Mandatory GBV orientation for all 2,035 workers. Safe grievance channels (hotline, gender desk).
Inequitable hiring	Set a minimum 30–40% female hiring target for administrative, logistics, finance, HR, community liaison roles. Include women in contractor hiring agreements.
Vulnerability of female-headed households	Prioritize women-led households in consultations. Provide targeted compensation and relocation support (if needed).
Strain on health services	Partner with LGU health units for mobile clinics. Ensure onsite first-aid with female health personnel. IEC campaigns on maternal and reproductive health.
Mobility & traffic safety	Provide shuttle services for women workers. Improve site lighting and pedestrian pathways. Coordinate traffic management with LGU.
Water system pressures	Conduct quarterly water quality checks. Implement water rationing protocols during peak construction periods.

13.9.2 Monitoring Plan

The monitoring plan provides a structured approach for tracking the effectiveness of the gender-responsive measures and ensuring that commitments translate into actual outcomes on the ground. Clear indicators, data collection methods, and assigned responsibilities guide the process, allowing the project to identify early signs of gender-related risks, adjust strategies as needed, and maintain accountability.

The proportion of women hired across project roles will be reviewed quarterly through HR records, enabling the project to determine whether inclusion targets are being met and whether additional outreach or training programs are needed. GBV and SEA incident logs will be reviewed monthly by the GAD Focal Team, ensuring that any reported cases are addressed promptly and patterns or gaps in preventive mechanisms are identified.

Satisfaction levels among women stakeholders will be assessed semi-annually through focus group discussions and structured surveys. These feedback mechanisms give voice to women's experiences regarding project activities, service accessibility, livelihood changes, and overall well-being. Health service utilization will likewise be monitored quarterly in coordination with local Rural Health Units (RHUs) to track trends in consultations, mobile clinic usage, and occupational health concerns.

Traffic and mobility risks will be monitored monthly through field inspections jointly conducted by the contractor and the LGU Traffic Office. These inspections help ensure that lighting, signage, shuttle services, and pedestrian pathways remain responsive to safety needs, particularly for women and students. Impacts on female-headed

households will be closely tracked through quarterly visits led by the Social Welfare and Development Office, allowing the project to understand how these households adapt, cope, or require enhanced assistance.

Table 13-9 Summary of Monitoring Plan

Indicator	Method	Frequency	Responsible Entity
% of female workers hired	HR records	Quarterly	BIPI HR
GBV/SEA incident reports	Incident logs	Monthly	GAD Focal Team
Satisfaction of women stakeholders	FGDs, surveys	Semi-annually	CSR Unit / GAD Team
Health service utilization	Coordination with RHUs	Quarterly	Contractor HSEM Team
Traffic safety observations	Field inspection	Monthly	Contractor / LGU Traffic Office
Impacts on female-headed HHs	Monitoring visits	Quarterly	BIPI / LGU SWDO

13.10 Conclusion and Recommendation

The Gender Analysis for the Bauan International Port Redevelopment Project highlights the intricate ways in which the project intersects with the social, economic, and demographic realities of the host communities. The findings demonstrate that while the population structure and educational attainment of Bauan present significant opportunities for gender-equitable participation, notable vulnerabilities also exist – particularly among female-headed households, women with caregiving roles, and groups most affected by construction-related stressors such as congestion, noise, and health service pressures. The in-migration of an estimated 2,035 mostly male construction workers further underscores the need for proactive measures to prevent gender-based violence, protect community safety, and maintain equitable access to resources and services.

Overall, the project stands to generate meaningful socio-economic benefits for both women and men if gender considerations are systematically integrated into every phase of implementation. The gender-responsive strategies identified – such as inclusive hiring practices, gender-sensitive skills training, targeted livelihood support, strengthened community safety programs, and enhanced monitoring systems – provide a concrete pathway for ensuring equitable outcomes. These interventions will not only mitigate risks but also maximize opportunities for women to participate in, contribute to, and benefit from the redevelopment effort.

In alignment with the **SMART framework** (Specific, Measurable, Achievable, Relevant, Time-bound), the following recommendations are proposed:

First, implement specific and measurable gender-inclusive employment policies, such as setting a target for women to comprise at least 30–40% of administrative, technical, and operational roles, supported by gender-sensitive training and capacity-building programs that equip women with industry-relevant skills. This ensures that the project's economic benefits are shared equitably and that women's participation is both visible and sustainable.

Second, institutionalize achievable and relevant measures to protect women and vulnerable groups from gender-based violence and social risks associated with workforce in-migration. This includes establishing a Zero-Tolerance GBV Policy, conducting mandatory orientations for all contractors and workers, strengthening community grievance mechanisms, and improving lighting, surveillance, and transport systems within and around project sites. These interventions should be implemented early – prior to mobilization – and monitored continually throughout construction.

Third, provide targeted and time-bound support for female-headed households and other vulnerable sectors who may be disproportionately affected by project-induced displacement, livelihood disruptions, or service strain. This includes livelihood restoration programs, financial literacy training, priority access to information and consultations, and close coordination with local social welfare offices. These measures should be initiated during pre-construction planning and assessed quarterly.

Fourth, integrate gender considerations into health, safety, and environmental management plans, ensuring accessible healthcare services, responsive occupational safety protocols for both male and female workers, and regular monitoring of environmental conditions that may disproportionately affect women and children—such as air quality, water availability, and traffic safety.

Finally, establish a robust gender-responsive monitoring and evaluation system, with sex-disaggregated data collection, quarterly progress reporting, and a Gender Action Plan (GAP) tracking mechanism that allows the project to measure progress, adjust strategies, and document successes. This ensures that gender commitments remain visible, accountable, and responsive throughout the lifecycle of the redevelopment.

In essence, the successful integration of gender considerations into the Bauan International Port Redevelopment Project will require coherent planning, committed leadership, and sustained collaboration with local stakeholders. Through deliberate, SMART-aligned actions, the project can serve as a model for gender-responsive infrastructure development – one that not only minimizes harm but actively promotes empowerment, equity, and inclusive growth

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