Initial Environmental Examination

Project No. 53421-001
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Date: February 2021

Solomon Islands: Land and Maritime Connectivity Project – Multitranche Financing Facility

Honiara Port Component

Prepared by Solomon Islands Port Authority

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# Abbreviations

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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AEP</td>
<td>Aggregate extraction plan</td>
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<td>BMP</td>
<td>Building Material Permit</td>
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<td>BSI</td>
<td>Biosecurity Solomon Islands (Department of MAL)</td>
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<td>CCP</td>
<td>Communications and Consultation Plan (of the project)</td>
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<td>CEMP</td>
<td>Construction Environmental Management Plan (of the contractor)</td>
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<td>CPIU</td>
<td>Central Project Implementation Unit (within MID)</td>
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<td>CSC</td>
<td>Construction supervision consultant</td>
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<td>CSS</td>
<td>Country safeguards system</td>
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<td>DMM</td>
<td>Department of Mines and Minerals (in MMERE)</td>
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<td>ECD</td>
<td>Environment and Conservation Department (in MECDM)</td>
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<td>EHSG</td>
<td>Environment, Health and Safety Guidelines (of World Bank Group)</td>
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<td>EHSO</td>
<td>Environment, Health and Safety Officer (of the contractor)</td>
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<td>EIA</td>
<td>Environment Impact Assessment</td>
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<td>EIS</td>
<td>Environment Impact Statement</td>
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<td>EMP</td>
<td>Environmental Management Plan</td>
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<td>ENSO</td>
<td>El Nino Southern Oscillation</td>
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<td>HSP</td>
<td>Health and Safety Plan</td>
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<td>ERP</td>
<td>Emergency Response Plan</td>
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<td>GRM</td>
<td>Grievance Redress Mechanism</td>
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<td>HCC</td>
<td>Honiara City Council</td>
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<td>HSMP</td>
<td>Hazardous Substances Management Plan</td>
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<td>IUCN</td>
<td>International Union for Conservation of Nature and Natural Resources</td>
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<td>IEE</td>
<td>Initial Environmental Examination</td>
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<td>LMCP</td>
<td>Land and Maritime Connectivity Project</td>
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<tr>
<td>MECDM</td>
<td>Ministry of Environment, Climate Change, Disaster Management and Meteorology</td>
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<td>MOFT</td>
<td>Ministry of Finance and Treasury</td>
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<td>MID</td>
<td>Ministry of Infrastructure and Development</td>
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<td>MMERE</td>
<td>Ministry of Mines, and Energy and Rural Electrification</td>
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<td>NTP</td>
<td>National Transport Plan 2016 - 2036</td>
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<td>PACCSAP</td>
<td>Pacific-Australia Climate Change Science and Adaptation Planning</td>
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<td>PER</td>
<td>Public Environment Report</td>
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<td>PPE</td>
<td>Personal Protective Equipment</td>
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<td>SECP</td>
<td>Sedimentation and erosion control plan</td>
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<td>SIPA</td>
<td>Solomon Island Ports Authority</td>
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<td>SPS</td>
<td>Safeguards Procedures Manual (of MID)</td>
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<td>SPS</td>
<td>Safeguard Policy Statement 2009 (of ADB)</td>
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<td>TMP</td>
<td>Traffic Management Plan</td>
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<td>TOR</td>
<td>Terms of Reference</td>
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<td>WMP</td>
<td>Waste Management Plan</td>
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## Glossary of terms associated with ports and port operation

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<th>Definition</th>
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<tr>
<td>Container vessel</td>
<td>A ship specially designed or equipped for carrying containerized cargo.</td>
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<tr>
<td>Port</td>
<td>A port is a maritime facility which may comprise one or more wharves where ships may dock to load and discharge passengers and cargo.</td>
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<tr>
<td>Reefer</td>
<td>A refrigerated cargo container. All reefers viewed at Honiara Port facility in January 2020 were Forty Foot Equivalent Unit (FEU). Though a reefer has an on-board refrigeration unit, they rely on external power from electrical power points at a land-based site, a container ship or on the quay.</td>
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<tr>
<td>Wharf</td>
<td>A structure on the shore of a harbour where ships may dock to load and unload cargo or passengers. Such a structure includes one or more berths, and may also include piers, warehouses, or other facilities necessary for handling ships.</td>
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Executive Summary

1. **Background:** Recognizing that domestic transport connectivity is critical to social and economic development, the Asian Development Bank (ADB) has been assisting three Pacific countries—Solomon Islands, Tonga and Vanuatu—improve road and inter-island shipping transport to provide access to essential services, improve trade and tourism, and facilitate access to domestic and international markets. There are several common obstacles to the effective maintenance and resilience of transport assets including:
   - Insufficient capacity of the institutions responsible for infrastructure delivery to implement sustainable routine and periodic maintenance programs;
   - Inadequate fiscal budgets to allocate required financial resources for recurrent maintenance and rehabilitation;
   - Vulnerability to natural disasters and anticipated climate change; and
   - Limited transport sector policy and legislation.

2. **The Project:** To address these constraints, ADB provided technical assistance through TA 9331-REG: Strengthening Domestic Transport Connectivity in the Pacific and the Transport Sector Project Development Facility (TSPDF). The technical assistance supported preparation of projects in each of the three countries to improve national and regional connectivity through new investments. In Solomon Islands the project—Land and Maritime Connectivity Project (LMCP)—proposes to improve urban and rural roads on Guadalcanal, upgrade the Honiara port, and construct and/or upgrade and repair wharves at two locations in two provinces. The LMCP is proposed as a four-year, time sliced multi-tranche financing facility with a tentative amount of $171 million. The subprojects and components have been fully prepared, and this includes conducting and reporting safeguards due diligence.

3. **Implementation arrangements:** The executing agency for the project is the Ministry of Finance and Treasury (MOFT) and the implementing agency is Solomon Islands Ports Authority (SIPA) under the purview of the Ministry of Infrastructure and Development (MID). SIPA will be supported during project implementation by a construction supervision consultant (CSC). The CSC will assist SIPA in detailed design and updating of safeguards due diligence, procurement (preparation of tender documents, tender evaluation) and will support the SIPA through supervision of construction. The CSC will include an international environmental specialist to assist SIPA, update the IEE and prepare the necessary documentation to obtain development consent from the Environment and Conservation Division (ECD) of the Ministry of Environment Climate Change and Disaster Management (MECDM). The CSC will ensure that SIPA meets all its obligations with respect to the development consent, updated EMP and the approved contractor-generated site-specific construction environmental management plan (CEMP). The CSC will provide training to SIPA staff in general environmental management of port operations and basic training in internationally recognised environmental management and health and safety good practices.
4. **Legal and policy framework.** The ECD has the mandate to implement the Environment Act 1998, Environmental Regulation 2008 and the Environmental Impact Assessment Guidelines 2010 and issuing of development consent for project development. This environmental assessment will be reformatted as a public environment report (PER), forming the basis of the development consent application. The application will be prepared by, or on behalf of, the MID as the ‘developer’. The project will also comply with the requirements of Asian Development Bank’s Safeguard Policy Statement 2009 (SPS) which also requires compliance with the World Bank Group’s Environmental Health and Safety Guidelines.

5. **Existing operations.** The Honiara Port has been operating as an international port serving Solomon Islands for many years. The original international wharf (#1) and its associated hardstanding areas has created a highly modified and disturbed environment (see Plate ES1). The replacement of the existing piled wharf on precast concrete piles with a precast concrete deck will not substantially change the existing situation. The footprint and wharf activity levels will be largely unchanged.

   **Plate ES1: Historic development at Honiara Port - situation before new #2 wharf constructed**


The vessel in the plate is occupying the wharf proposed for refurbishment. The photograph is undated.

6. **Subproject description.** The 2018 phase of the Honiara Port Development Project focused on the practicality of extending the life and increasing the resilience of the old international wharf (Wharf#1) with minimum intervention, namely minimum repairs, major strengthening or reconstruction. The 2020 studies developed the minimum intervention approach by deriving six options and determining a preferred option. This environmental assessment identifies and evaluates the environmental implications of the preferred option that assumes reconstruction of the old wharf within its existing footprint. As such the key construction activities would involve:

   - Removal/demolition of the old wharf concrete deck and beams using rock breaker, cranes and possibly heavy-duty truck(s).
• Dumping of demolished sections of the old wharf within the port area as reclamation fill between the new wharf and old wharf using a crane, excavator and truck.

• Emplacement of additional piles, new beams and new deck for the old wharf using cranes, and piling equipment.

• Concrete batching and pre-casting. It is assumed that the western part of the port area currently occupied by MID’s concrete batching facility would be used for concrete batching and precast yard for the wharf refurbishment works.

• A small amount of dredging in the order of 10,000m$^3$ (approximately equivalent to a 21.5m x 21.5m x 21.5m cube).

• Approximately 20 -30 workers would be involved in this activity over approximately 6 – 9 months.

7. **Screening and categorization.** The subproject has been screened based on the existing site conditions and proposed scope of works and is categorized as B for environment, given the works will have site-specific, largely temporary and intermittent impacts during construction and most impacts can be avoided or reduced through mitigation measures. The appropriate level of assessment for a category B project is an initial environmental examination (IEE). The IEE complies with requirements of the country safeguards system for environment and the SPS. The IEE has been prepared to provide an account of the baseline environmental conditions and to describe and evaluate likely impacts caused by the proposed road and drainage infrastructure upgrade improvements and identify measures to avoid and/or mitigate the same.

8. **Environmental safeguards.** This document represents the environmental due diligence for the refurbishment and upgrading of the Honiara International Port. This IEE updates the IEE prepared in 2018 and relies on updated information on the preferred arrangement for improvement of port facilities, specifically the preferred option for the renovation and extension of the “old” international wharf which is one of two wharves at the port. The preferred option is to demolish the existing degraded wharf (built in 1983), extend it slightly to the west and reconstruct to current seismic engineering design standards. Strengthening of the remainder of the “old” wharf, built in 1988, will also be undertaken.

9. The objectives of the IEE are to: (i) describe the existing environmental conditions; (ii) identify potential environmental impacts; (iii) evaluate and determine the significance of the impacts; (iv) develop an environmental management plan detailing mitigation measures, monitoring activities, reporting requirements, institutional responsibilities and cost estimates to address adverse environmental impacts; and (v) carry-out public consultations to document any issues/concerns and to ensure that such concerns are addressed in the project design. The IEE is based on field inspection including marine ecological surveys, discussions with key government agencies, information gathered during stakeholder consultations and data compiled from secondary sources. This IEE is submitted to ADB by the borrower and the final IEE report will be disclosed to the public by the government’s executing agency and uploaded to ADB’s website.
10. **Marine biological environment**: The potential impacts of the works on the marine biological environment include: (i) localized and temporary increased suspended sediment levels within and around the footprint of the wharf affecting marine habitats and associated resources during construction activities; and (ii) accidental spillage/leakage of oil and other pollutants into the marine environment from plant and equipment used during the refurbishment of the old wharf.

11. Initial development and continued operation of the Honiara Port has removed the inshore shallow water fringing reef ecosystem. Due to years of anthropogenic impacts the environment is all but devoid of living sessile organisms (flora and fauna) and is covered in various levels of sediment. As such the benthic habitat associated with the Honiara Port can be classified as a highly modified habitat of low ecological value. This is the result of land reclamations and port infrastructure development and operations over many years. The habitats are also subject to polluted discharges (silt and some hydrocarbons) from the existing port drainage system.

12. Given the existing marine ecological conditions in the vicinity of the works the potential impacts of the works on the existing marine environment will be small. There will be no loss of significant marine habitat and there are no threats to the area’s marine and coastal biodiversity associated with the project.

13. The following is the status of the quality of habitat following assessment according to the SPS:

   (i) **Modified habitat** – describes the subproject area and the immediate construction footprint which comprises extensive benthic (reclamation, revetment wall, docks) and major shallow water benthic and coastal alteration. Adjacent to the domestic port it is a highly altered environment. Boat and rainwater sewage and garbage enters the water further degrading the site.

   (ii) **Natural habitat** – does not exist within the subproject area. There is an area of natural habitat associated with a remnant coral reef on the north-western corner of the port site (beyond wharf # 1). This area will not be impacted by the proposed scope of works.

   (iii) **Critical habitat** – none identified or recorded within the subproject area.

14. **Environmental mitigation and the EMP.** An environmental management plan (EMP) has been prepared as part of the IEE. Mitigation measures, environmental monitoring, and capacity development are required to minimize the environmental impacts in the pre-construction, construction and operation phases and the environmental management plan addresses these aspects. Implementation of internationally recognized good construction environmental practices forms the basis of the EMP which covers minimization of habitat disturbance, sedimentation control, waste management and worker and community health and safety, etc. The EMP and the development consent will form part of the bid and contract documents and the contractor will be required to prepare their own site specific construction environmental management plan (CEMP) based on the EMP. The CEMP will include site plans, construction methodology and approach (including timing of certain works in the marine environment) and the sub-plans. The contractor will submit the CEMP to SIPA, CSC and ADB for review and approval, which must be obtained prior to commencement of any works on site (including any clearing or demolition activities).

15. Standard environmental mitigation measures associated with good engineering practice will be implemented to ensure the potential impacts from the construction works are minimised, acceptable and insignificant. Key mitigation measures will include:
• Requiring the contractor to develop their site-specific construction EMP based on the project’s EMP and reflecting their approach to the works. The CEMP will include specific sub-plans to deal with work elements (such as dredging) and topics such as health and safety, traffic management, noise control, hazardous substances management, waste management etc.

• Deploying silt curtain/s around the wharf during all construction and redevelopment activities to reduce the dispersion of silt disturbed during construction. Deploying floating booms to trap any floating pollution generated during construction.

• Ensuring all powered mechanical equipment is properly maintained such that all necessary measures are taken to prevent leakage and accidental spillage of fuel and oil from construction equipment into the marine environment and that noise and air quality (exhaust) emissions are minimised.

16. The contractor will be responsible for implementing the approved CEMP and reporting on this to the SIPA and CSC. The CSC will monitor compliance with the approved CEMP.

17. **Consultation and information disclosure.** A dedicated stakeholder consultation process was carried out in that disseminated information to the public, project affected communities and key stakeholders. A communications and consultation plan (CCP) has been prepared for the project and will guide all information provided to or requested from stakeholders and the beneficiary communities. Information was provided on the scale and scope of the project and the expected impacts and the proposed mitigation measures for government departments, local authorities and the public in meetings. The consultations are summarised in this IEE document and are the subject of a separate due diligence report. The contractor will establish how they will respond to the relevant elements of the CCP in their CEMP.

18. **Grievance redress mechanism:** A grievance redress mechanism (GRM) is identified in the IEE and will be established to receive, evaluate and facilitate the resolution of affected people’s concerns, complaints and grievances about the environmental and social performance of the project. The GRM is based on accepted practices in Solomon Islands and provides an accessible, time-bound and transparent mechanism for the affected persons to voice and resolve social and environmental concerns linked to the project. The contractor will establish how they will respond to the relevant elements of the GRM in their CEMP.

19. **Inspections, monitoring and reporting.** When construction commences, inspections and audits will be undertaken to ensure measures set out in the EMP and CEMP are effective in mitigating impacts and protecting the environment (based on benchmarked conditions recorded prior to works commencing for parameters identified in the EMP) and that overall the contractor is working in compliance with the approved CEMP. Monitoring will provide information to determine whether critical factors are within acceptable environmental levels or being exceeded. It also helps to determine whether mitigation measures are effective or should be modified or improved to address the observed and measured change in impacts. Inspections and regular monitoring will be reported. Reporting will include contractor’s monthly reports to the CSC, quarterly progress reports (including summary of contractor’s reports and safeguards matters) prepared by the CSC for submission to SIPA, executing agency and ADB, and semi-annual safeguards monitoring reports prepared by the SIPA and CSC and submitted to the executing agency and ADB. ADB will disclose the monitoring reports.
20. **Conclusion and recommendations**: This IEE concludes that the potential environmental impacts arising from design, construction and operation of the refurbishment and upgrading of the Honiara port will be minor, localized and acceptable provided that the mitigation measures set out in the EMP are implemented during construction and operation.

21. An audit of existing facilities and operations of the port in 2018 concluded that facilities operations and maintenance fell short of internationally recognized good environmental practice in a number of areas. It was noted at the time that SIPA management was actively addressing these issues through planning and procurement of new facilities to improve environmental management and a visit in 2020 confirmed that great steps had been accomplished. The measures required to strengthen and improve operations have been incorporated into the EMP and will be implemented during the pre-construction phase.

22. The potential environmental impacts arising from the design, construction, operation and maintenance of the project will be relatively minor, localized and acceptable provided that the mitigation measures set out in the EMP of this IEE are implemented properly. The findings of the IEE evaluation suggest that improvements to the wharf will improve the quality of life for the local community in terms of economic prosperity, improved access to markets and public services.
1 Introduction

1.1 Background

1. The Solomon Islands comprises a double chain of 992 islands (volcanic and coral atolls) that forms an archipelago stretching approximately 1,600 km across the South-western Pacific Ocean between the latitudes of 50 – 120 South and longitude 1520 – 1700 East (Figure 1.1). The total land area is approximated to be 28,000 km² with an exclusive economic zone (EEZ) of 1.6 million km² (SPC, 2017) which represents the third largest archipelago in the South Pacific Ocean. The nation is bordered to the west by Papua New Guinea (PNG), south by Vanuatu, east by Tuvalu, north east by Nauru and the Federated States of Micronesia to the north. The unique geography and scattered nature of islands has given rise to a heritage of considerable environmental and ecological diversity.

Figure 1.1: Solomon Islands, indicating provincial island groupings

2. Transport challenges: Recognizing that domestic transport connectivity is critical to social and economic development, the Asian Development Bank (ADB) has been assisting three Pacific countries—Solomon Islands, Tonga and Vanuatu—to improve road and inter-island shipping transport to provide access to essential services, improve trade and tourism, and facilitate access to domestic and international markets.
3. There are several common obstacles to the effective maintenance and resilience of transport assets including:

- Insufficient capacity of the institutions responsible for infrastructure delivery to implement sustainable routine and periodic maintenance programs;
- Inadequate fiscal budgets to allocate required financial resources for recurrent maintenance and rehabilitation;
- Vulnerability to natural disasters and anticipated climate change; and
- Limited transport sector policy and legislation.

4. Transport infrastructure in Solomon Islands is generally inadequate, in a poor state of repair, and lacking in many areas. In the road sector, out of the country’s 1,523 kilometers (km) road network, 67% is in maintainable condition while the rest needs substantial rehabilitation to become maintainable. In the maritime sector, out of the 91 domestic wharves, only 46 are in maintainable condition, and two international and associated domestic ports require major rehabilitation.¹ The country’s main economic corridor, the 120km east-west Guadalcanal corridor is in deteriorating condition, critical urban road sections have capacity constraints leading to traffic congestion, and inadequate maritime facilities aggravating safety and efficiency of shipping services.

5. The project. To help address these constraints, ADB provided technical assistance through TA 9331-REG: Strengthening Domestic Transport Connectivity in the Pacific and the Transport Sector Project Development Facility (TSPDF). The technical assistance supported preparation of projects in each of the three countries to improve national and regional connectivity through new investments. In Solomon Islands the project—Land and Maritime Connectivity Project (LMCP)—proposes to improve urban and rural roads on Guadalcanal, upgrade the Honiara port, and construct wharves at two locations in Makira and Bellona. The LMCP is proposed as a four-year, time sliced multi-tranche financing facility² with a tentative amount of $171 million. The subprojects and components have been fully prepared, and this includes conducting and reporting safeguards due diligence. The project includes three outputs:

- Output 1 - will support the rehabilitation or upgrading of about 84 kilometers of existing urban and rural road network along east-west Guadalcanal corridor. The rural sections will include rescaling and repairing damaged infrastructure, including bridges and culverts, within the existing right of way. For the urban sections, provision of paved footpath, signage and marking, and drainage improvements are included to ensure pedestrian safety.
- Output 2 - will support reconstructing the old wharf at Honiara port. It will also support the construction of new piled reinforced concrete wharves in Kirakira (Makira-Uluwa province) and Ahanga (Renell-Bellona province).

² The multi-tranche financing facility will be disbursed over three tranches. As all investments are known and have been fully prepared during preparation of tranche 1, the subsequent tranches will not include additional subprojects and will disburse funds only.
Output 3 will provide support to improving the transport infrastructure maintenance practices by providing funding to maintenance works programmed under the National Transport Fund (NTF) for the project implementation period, reviewing the MID structure and provide advisory to strengthen institutional arrangement for maintenance, conducting further capacity strengthening to the MID in terms of planning, project preparation and works supervision, and further developing its asset management system.

6. **Impact and outcome.** Overall the LMCP will contribute to the nations overarching goal of poverty reduction, thereby support one of the goals of the National Development Strategy (NDS). Further, the rehabilitation of urban and rural roads contributes to a long-term strategy articulated in the National Transport Plan 2017-2036 (NTP), to improve connectivity between main roads, feeder roads and access roads. The solutions delivered through the project will result in the following outcome: efficiency and safety of transportation in Solomon Islands improved. The project is aligned with the following impact: All Solomon Islanders have access to essential services and productive resources and markets.

7. **Institutional arrangements.** The executing agency will be Ministry of Finance and Treasury (MOFT) and the implementing agencies will be the Ministry of Infrastructure Development (MID) through its Central Project Implementation Unit (CPIU) for the road and wharf subprojects and the Solomon Islands Port Authority (SIPA) for the port subproject. The Environment and Conservation Division (ECD) of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) is responsible for implementing the country safeguard system (CSS). The CPIU and SIPA will be supported by a construction supervision consultant (CSC) which will include environmental specialist(s).

### 1.2 Evolution of the Project

23. This document represents the environmental due diligence of a proposed refurbishment of the international port, located in Honiara (Guadalcanal), the capital of the Solomon Islands. The project as reported here is the preferred option for improvement of port facilities, specifically the renovation and extension of the “old” international wharf (#1 wharf).³ The preferred option is to demolish the existing degraded wharf (built in 1983), extend it slightly to the west and reconstruct to current seismic engineering design standards. Strengthening of the remainder of the old wharf, built in 1988, will also be undertaken.

8. **Previous and current studies.** An engineering feasibility study on the rehabilitation and upgrade of Honiara Port (located in the Honiara central business district) was carried out in 2018 focused on rehabilitation of the existing older international wharf (old wharf) the feasibility included environmental audit of the existing facility and the production of an environmental assessment for rehabilitation of the old wharf.

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³ There are currently two operational wharfs at Honiara Port. A “new” wharf (#2) opened in 2016 and an “old” wharf (#1) constructed when the Port was opened. The #1 wharf was built in two parts, in 1983 and 1988. The wharf is structurally substandard – the 1983 portion requires reconstruction, the 1988 can be strengthened - for it to remain in operation. Closing # 1 wharf completely would compromise import / export capacity at Honiara and for Solomon Islands.
9. The current studies (2019-2020) revisited the “old wharf” rehabilitation option and this document presents the updated environmental assessment, drawing extensively on the 2018 document for rehabilitation of the international wharf modified to cover the current proposals and updated with additional consultations.

10. **Screening and categorization.** The subprojects have been screened based on the site condition\(^4\) and proposed scope of works and have been determined as category B for environment given they will have site-specific, largely temporary and intermittent impacts during construction and most impacts can be avoided or reduced through mitigation measures. The appropriate level of assessment for a category B project is an initial environmental examination (IEE).

11. The IEE complies with requirements of the country safeguards system (CSS) and ADB’s Safeguard Policy Statement 2009 (SPS).

12. **Scope and coverage.** This IEE has been prepared in accordance with the Environment Act 1998 and Environment Regulations 2008 and following MID’s Safeguards Procedures Manual (SPM). The assessment also complies with the requirements for category B projects in accordance with ADB’s SPS. The IEE will be reformatted, as required, and submitted as public environmental report (PER) as part of the development consent application (see section 2.1.1).

13. The IEE describes the baseline environmental conditions and results of the impact assessment of the port upgrading. The IEE includes description and assessment of the existing institutional arrangements for environmental management. The impacts on the existing physical, biological and social environment are assessed, resulting in an environmental management plan (EMP) which will be further developed by the contractor.

\(^4\) This includes marine ecological survey to compile the marine flora and fauna (including benthic) baseline) and determine if any areas of critical habitat are present. The subproject site does not comprise areas of critical habitat.
2 Legal and Institutional Framework

2.1 Legal and Planning Framework

2.1.1 Country safeguard system

15. The CSS for environment includes legislation (laws and regulations) governing management and protection of the environment, various supporting legislation, and procedures established to implement the CSS. The ECD within MECDM implements the Environment Act and Environment Regulations, which stipulate the type of activities for which development consent, must be sought and which propose developments require environmental assessment. The ECD is also the government agency responsible for reviewing and clearing development consent applications and environmental assessments on behalf of the government and is the agency responsible to manage the environmental compliance of all projects.

16. **Environment Act.** The Environment Act 1998 provides for the protection and conservation of the environment. The core objectives of the Act are to provide for and establish integrated systems of development control, environmental impact assessment (EIA) and pollution control, including:

- Prevention, control and monitor pollution;
- Reducing risks to human health and prevent degradation of the environment by all practical means, including the following;
- Regulating the discharge of pollution to the air, water and land;
- Regulating the transport, collection, treatment, storage and disposal of wastes;
- Promoting recycling, re-use and recovery of materials in an economically viable manner; and
- To comply with and give effect to regional and international conventions and obligations relating to the environment.

17. The Act is divided into four sections. Part I provide the Act with considerable power and states that in the event of conflict between the Environment Act and other legislation, the Environment Act shall prevail. Part II establishes and defines the powers and role of the ECD. Part III establishes the requirements for environmental assessment, review and monitoring. This provides for an environmental assessment to consist of either a PER or if the development is shown to be of such a nature as to cause more serious impacts then the developer is required to prepare and submit an environmental impact statement (EIS). Part IV details requirements for pollution control and emissions (noise, odor and electromagnetic radiation) and requirements to permits for the discharge of waste. Noise (restrictions on emitting unreasonable noise) is covered in Article 51(1).

18. **Environment Regulations.** The Environment Regulations 2008 establish the procedures for undertaking the environmental assessment of any projects categorized as ‘prescribed activities’.
19. The developer is required to first submit a “development application” which is reviewed by the ECD to determine the likely significance of impact and required level of environmental assessment. The decision resulting from the review may include that:

- No further assessment is required, as such the development application is accepted, and development consent is issued;
- A PER is required; or
- Where major projects are considered such as logging, large agricultural developments, mining and large-scale tourism developments and infrastructure projects, an EIS is required which includes technical, economic, environmental and social investigations.

20. Both the PER and EIS require public consultation. Following review and approval by the MECDM the development consent is issued either with or without conditions.

### 2.1.2 Other legislation supporting the CSS

21. **Protected areas.** The Protected Areas Act 2010 and Protected Areas Regulations 2012 establish procedures for the establishment and management of protected areas and to conserve and regulate biological diversity. Key objectives of the legislation are to:

- Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
- Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;
- Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;
- Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
- Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of the protected areas; and
- Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, such as, through the development and implementation of plans or other management strategies.

22. Specifically, Part 3 of the Act allows for the declaration, registration and management of Protected Areas (PA), Part 5 of the Act prohibits any unauthorized bio-prospecting research in these areas except if given permission by the Advisory Committee and Part 6 provides for the appointment of inspectors to enforce the provision of the Act.

23. **Wildlife protection.** The Wildlife Protection and Management Act 1998 regulates the international trade of flora and fauna to protect and conserve the country’s biological diversity. The Act was developed to meet obligations under Convention on International Trade in Endangered Species (CITES) signed by the government in 2007.
24. Section 26 of the Act deals with possession of illegally obtained species of animals, plants and individual from marine and terrestrial environment in the country. Schedule I (Section 11) lists prohibited exports.

25. The objective of the Wild Birds Act 1978 is to provide protection of selected bird species throughout by providing a mechanism for the establishment of bird sanctuaries and the management of hunting of several species.

26. **Fisheries.** The Fisheries Act 2015 provides the framework for marine, brackish and freshwater fisheries management, protection and development, including licensing of fishing vessels and fish processing plants. It lists prohibited fishing methods, provides for establishment of Marine Protected Areas (MPA’s) and preparation of coastal management plans. The Act regulates the utilization and conservation of marine resource and includes resources associated with estuarine and freshwater coastal river systems.

27. **Land.** The Land and Titles Act 1988 manages and defines all lands and sets out the procedures for land acquisition, lease or purchase. The Land and Titles Amendment Act 2016 revises the Act to provide a right to resume certain fixed term estates.

28. **Provincial government.** The Provincial Government Act 1997 gives power to the provinces to make their own legislation and pass ordinances including for protection and conservation of environment, culture, wildlife and coastal and lagoon shipping.

29. **Town and country planning.** The Town and Country Planning Act 1979 applies to all urban areas (Honiara and provincial towns) and includes the management of land (all types of ownership) and management and planning functions for urban and rural areas including development.

30. **Mines and minerals.** The Mines and Minerals Act 1996 establishes the regulatory system for all mining applications and licensing and provides the system to regulate and manage mining activities including the management and permitting process required for all alluvial mining (rock, gravel and sand extraction). Construction materials must be sourced by the contractor, in accordance with the guidelines and processes outlined in this Act. For new sources, the contractor will be required to apply for a Building Material Permit (BMP) from Department of Mines and Minerals (DMM), see also section 2.1.3. The use of existing permitted quarries is preferred to the use of new locations.

31. **Forest resources.** The Forest Act 1999 provides for the sustainable harvesting and management of forest resources and repeals the Forest and Timber Utilization Act. A Forestry Bill to govern licensing of felling trees and sawmills, timber agreements on customary land, establishes State Forests and Forest Reserves and provides for the conservation of forest and its management was prepared in 2004 but has not been passed by Parliament.

32. **Water resources.** The River Waters Act 1973 provides the legal mechanism to manage and control river water for the equitable and benefit use for all and includes specific activities that manages (through acquisition of permits) construction (e.g. bridges) and the removal of key environmental habitats and biological resources.

33. In addition, the act provides a specific order for the management of the use of water and activities associated with six specific rivers systems located on Guadalcanal including; the Mataniko, White, Mbalasuna, Ngalimbui, Lungga and Mamara rivers.
34. **Health and safety.** The Safety at Work Act 1996 states that it is the duty of every employer to provide a safe workplace and to ensure the health and safety of employees under their control. This Act is linked to the Labor Act 1978 and the Safety at Work (Pesticide Regulations) 1983.

35. The Solomon Islands does not have emissions or water quality standards. While environmental standards are not provided in the regulations, the MECDM requires the use of World Health Organization standards to be used. Part IV of the Environment Act covers control of pollution and includes need to apply for licenses to discharge waste or emissions, the enforcement of these are problematic without defined national standards.

36. **Biosecurity.** The Bio-Security Act 2013 and Biosecurity Regulations 2015: i) prevent the entry of animal and plant pests and disease into Solomon Islands; ii) to control their establishment and spread; iii) to regulate the movement of animal, plant pest and diseases and of animals and plants and their products; and iv) to facilitate international cooperation in respect of animal and plant diseases and related matters. Duties and responsibilities under the legislation are performed by Biosecurity Solomon Islands (BSI), a Department of the Ministry of Agriculture and Livestock.

37. **International agreements.** Solomon Islands are a signatory to a number of international environmental agreements, conventions and treaties including those for regional agreements on chemicals, waste, pollution, biodiversity and climate. The names, purpose and the date of ratification of these agreements are provided in Appendix A.

### 2.1.3 Procedures for implementing the CSS

38. **EIA Guidelines.** The Environmental Impact Assessment Guidelines 2010 were developed by ECD to administer the second schedule of the Environment Act 1998. The guidelines comprise EIA procedural descriptions, stakeholders in the EIA process and fees required for development type and provide basic advice and guidance to government officers, planners, developers, resource owners on the environment impact assessment process. These guidelines conform with the proposed amendments to the Environment Act 1998 and the Environmental Regulations 2008. A review and suggested amendments to these guidelines have been undertaken and currently await endorsement and ratification by the nations parliament (expected to be undertaken in last quarter of 2018). The amended guidelines are currently used by ECD.

39. **Safeguards Procedures Manual.** MID is required to ensure that its activities meet both the legislative requirements of the Solomon Islands as well as the policy requirements of its development partners for all externally financed projects. MID has developed a Safeguard Procedures Manual (SPM) to guide the management of environmental and social impacts and risks from implementing the NTP, see also section 2.2.2. The SPM is based on the CSS and includes additional procedures for avoiding, minimizing, and offsetting the environmental and social impacts as required to also comply with safeguard requirements of development partners.

40. The NTP identifies the types of infrastructure required and prioritizes the area for financing which include in descending order: i) road and maintenance and rehabilitation; ii) wharf maintenance and repair; iii) new wharves; iv) maritime navigation aids and maintenance; and v) airfield maintenance.

41. In accordance with the SPM, the CPIU screens and scopes investments/projects and identifies which tier of activity it belongs to, each of the tiers creates different environmental and social impacts, the management of which requires different levels of due diligence and mitigations, as shown in Table 2.1.
### Table 2.1: SPM due diligence requirements for tiers of activity

<table>
<thead>
<tr>
<th>Tier</th>
<th>Activity type</th>
<th>Likely impact</th>
<th>Due diligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Community-based routine and preventative maintenance through labor-based equipment supported contracts, mainly for roads</td>
<td>Negligible or minor impact and risk</td>
<td>Environmental, health and safety guidelines and checklists (developed by CPIU) included in the civil works contract</td>
</tr>
<tr>
<td>2</td>
<td>Machine-based maintenance contracts for roads, wharves, and airfields</td>
<td>Localized impacts during construction activities</td>
<td>Site-specific construction environmental management plan (CEMP) prepared by contractor</td>
</tr>
<tr>
<td>3</td>
<td>Major rehabilitation, reconstruction and/or new construction contracts for roads, wharves, and airfields</td>
<td>More extensive works and larger footprint with potential to create significant impacts</td>
<td>Environmental assessment (PER or EIS) and development consent</td>
</tr>
</tbody>
</table>

Source: Adapted from MID Safeguards Procedures Manual

42. Under the CSS for environment, Tier 1 and the majority of Tier 2 are not listed as ‘prescribed activities’ under the Environment Act 1988 and are waived from requiring a development consent. Tier 3 works comprise prescribed activities that require application for development consent and some level of environmental assessment.

43. The impacts of the Tier 3 activities (generally equivalent to SPS category B) are also generally well understood and in most cases do not require more detailed impact assessment or EIS. As the subprojects involve major road rehabilitation and new works, they are a Tier 3 activity.

### 2.2 National Strategy and Plans

44. **National Development Strategy.** The NDS provides a longer-term framework for planning. The NDS is a vision and plan for all the people of Solomon Islands. It sets out a framework for development policies, priorities and programs, providing a single reference point and common direction over the next twenty years.

45. The overarching theme of the NDS is to ‘build better lives for all Solomon Islanders’ and its mission is to: “create a modern, united and vibrant Solomon Islands founded on mutual respect, trust and peaceful co-existence in a diverse yet secure and prosperous community where tolerance and gender equality are encouraged and natural resources are sustainably managed; and enable all Solomon Islanders to achieve better quality of life and standard of living for themselves and their families through constructive partnership for social, economic, political and spiritual development”. Objective 7 of the NDS is to effectively respond to climate change and manage the environment and risks of natural disasters.
46. **National Transport Plan.** The NTP, finalized in 2010 and revised in 2016, provides the strategies and objectives for the national transport system until 2036. The plan provides direct reference to the long-term management of environment safeguards and notes that the environment is the key to the country’s economic development, and that the transport sector needs to be planned and implemented in such a way that minimizes adverse environmental impacts. The NTP identifies adverse transport related impacts, which include:

- Marine pollution from shipping;
- Land degradation and pollution of water courses resulting from poor infrastructure design;
- Destruction of landscapes from poor operating practices at quarries and construction sites;
- Air pollution from both road traffic and air transport; and
- Land degradation due to inadequate facilities for the disposal of transport related waste.

47. The NTP adopts four policy interventions to minimize negative environmental impacts associated with development of the transport network and also notes that past transport activities have had less than satisfactory environmental outcomes. Therefore, one of the key objectives of the NTP is to improve safety and reduce accidents, injuries and deaths associated with the transport network.

### 2.3 Safeguard Policy Statement

48. The ADB’s SPS has the objectives to i) avoid adverse impacts of projects on the environment and affected people; ii) where possible; minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

49. The environment safeguard requires due diligence which entails addressing environmental concerns, if any, of a proposed activity. This commences with screening a project to determine its category of impact. The SPS categorizes potential projects or activities into A (most significant), B or C (least significant) to determine the level and depth of environmental assessment required to address the potential impacts.

50. ADB’s SPS applies pollution prevention and control technologies and practices consistent with good practices as reflected in internationally recognized standards such as the World Bank Group’s Environmental, Health and Safety Guidelines (EHSG). The EHSG provide the context of international best practice and contribute to establishing targets for environmental performance. Standards incorporated into the EHSG will be used in parallel with local Solomon Island environmental standards (where they exist) throughout this document with the principals of due diligence and a precautionary approach adopted. Application of occupational and community health and safety measures, as laid out in the EHSG is required under the SPS.
3 Description of the Project

3.1 Existing Operations and Facilities

51. The SIPA was established in 1956 as a statutory corporation by an Act of Parliament. The Act establishing SIPA was updated in 1996 where SIPA is now a wholly owned Solomon Islands government authority subject to the State Owned Enterprises Act (2007). SIPA reports to the Minister of Infrastructure Development (MID) and is responsible for the operation of the ports of Honiara and Noro. SIPA plays a vital role in the economy of Solomon Islands. The country’s main exports are palm oil and fish. Palm oil is exported for processing by tanker. Fish exports are concentrated in Noro, New Georgia, from where they are exported in 40ft reefer containers.

52. Imports include petroleum products for transport and power generation, processed foods, construction materials, transport equipment and consumer goods. There is a substantial trade deficit, balanced at present by international aid and remittances. The majority of unitized goods in containers are imported through Honiara. As a result of the absence of manufacturing or processed agricultural products, the trade is dominated by imports of full 20ft containers, about 80% of which are exported empty. The total throughput at Honiara Port (Plate 3.1) in 2016 was approximately 30,000 TEUs.

Plate 3.1: Aerial view of Honiara Port

Source: SIPA 2020

53. **Previous and current studies.** An Engineering feasibility study on the rehabilitation and upgrade of Honiara Port was carried out in 2018 focused on rehabilitation of the existing older international wharf (old wharf) the feasibility included environmental audit of the existing facility and the production of an IEE on the old wharf rehabilitation (IEE 2018). The current studies (2020) have revisited the “old wharf” rehabilitation option and this document presents a revised IEE, drawing extensively on the 2018 IEE document, for rehabilitation of the international wharf. An aerial photograph of the situation in 2020 is shown in Plate 3.2.

![Plate 3.2: Looking north across existing “old” wharf (Jan 2020)](source: SIPA drone photos 2020)

54. The existing facilities at Honiara (latitude. 09° 26.0’ south and longitude 159° 57.0’ east) comprise:

- #2 wharf - the “new” wharf 150m long international wharf (minimum depth 11.5m);
- #1 wharf - the “old” wharf 110m long international wharf (minimum depth 10.5m);
- Seven jetties in the domestic wharf area; and
- Port support facilities (storage, administration, servicing), freshwater, reefer, fumigation, pilotage, tug boat, equipment – forklifts, empty container handlers, loaded container handlers, reach stackers.

### 3.2 Analysis of Development Options

55. **Overview.** One of the reporting requirements of an environmental document is to investigate alternatives. The current situation is that there are two wharfs operating but the “old” wharf is structurally compromised and at the end of its working life. Decommissioning of the old wharf will substantially reduce the throughput of the Honiara Port, directly impacting on the ability of the Solomon Islands to maintain its import and export commitments.

56. In relation to this project, “alternatives” mean different ways of meeting current (or enhanced) throughput, i.e., either (i) addressing the “loss” of the old wharf by increasing capacity of the new wharf through extension and / or efficiency improvements or (ii) by refurbishing the “old” wharf to meet current and projected engineering (seismic) standards.
3.2.1 No project scenario

57. For environmental considerations, the “no project” scenario will require no new piling or additional dredging. There will be no construction impact of noise or air quality (dust) and disturbance to the benthic environment.

58. In terms of environmental impact, on the negative side, the risk for spills will continue to be present, without new interception built into the existing facilities and the likelihood of spills (due to risk) will be increased due to the poor condition of the existing wharf surface. The surface of the wharf was visibly distressed with major cracking suggesting that the safe operation of the wharf would soon be compromised (see Plate 3.3).

Plate 3.3: Major cracking and uneven surface at the #1 wharf

Source: Author 2020

59. The “do nothing” approach will result in the loss of wharf capacity as the current wharf will become structurally unsafe to operate. This is not considered to be an acceptable economic solution for the Solomon Islands.

3.2.2 Options considered in 2018

60. The 2018 studies looked at the overarching options of enhanced throughput at the new wharf and rehabilitation of the old wharf. The 2018 phase of the port development and upgrade focused on the practicality of extending the life and increasing the resilience of the old international wharf (#1 wharf) with minimum intervention, namely minimum repairs, major strengthening or reconstruction.

61. In the first phase of the project (2018) three options were considered and a preferred option assessed in terms of environmental performance. Studies were presented at a strategy workshop in March 2018, identified three possible development scenarios:
• **Do minimum** - in the short term reorganize the port layout, possibly moving specialized trades such as palm oil away from the old international wharves, repair the Old International Wharf and ensure that the method of operation of the New International Wharf takes account of the possibility of overtopping.

• **Reconstruct the old international wharf** - rather than carrying out repairs, to ensure modern standards of resilience including to seismic effects including particularly to a MM VIII earthquake.

• **Extend the new international wharf** - to the east (towards the old international wharf), retaining the old wharf primarily for small vessels, general cargo and palm oil tankers until such time as it is life expired or severely damaged by an earthquake.

24. The 2018 study assessed: (i) the requirements for additional wharf facilities to cater for growth in demand and changes in vessel types and sizes; (ii) the resilience of the existing structures to natural disasters including cyclonic storms and earthquakes’ (iii) 20 year development strategies for the port in light of the above; and (iv) feasibility designs for the first phase development at Honiara and Noro.

62. The work carried out on developing options and discussed at the workshop indicated that:

• Provided efficiency could be increased, there would no requirement within the 20 years’ period covered by the study for an increase in the wharf length.

• The old international wharf is low and likely to be impacted by mean sea level rise, but it is in the location best protected from wind and waves

• The new international wharf has sufficient length to serve the vessels most likely to use the port over the next 20 years and extending it to the east would compromise use of the old international wharf

• Future options should be restricted to alternative means of extending the life and increasing the resilience of the old international wharf.

63. The 2018 IEE was based on the fourth option of extending the life and increasing the resilience of the old wharf.

3.2.3 Options considered in 2020

64. The existing conditions at the #1 wharf are: (i) 46m suspended deck on piles constructed circa 1983 and (ii) 74m tubular bulkhead pile wall constructed circa 1982. In terms of construction, new wharves are likely to be piled with reinforced concrete decks and associated revetment works for erosion protection There may be a requirement for minor dredging works to facilitate extension of the wharf. In the 2020 studies options for the refurbishment of the #1 wharf were developed. Six options were identified and were the subject of a multi criteria analysis.

65. The options considered include:

• Option 1- repairing and strengthening # 1 wharf (US$16.2M)

• Option 2 - reconstruction of a new wharf at the old # 1 wharf location (US$78.0M)
• Option 3 - reconstruction and extension of 1983 built part of the #1 wharf and strengthening part of the wharf built in 1988 (US$31.7M)
• Option 4 - strengthening of #1 wharf and extension on western side (US$28.1M)
• Option 5 - strengthening of #1 wharf and extension on eastern side (US$22.6M)
• Option 6 - strengthening of part of #1 wharf built in 1988 and extension at southern end of the new international wharf and eastern side of #1 wharf (US$70.7M).

66. A comparison through multi-criteria analysis was used to rank the different options. Criteria were: constructability; operational upgrade; structural reliability (seismic resistance); durability; relative cost; and risk. Environmental issues were common to all options and therefore were not included in the analysis. An initial screening revealed no significant delimitation between options primarily due to the environmental similarity between options before and after renovation.6

67. Option 3 ranked best and was selected by SIPA as the preferred option for development. The key elements of Option 3 are set out in Figure 3.1.

Figure 2.1: Honiara port – the preferred option

6 Environmental impact indicators included: water quality during construction and operation; construction and operation noise and air quality; solid waste management were considered. The environmental indicators were not significantly different across the options due to the uniform footprint and already modified situation at the site.
3.3 Scope of Works and Activities

25. The 2020 studies developed the minimum intervention approach by deriving six options and determining a preferred option. The preferred option is reconstruction of the old wharf within its existing footprint. As such the key construction activities would involve:

- Removal/demolition of the old wharf concrete deck and beams and understrength western end of #1 wharf using rock breaker, cranes and possibly heavy-duty truck(s)
- Dredging of approximately 10,000m³ at west end of old wharf
- Reuse of demolished material within a reclamation removing the need for offsite disposal using a crane, excavator and truck
- Dumping of demolished sections of the old wharf within the port area as reclamation fill between the new wharf and old wharf using a crane, excavator and truck
- Reconstruction of western end of old wharf
- Emplacement of additional piles, new beams and new deck for the old wharf using cranes, and piling equipment.
- Concrete batching and pre-casting. It is assumed that the western part of the port area currently occupied by MID’s concrete batching facility would be used for concrete batching and precast yard for the wharf refurbishment works
- A small amount of dredging (10,000m³)
- Approximately 20-30 workers would be involved in these activities over approximately 6 – 9 months.

68. Figure 3.2 shows the location of wharves and identifies works proposed.

7 10,000m³ is equivalent to a 21.5m x 21.5m x 21.5m cube
Figure 3.3: Aerial view of Honiara showing wharf facilities (29 April 2019)

Source: Google Maps (accessed May 2020)
4 Description of Existing Environment (Baseline Conditions)

4.1 Physical Conditions

4.1.1 Geology and soils

69. **Geology.** Solomon Islands lies at the boundary of three major tectonic plates which form part of the Solomon Islands Subduction Zone, which include the Pacific, the Australian and the Woodlark (PNG) plate. In addition, and further northwest of the Solomon Islands is the Solomon Sea plate, which is the source of the majority of volcanoes in the Solomon Islands Figure 4.1. The uplift of the pacific plate along with intermittent volcanic and seismic activity has contributed to the island masses that now form the Solomon Islands. The islands are, geologically speaking relatively young, and the larger islands are almost entirely volcanic in origin and consist of basalt surrounded by uplifted coral terraces.

![Figure 4.1: Tectonic plates associated with the Solomon Islands](www.walrus.wr.usgs.gov/tsunami/solomon07)

70. **Soils.** There are 27 soil groups identified in Solomon Islands. Depending on parent material and land use, soils exhibit a range of fertility. The basalt volcanic derived soils are generally rich in nitrogen, phosphorous and organic carbon, but poor in potassium. The alluvially deposited soils are deep, freely drained yellowish brown to red humus-rich medium to coarse textured soils with limited profile development and reasonable natural fertility. The hill soils are older and have weathered to well-structured clays with somewhat poorer internal drainage. These soils have inclusions of limestone within their profiles and may overlie weathered coralline rock materials. Such soils have limited use and where they are retained in forests, are used for subsistence gardens, otherwise, these areas have reverted to extensive areas of grassland and have limited agricultural use.
4.1.2 Air quality, climate and climate change

71. **Air quality.** Air quality in Solomon Islands is very good, largely as a result of there being very few industries and a relatively small vehicle fleet generating emissions. There are no air quality or emissions standards in Solomon Islands and no monitoring is undertaken. Recent road rehabilitation and upgrading activities associated with the nation’s capital, Honiara has caused significant increases in air born dust as a result of the construction of roads. These temporary increased levels of dust are expected to greatly subside once sealing activities are undertaken. For the wharves, elevated air quality parameters are not anticipated during construction due to the use of precast construction (i.e. not at the construction site) and limited reclamation for the new road access.

72. **Climate overview.** The Solomon Islands has a typical tropical oceanic climate (high temperature and high humidity) throughout the year with a pronounced wet season from November to March and a dry season from April to October. The nation is subjected to tropical cyclones that are associated with the south-easterly trade winds (November to March) and is also vulnerable to the effects of tsunamis generated from volcanic activity in the Asia-Pacific region. The most important driver of global climate is the El Nino Southern Oscillation (ENSO), the ocean-atmosphere mechanisms of which impact the equatorial Pacific.

73. **ENSO** oscillates with a period of 2-7 years between El Nino, which brings lower than normal sea levels, weaker trade winds, cooler ocean temperatures and higher barometric pressures across the western equatorial Pacific, and La Nina, which brings the opposite conditions (Figure 4.2). Predominant trade winds and easterlies are shown with yellow arrows, convergence zones with rainfall are shown in blue. The warm pool of near surface water that oscillates in depth and extent across the equator during ENSO is shown in red along with high pressure systems indicated with ‘H’.

**Figure 4.2: El Nino Southern Oscillation**
74. **Temperature.** Solomon Islands has a relatively uniform temperature ranging from 22 degrees Celsius (°C) to 31°C throughout the year. The monthly average maximum temperatures are 30 to 31°C and the monthly average minimum temperatures range from 22 to 23°C. The monthly average maximum and minimum temperatures observed for 2016 in Honiara are as shown in Figure 4.3.

![Figure 4.3: Average annual (2016) min & max temperature °C for Honiara](source: www.weather-and-climate.com)

75. **Precipitation.** The average annual rainfall is mostly within the range 3000 to 5000 mm with the majority of monthly rainfall amounts in excess of 200 mm. In most of the Solomon Islands, the wettest months are during the Northwest monsoon season (January to March averaging 380 mm), with a tendency for reduced amounts during February when the equatorial trough is normally furthest south. Locations on the southern sides of the larger islands (e.g. Guadalcanal) tend to have rainfall maximums between June and September. The average monthly rainfall per month in mm for 2016 for Honiara is given in Figure 4.4.

![Figure 4.4: Average annual monthly rainfall in mm for 2016](source: www.weather-and-climate.com)

76. **Humidity.** Relative humidity throughout the nation shows little seasonal variation however it does have a marked diurnal fluctuation. Humidity is highest in the morning and frequently reaches 90 percent.
77. **Cyclones and extreme weather.** Tropical low-pressure systems occur each year over the Solomon Islands at times when the equatorial trough is in the vicinity; few of these develop into cyclones. The average frequency of tropical cyclones is between one and two per year, tending to increase southwards (Figure 4.5). Tropical cyclones affecting Solomon Islands are usually relatively small but can result in serious damage due to strong winds and heavy rainfall. In addition, tropical cyclones will result in abnormally high ocean tides that may rise 3-6 m above the regular tide. This is due to the pooling of seawater by the frictional effect of very strong winds persistently gusting on shore as the cyclone approaches a shallow coastline. This can result in inundation of low-lying coastal plains and impacts on the shoreline and beach on beach profiles.

78. Solomon Islands has been affected by an average of 13 tropical cyclones per decade, with most occurring between November and April, the tropical cyclone season in the Solomon Islands. Only rarely are occurrences reported outside this period.

**Figure 4.5: Tropical cyclone pathway in the Solomon Islands**

79. Tropical cyclones are most frequent in El Niño years and least frequent in La Niña years. The ENSO-neutral average is nine cyclones per decade. Tropical cyclones result in flooding and wind damage in the Solomon Islands. There have been severe floods on Guadalcanal, Malaita, Makira and Isabel in recent years, with lives lost, and severe damage to agriculture and infrastructure.

80. In addition, tropical cyclones will naturally result in abnormally high ocean tides that may rise up to 3-6 m above the regular tide. This is due to the pooling of seawater by the frictional effect of very strong winds persistently gusting on shore as the cyclone approaches a shallow coastline. This can result in inundation of low lying coastal plains and impacts on the shoreline and beach on beach profiles.
81. **Climate change.** Wave climate and climate change trends around the Solomon Islands are affected by processes occurring over large areas of the Pacific Ocean, from the northern to the southern subtropical zones (35° north to 35° south). Climate change projection scenarios are typically divided into four representative concentration pathways, based on a range of emissions output scenarios. These were developed by others and refined for the Pacific by the Pacific-Australia Climate Change Science and Adaptation Planning Science Program (PCCSP) supported by the Australian Government using global climate modeling experiments.

82. The climate change risk and vulnerability assessment for the Project, using PCCSP data and projections, concluded that by 2030, annual temperatures are projected to increase by approximately 0.7°C, irrespective of the emissions trajectory over the next decade and a half, while by 2090, a ‘business as usual’ high emissions scenario could result in as much as a 4.0°C annual temperature increase and that there is very high confidence that both sea surface and air temperatures will continue to increase across the Solomon Islands (PCCSP 2014).

83. Extreme rainfall events, however, are expected to increase in frequency and intensity, with a current 1-in-20-year daily rainfall event increasing by 9mm by 2030. This increases to an additional 43mm by 2090, under a worst-case, very high emissions scenario. It is projected that the intensity and frequency of days of extreme heat will increase over the course of the 21st century. As greenhouse gas concentrations increase, so will the intensity and frequency of days of extreme heat. Extreme rainfall, with lower drought incidence, and a decline in the number of tropical cyclones in the south-west Pacific Ocean are the key weather projections.

84. Satellite data indicates the sea level has risen near the Solomon Islands by about 8 mm per year since 1993, more than double the global average of 2.8–3.6 mm per year and is expected to continue to rise (PCCSP 2013). The tide gauge at Honiara installed in 1994 records sea level and other meteorological data at hourly intervals. The ocean around the Solomon Islands is increasing in acidity, impacting corals and reef ecosystems (PCCSP 2013). Ocean acidification is projected to continue (very high confidence). Projections from all analyzed CMIP3 models indicate that the annual maximum aragonite saturation state will reach values below 3.5 by about 2045 and continue to decline thereafter. This will impact the coastal ecosystems, especially of reef ecosystems. It may be compounded by other stressors including coral bleaching, storm damage and fishing pressure.

85. The projected climate changes for some key variables are shown in Table 4.1. In summary the key projections suggest:

- Increase in average annual rainfall, intensity of extreme rainfall event and changes in average recurrence interval (ARI) for 24-hour rainfall event;
- Sea level rise;
- Storm surge;
- Increased temperatures; and
- Changes in wind and wave climate and increases in extreme wave heights and ocean acidity.
Table 4.1: Projected changes in annual and seasonal mean climate for Solomon Islands

<table>
<thead>
<tr>
<th>Variable</th>
<th>Return or time period</th>
<th>2020-2039</th>
<th>2046-2065</th>
<th>2080-2099</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1</td>
<td>A1B</td>
<td>A2</td>
<td>B1</td>
<td>A1B</td>
</tr>
<tr>
<td>Surface air temp (°C)</td>
<td>Annual</td>
<td>0.4-0.6</td>
<td>0.4-0.8</td>
<td>0.3-0.7</td>
<td>0.4-1.1</td>
</tr>
<tr>
<td>Max. temp (°C)</td>
<td>1-in 20-years</td>
<td>NA</td>
<td>0.5-1.0</td>
<td>0.6-1.4</td>
<td>0.4-1.5</td>
</tr>
<tr>
<td>Min. temp (°C)</td>
<td>1-in 20-years</td>
<td>NA</td>
<td>1.2-1.8</td>
<td>1.5-1.9</td>
<td>1.6-1.7</td>
</tr>
<tr>
<td>Total rainfall (%)</td>
<td>Annual</td>
<td>1-9</td>
<td>2-9</td>
<td>2-6</td>
<td>4-8</td>
</tr>
<tr>
<td>Wet season rainfall (%)</td>
<td>Nov-Apr</td>
<td>2-9</td>
<td>2-9</td>
<td>2-7</td>
<td>5-8</td>
</tr>
<tr>
<td>Dry season rainfall (%)</td>
<td>May-Oct</td>
<td>0-11</td>
<td>2-13</td>
<td>2-9</td>
<td>3-11</td>
</tr>
<tr>
<td>Sea surface temp (°C)</td>
<td>Annual</td>
<td>0.4-0.6</td>
<td>0.3-0.7</td>
<td>0.4-0.7</td>
<td>0.3-0.9</td>
</tr>
<tr>
<td>Mean sea level (cm)</td>
<td>Annual</td>
<td>4-14</td>
<td>5-14</td>
<td>4-15</td>
<td>10-26</td>
</tr>
</tbody>
</table>

Notes: B1 – low emissions scenario; A1B – medium emissions scenario; A2 – high emissions scenario

Source: Pacific-Australia Climate Change Science and Adaptation Planning (2011)

86. The climate change risk and vulnerability assessment undertaken for the Project adopted the worst-case (business-as-usual) scenario. To include climate change and uncertainty in the design criteria the allowances presented in Table 4.2 were incorporated into the design. A 20% increase in rainfall intensity has been included in the hydrology calculations for the design of the subprojects.

Table 4.2: Climate change criteria for design consideration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Climate change impacts</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level rise</td>
<td>60 cm for 2090</td>
<td>MID, 2015</td>
</tr>
<tr>
<td>Wave setup</td>
<td>60 cm (severe wave condition)</td>
<td>WACOP, 2014</td>
</tr>
<tr>
<td>Storm surge</td>
<td>1.5 m</td>
<td>MID, 2015</td>
</tr>
<tr>
<td>Astronomical tide</td>
<td>57 cm (from Chart datum)</td>
<td>IGOSS, 2017</td>
</tr>
<tr>
<td>Wind</td>
<td>100-year ARI, 2 - 11% increase in max. wind speed</td>
<td>PACCSAP, 2014</td>
</tr>
<tr>
<td>Sea level fluctuations</td>
<td>0.25 m</td>
<td>T+T, 2017</td>
</tr>
<tr>
<td>Temperature</td>
<td>+2 – 8°C (RCP 8.5)</td>
<td>PACCSAP, 2014</td>
</tr>
<tr>
<td>Rainfall</td>
<td>320 mm for 1 in 20 year-event (RCP 8.5)</td>
<td>MID, 2017</td>
</tr>
</tbody>
</table>

Source: TA 9331-REG - Climate Change and Disaster Risk Vulnerability Assessment- (May 2018)
4.1.3 Hazards- volcano, earthquakes, tsunami

87. The Solomon Islands is prone to natural hazards including cyclones, earthquakes, tsunamis and landslides. Due to the location of Solomon Islands at the junction of the tectonic plates, there is constant seismic activity including earthquakes and volcanic eruptions. The World Bank’s Natural Disaster Hotspots study identifies the Solomon Islands as the number one Pacific nation subject to hazards risk, 10th in the world most exposed to three or more hazards and 25th country in the world for relatively high mortality risk for multiple hazards.8

88. Volcanoes. The volcanoes of the Solomon Islands form a NW-SW trending island chain continuing along to the Bougainville Island chain (which forms part of Papua New Guinea). The islands belong to a volcanic arc caused by the subduction of the oceanic crust of the small Solomon Plate under the Pacific Plate (Figure 4.6). New Georgia Sound constitutes the junction between the New Georgia-Kolombangara-Vella Recent volcanic province and the older Choiseul Cretaceous-Early Tertiary basaltic platform. The main observed faulting is northwest-southeast. This area is tectonically complex, marked by the interaction of several closely spaced oceanic microplates separated by subduction zones and short spreading centres, such as one extending from southeast PNG to Kavachi volcano. There are 11 volcanoes in the vicinity of the Solomon Islands of which four have been active in the recent past, Kavachi and Cook are submarine and Savo and Tinakula islands. The Solomon Islands are exposed during eruptions to impacts such as ash fall, ballistics, lahars and pyroclastic and lava flows from landmasses and neighbouring islands.

Figure 4.6: Solomon Islands & PNG Volcanoes experienced Holocene eruptions

Source: Siebert, Simkin and Kimberly, 2010

89. **Earthquakes.** Earthquakes are common in Solomon Islands with 66 earthquakes reported for the year 2017; as such they are a near-weekly event. The active seismicity is directly linked to the location of Solomon Islands at the junction of several tectonic plates that results in constant seismic activity including earthquakes and uplifting of land and reef areas. Solomon Islands remain vulnerable to future earthquakes.

90. The most recent destructive earthquake was on the 6th of February 2013 with a magnitude 8 which struck the island of Santa Cruz in Temotu Province leading to a tsunami which generated a peak sea level change of 0.9 - 1 m. Similarly, a destructive earthquake and tsunami occurred in Western and Choiseul provinces on 2 April 2007. In the 1970’s an earthquake affected the populations of Guadalcanal causing considerable destruction to village on the weathered coast resulting in three new villages, New Duidui, New Gorabau and Vatuloki, being constructed at Aruligo in the north west in 1977 after the people’s original homes on the weather coast were completely destroyed by the earthquake.

91. **Tsunami.** Tsunamis are caused by the vertical displacement of seabed fault lines during earthquakes, or by other processes such as a volcanic eruption, volcanic collapse or submarine landslide. Tsunami-generating earthquakes tend to be shallow and of relatively-large magnitude (i.e., greater than Richter Scale magnitude 7.0), hence the occurrence of a large shallow earthquake located beneath the ocean will more often than not produce a tsunami, providing there is vertical offset of the sea floor.

92. The Solomon Islands has been impacted by 22 tsunami events between 1926 and 2016. The majority of tsunamis were caused by earthquakes in, or close to, the Solomon Islands whilst two were caused by a distant earthquake and one by landslides on a volcano. Four tsunamis caused loss of life, and at least five tsunamis caused significant damage to structures, four of which had increased sea wave heights of 3 to 6 m. The largest in more recent times was in April 2007 that was triggered by an earthquake of magnitude of 8.1 (Richter Scale) and resulted in considerable damage and loss of life predominately in the western province of the nation. The tsunami generated a wave with a focus run of up to >12 m in some areas (Newman, et al., 2011). The Pacific Tsunami Warning Centre in Hawaii provides tsunami warning advice for the Pacific Island Countries, including the Solomon Islands.

4.1.4 **Water resource availability and quality**

93. Freshwater availability varies considerably across the archipelago. On the large volcanic islands (e.g. Guadalcanal) water resources derived from river systems are abundant due to the mountainous topography and weather conditions whilst, the nation’s coral atolls and islets have no perennial surface water resources and rely on rainwater and thin fresh groundwater lenses (SOPAC, 2007, SIWA, 2013). Aquifers on the islands are small and depend mainly on precipitation for recharge (Sullivan and Guglielmi, 2007). The total annual renewable water resources in the country are estimated at 44,700 million m³ and is estimated that about 50-70% of rural population have access to piped or improved water supply while coverage in urban areas is about 80-90%.

94. The larger islands, surface water in the form of streams, springs or rivers are the main source of drinking water. Some communities on the higher volcanic islands also use groundwater for domestic purposes. On the small atoll islands and islets where water is scarce, rainwater is collected for drinking and brackish water from shallow hand-dug wells is utilized for most of their other domestic needs.
95. Freshwater quality in general throughout the nation is of good quality, however water resource quality associated with the urban and village areas, especially Honiara is in decline.

96. The key institutions responsible for water resources management are:
   - The Ministry of Mines and Energy (MME) is responsible for providing national coverage related to water resources assessment, management and the development of groundwater;
   - The Solomon Islands Water Authority (SIWA) is responsible for providing management and development of water resources and sewerage services in the capital Honiara and main urban areas; and
   - The Environmental Health Division of the Ministry of Health and Medical Services (MHMS) is responsible for providing safe water and sanitation to rural populations in Solomon Islands.

97. Water is available and plentiful in Honiara and the port provides fresh water for ships accessing the port.

4.1.5 Honiara port water quality

98. A detailed water quality survey of Honiara Harbour was undertaken as part of the JICA financed port study in 2013. Survey findings are considered sufficient for establishing baseline harbour water quality conditions for the IEE. A summary of sampling locations, parameters measured and key findings of the JICA survey is provided below.

99. Methodology. Five water samples were collected from five sampling points. At each sampling point the sample was collected 0.5m below the water surface. Sampling locations are shown in Figure 4.7.

100. Parameters measured. Dissolved oxygen and temperature measurements were taken on site. Bottled samples were collected for turbidity, pH, salinity, total suspended solids (SS), total nitrogen, total phosphorus, chemical oxygen demand, oil and grease, total coliforms and transparency. The results of the water quality survey are shown in Table 4.3.

---

9 JICA. 2013. Second Preparatory Survey Report for Outline Design on the Project Improvement of Honiara Port Facilities - Section 1-3 Environmental and Social Considerations
**Figure 4.7: Water quality sample locations**

![Google Earth map showing water quality sample locations](image)

**Table 4.3: Results of JICA water quality survey**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>WQ-1</th>
<th>WQ-2</th>
<th>WQ-3</th>
<th>WQ-4</th>
<th>WQ-5</th>
<th>Criteria / Guidelines</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen-ion Exponent (pH)</td>
<td>-</td>
<td>7.8</td>
<td>7.9</td>
<td>8.1</td>
<td>7.9</td>
<td>7.9</td>
<td>7.8 - 8.3</td>
<td></td>
</tr>
<tr>
<td>Suspended Solids (SS)</td>
<td>g/m³</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>&lt;3</td>
<td>5mg/l or less</td>
<td>1)</td>
</tr>
<tr>
<td>Chemical Oxygen Demand (COD)</td>
<td>mg/l</td>
<td>1.4</td>
<td>1.3</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>2mg/l or less</td>
<td>1)</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO)</td>
<td>mg/l</td>
<td>7.18</td>
<td>7.20</td>
<td>7.69</td>
<td>7.32</td>
<td>7.34</td>
<td>7.5mg/l or more</td>
<td>1)</td>
</tr>
<tr>
<td>Coliform Bacilli</td>
<td>cfu/100 ml</td>
<td>2,900</td>
<td>2,500</td>
<td>130</td>
<td>630</td>
<td>300</td>
<td>1,000/100ml or less 500/100ml</td>
<td>2)</td>
</tr>
<tr>
<td>n-Hexane Extraction Substance</td>
<td>mg/l</td>
<td>&lt;4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>&lt;4</td>
<td>Not to be detected</td>
<td>1)</td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>mg/l</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
<td>0.2mg/l or less</td>
<td>1)</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>mg/l</td>
<td>0.015</td>
<td>0.027</td>
<td>0.018</td>
<td>0.014</td>
<td>0.017</td>
<td>0.02mg/l or less 0.025mg/l</td>
<td>1)</td>
</tr>
<tr>
<td>Salinity</td>
<td>%</td>
<td>33</td>
<td>33</td>
<td>35</td>
<td>34</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparency</td>
<td>Secchi Depth(m)</td>
<td>4.2</td>
<td>5.0</td>
<td>10.0</td>
<td>5.0</td>
<td>11.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>28.8</td>
<td>28.9</td>
<td>29.1</td>
<td>29.1</td>
<td>29.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Japan - Environmental quality standards for conservation of the living environment, Coastal Waters, class A, class I (Total nitrogen, Total phosphorus) or Lakes, class A (SS)
2) Japan - Water Quality Criteria for Bathing Beaches, Satisfactory for bathing, Category C
3) Australian and New Zealand Environment and Conservation Council (ANZECC) - Guidelines for Fresh and Marine Water Quality and Sediment Quality Guidelines

Source: JICA Section 1-3 Environmental and Social Considerations (2013)
101. **Key findings.** Water quality parameters in Honiara harbour within and around the project site are generally within acceptable international guidelines at all 5 sampling locations with the exception of coliform bacteria at WQ-1 and WQ-2. These two locations also show higher COD and total phosphorus and lower transparency compared with the other locations. This seems to indicate that water quality in the vicinity of WQ-1 and WQ-2 are affected by municipal effluent.

4.2 Biological Resources

4.2.1 Marine and coastal habitats, flora and fauna

102. **Overview.** The marine and coastal ecosystems of Solomon Islands are part of the Western Pacific centre of marine biodiversity. The coastal zones are characterized by highly variable patchy ecosystems that include estuaries, lagoons, beaches, mangroves, coral reef areas, sea grass beds, algal beds and small islands. Coral reefs are narrow, fringing, and intermittently distributed around the high islands, with barrier reefs and expansive inter-tidal reefs not common. The coral reefs are most often associated with either uplifted shores attached to volcanic coastlines or seaward elevated coral limestone beaches.

103. Solomon Island has an open marine tenure system that allow anyone to fish the inshore waters (high water mark to 12 nautical miles offshore) and is subsequently managed by the national government, although historically and currently, communities claim some authority (which varies between islands and communities) over adjacent community marine and coastal areas with respect to resource ownership and extraction.

104. The dominant marine ecosystems of Guadalcanal adjacent to the Honiara Port project site includes the remnants of a coastal foreshore beach (that has been reclaimed for port activities) and a coastal fringing reef system that includes intertidal and subtidal marine habitats. The reef systems associated with the project within the urban areas of Honiara adjacent to the project sites have been impacted by anthropogenic activities for many years and degradation of the natural system has occurred. The beach and intertidal reef systems associated with the port have been reclaimed and are utilized for port activities.

105. Solomon Islands’ main fisheries zones include: the freshwater streams and rivers and associated wet lands; the shallow fringing coastal reef or intertidal zone; the sub-tidal areas and reef slope including fissures or canyons in the reef slope (to about 25 m depth); the deep reef and near-shore deep-water areas below 25 m; and the open ocean or pelagic fishery. All of these areas are of critical subsistence importance, as well as being a local income generation opportunity. The first four zones are usually considered to be part of the “inshore fishery” and the latter referred to as the “offshore fishery”.

106. Marine systems, especially the first three zones (intertidal, sub tidal, and inshore reef areas) have been heavily exploited for subsistence and small scale artisinal livelihood activities whilst the deeper water slope benthic fisheries are becoming increasingly targeted. These activities have used a wide range of traditional and modernized fishing gear and techniques targeting a wide range of resources.

107. **Coral reefs.** The marine fauna and flora of the Solomon Islands is considered highly diverse. According to a 2007 study conducted by Coral Reef Initiatives for the Pacific, the Solomon Islands have one of the highest coral diversities in the world. 494 species were recorded (485 known species and nine unknown species which may be new species).
108. These reef systems support one of the richest concentrations of reef fishes in the world with a total of 1,019 fish species identified. The coral reefs are mainly fringing and intermittent around islands and occur along mostly shallow coastlines where the water is clear and warm and maintains a constant level of salinity. Coral reefs support extraordinary diversity of species by providing food, shelter, nursery and feeding grounds for many fish species and crustaceans. The reefs protect coastal areas from storms and erosion by forming natural breakwaters, whilst providing a wide range of services to the nations citizens. There are no coral reefs associated with the wharf projects area of influence.

109. **Fisheries.** Solomon Islands has an open marine tenure system that allows anyone to fish the inshore waters (from high water mark to 12 nautical miles offshore) and which is managed by the national government, although both historically and currently, communities claim some authority over adjacent community marine and coastal areas with respect to resource ownership and extraction.

110. Solomon Islands’ fisheries include five zones: i) freshwater streams and rivers and associated wet lands; ii) shallow fringing coastal reef or intertidal zone; iii) sub-tidal areas and reef slope including fissures or canyons in the reef slope (to about 25 m depth); iv) deep reef and near-shore deep-water areas below 25 m; and v) open ocean or pelagic fishery. All of which are of critical subsistence importance, as well as local income generation. zones i) to iv) are usually considered to be part of the “inshore fishery” whilst v) is referred to as the “offshore fishery”. Commercial fishing--foreign fishing licenses focusing on pelagic resources, tuna species specifically--is permitted between 12 nautical miles from the coast to 200 nautical miles from the shoreline. The first three zones (intertidal, sub tidal, and inshore reef areas) have been heavily exploited for subsistence and small-scale artisanal livelihood activities whilst the deeper water slope benthic fisheries are becoming increasingly targeted. These activities have used a wide range of traditional and modernized fishing gear and techniques targeting a wide range of resources.

111. **Mangroves.** Mangroves are important ecosystems for aquatic organisms and provide critical breeding habitats for a wide variety of reef and coastal invertebrate and vertebrate species. They provide structural protection to coastlines and act as a buffer between land and sea and act as a sink for sediments, nutrients and other contaminants to maintain coastal water quality, and promote the growth of coral reefs and sea grass. The Nature Conservancy reported 20 species and two hybrids of mangroves in the Solomon Islands. They include: *Heritiera littoralis, Aegiceras corniculatum, Sonneratia alba, S. caseolaris, S. gulgai, Osbornia octodonata, Lumnitzera littorea, Rhizophora apiculata, R. stylosa, R. lamarckii, R mucronata, Bruguiera gymnorrhiza, B. parviflora, B. sexangula, Ceriops tagal, Excoecaria agallocha, Xylocarpus granatum, X. mekongensis, Avicennia alba, A. marina, Scyphiphora hydrophyllacea* and *Nypa fruticans*. There are no mangrove forests or individual trees that will be directly or indirectly impacted by the subprojects’ scope of works.

112. **Seagrass.** Seagrass meadows are a significant coastal habitat and contain high biodiversity value and are the main diet for species such as the endangered green sea turtle (*Chelonia mydas*) and dugongs (*Dugong dugon*) and are found throughout the Solomon Islands. Seagrasses grow in soft bottom estuarine and marine environments and can be found extending from the intertidal zone to sub-tidal, along mangrove coastlines, estuaries, shallow bays, coral reefs, inter-reed and offshore islands. In Solomon Islands there are ten species of seagrass (in two families), which represents 80% of the known seagrass species in the Indo-Pacific Region.
113. Malaita Province has the most extensive meadows within Solomon Islands (Table 4.4), including one that is more than 1,000 ha in size.

<table>
<thead>
<tr>
<th>Province</th>
<th>Area of seagrass (ha)</th>
<th>No. of seagrass meadows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalcanal</td>
<td>101.3</td>
<td>31</td>
</tr>
<tr>
<td>Makira</td>
<td>229.1</td>
<td>52</td>
</tr>
<tr>
<td>Central</td>
<td>651.5</td>
<td>56</td>
</tr>
<tr>
<td>Western</td>
<td>754.4</td>
<td>134</td>
</tr>
<tr>
<td>Isabel</td>
<td>535.9</td>
<td>99</td>
</tr>
<tr>
<td>Choiseul</td>
<td>753.8</td>
<td>49</td>
</tr>
<tr>
<td>Malaita</td>
<td>3,607.6</td>
<td>59</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,633.8</strong></td>
<td><strong>480</strong></td>
</tr>
</tbody>
</table>


4.2.2 Threatened and protected species

114. The International Union for Conservation of Nature and Natural Resources (IUCN) undertakes a global assessment to classify species at risk of global extinction. The 2015 IUCN Solomon Islands Red List identifies 234 threatened species in total; 20 mammals, 21 bird species, five reptiles, two amphibians, 18 fishes, two mollusks, 149 other invertebrates and 17 plants. Two species of bird have been declared extinct in the Solomon Islands; the Thick-billed Ground Dove, *Gallicolumba salamonis* and the Choiseul Pigeon, *Microgoura meeki*. The IUCN’s Critical Ecosystem Partnership Fund (CEPF) work has identified three critically endangered species and one endangered within the Guadalcanal Watersheds KBA; *Pteralopex pulchra* (Montane monkey-faced bat), *Uromys imperator* (emperor rat), *Uromys porculus* (Guadalcanal rat) and *Tiradelphe schneideri* (Schneider’s Surprise – butterfly), respectively.

115. These are also Alliance for Zero Extinction (AZE)\(^{10}\) trigger species. None of these species are recorded within the port’s influence area.

116. **Turtles.** Five turtle species found in Solomon Islands are listed as protected on the Red List including: critically endangered Hawksbill turtle (*Eretmochelys imbricata*); endangered Green turtle (*Chelonia mydas*), Olive Ridley turtle (*Lepidochelys olivacea*) and Loggerhead turtle (*Caretta caretta*); and vulnerable Leatherback turtle (*Dermochelys coriacea*). None of the species are recorded to nest on the beaches along the northern coastline of Guadalcanal nor are any associated with the port of Honiara. The identified nesting sites for turtles in Solomon Islands include:

- Arnavon Islands (Isabel/Choiseul Provinces);

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\(^{10}\) Launched globally in 2005, the AZE engages 88 non-governmental biodiversity conservation organizations working to prevent species extinctions by identifying and safeguarding places that are habitat for species evaluated to be endangered or critically endangered under IUCN criteria.
117. **Cetaceans.** Cetacean species are common in Solomon waters and their habitat is usually major rivers, mangroves and open ocean environments such as oceanic islands, oceanic fronts and upwelling, seamounts, canyons, deep-sea trenches and the water column itself. As one of the few equatorial regions worldwide where hemispherical oceanic exchange of a wide variety of marine life occurs, The Nature Conservancy (TNC) conducted a survey in 2006 to trace movements of these cetaceans. According to a survey, cetacean movements between the South Pacific and North Pacific are known or suspected (depending on the species) to occur through the major island passages of the Solomon Islands’ archipelago, such as Indispensable Strait, Bougainville Strait - separating the Solomon Islands from Papua New Guinea (PNG), Manning Strait and New Georgia Sound. These areas have been classified as the migratory corridor for these marine mammals. There is no known readily available information on their seasonal migrations. These mammals in general are off shore and outside the area of influence of the project area.

118. **Dugong.** Dugong (*Dugong dugon*) is a medium size marine mammal (up to 3m long and 400 kg) that can travel long distances and spends its entire life in the ocean, predominately in shallow coastal areas. Their status on the IUCN threatened red list is Vulnerable (IUCN, 2012). The animal is exclusively herbivorous feeding only on sea grass and as such is closely linked with sea grass habitats. Dugong populations in the Solomon Islands have decreased considerably over the past century and current population stocks are very low and are predominately found associated with the country’s large sea grass ecosystems. The shallow water coastal waters associated with the port of Honiara have no sea grass beds and as such there are no resident populations of dugongs, however anecdotal information gathered during the assessment indicated periodically small numbers of individuals can be seen moving through the waters adjacent to the commercial center of Honiara and the commercial port.

119. **Crocodiles.** Crocodiles (namely *Crocodylus porosus*) are found throughout the Solomon Islands and are listed as threatened on the IUCN Red list as a Low Risk and are currently protected from export (skins and parts) under the Conservation Act. This species of crocodile is large (up to 6 m in length) and its preferred habitat is associated with rivers, wetlands, lagoons and coastal areas and as such has been reported in these ecosystems to the west and east of the port. The incidence of an individual being seen passing through the waters associated with the Honiara port is rare.

120. Of the 308 globally threatened species in the east Melanesian hotspot 225 (73 percent) occur in the Solomon Islands key biodiversity areas (KBA), including 40 not found elsewhere. Appendix 3 is a summary of these species in classes by status for the whole hotspot and by country distribution. As part of the east Melanesian hotspot, Solomon Islands has a high level of endemism (Table 4.5), predominately associated with fauna. This includes 19 mammals (14 bats and 5 rats), 67 birds, 19 reptiles, three amphibians (frogs), two butterflies and one vascular plant.
Table 4.5: Endemism in East Melanesian Hotspot and Solomon Islands

<table>
<thead>
<tr>
<th>Class</th>
<th>East Melanesian Islands Hotspot</th>
<th>Solomon Islands KBA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resident &amp; breeding species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotspot endemics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Threatened hotspot endemics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Endemism (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Threatened endemics (%)</td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td>81</td>
<td>21</td>
</tr>
<tr>
<td>Birds</td>
<td>288</td>
<td>34</td>
</tr>
<tr>
<td>Amphibians</td>
<td>49</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>418</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Endemism (%)</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Threatened endemics (%)</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Solomon Islands KBA</td>
<td>89</td>
</tr>
</tbody>
</table>

Source: CEPF – Ecosystem Profile of East Melanesian Hotspot (2012)

4.2.3 Protected areas

121. **Marine protected areas.** Most marine protected areas are designated as no take zones and are managed as custom resource and three have a national designation. The marine protected areas and managed marine areas (MMA) account for 956 km² or 0.06% of the exclusive economic zone.

122. There are a total of 22 marine protected areas in the Solomon Islands and one designated marine conservation area (Arnavon Marine Conservation Area), none of which are located along the north western coastline of Guadalcanal and as such well beyond the Honiara Port. In addition, local communities around the country are developing marine managed areas (MMA) based principally on traditional and community (customary) ownership. It is reported that in 2016 there were a total 127 MMAs located throughout the country. The only registered MMA on Guadalcanal is located in the eastern end of the island in Marau Sound. However, recently the communities located in the western end of the island have developed small MMAs which have as yet to be officially registered. The Marau Sound and the small MMA are not located anywhere near the Port of Honiara.

123. **Terrestrial protected areas.** There are 17 terrestrial protected areas in the Solomon Islands (Table 4.6) and these are detailed in Appendix 4.

Table 4.6: Terrestrial protected areas

<table>
<thead>
<tr>
<th>Province</th>
<th>No. of protected areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalcanal</td>
<td>2</td>
</tr>
<tr>
<td>Western</td>
<td>4</td>
</tr>
<tr>
<td>Choiseul</td>
<td>3</td>
</tr>
<tr>
<td>Isabel</td>
<td>3</td>
</tr>
<tr>
<td>Makira</td>
<td>2</td>
</tr>
<tr>
<td>Malaita</td>
<td>2</td>
</tr>
<tr>
<td>Temotu</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

Source: MECDM (2009)
124. **Biodiversity areas.** In July 2013 the IUCN launched the CEPF a $9 million, eight-year investment program to conserve globally important biodiversity found in 20 KBA, approximately 1.5 million ha within the east Melanesian hotspot in Solomon Islands, Vanuatu and east Papua New Guinea. The hotspot is also part of the Coral Triangle, a region defined by areas with more than 500 coral species and high alpha diversity of fish and marine invertebrates. Notable endemic species include the Solomon’s sea eagle (*Haliaeetus sanfordi*) and many species of flying-fox (*Pteropus sp.*).

125. The east Melanesian hotspot also harbor a diverse and unique group of flora and fauna including: 3,000 endemic vascular plants species, 41 endemic mammals, 148 endemic birds, 54 endemic reptiles, 45 endemic amphibians and three endemic freshwater fishes. The hotspot is a conservation priority, and habitats include coastal vegetation, mangrove forests, freshwater swamp forests, lowland rainforests, seasonally dry forests and grasslands, and montane rainforests.

126. Not only do species have importance at the global scale due to endemism and the threatened status of many species but also in the patterns and processes that have underpinned the development of theories of evolutionary biology. Moreover, the natural environment still has extremely high local importance to the people of the islands, due to its role in their traditional practices and cultural identity.

127. None of the 36 KBA identified in Solomon Islands (Figure 4.8) are within or close to the port.

**Figure 4.8: Priority biodiversity sites Identified by the CEPF**

![Priority biodiversity sites](image)

Source: CEPF – Ecosystem Profile of East Melanesian Hotspot (2012)
4.2.4 Inshore marine ecology baseline

128. An inshore marine baseline ecological survey and assessment was undertaken on the marine ecosystems associated with the intertidal and subtidal reef habitats and benthic substrate within the port of Honiara. The full marine ecological assessment is provided as a stand-alone report and the main findings of the inshore baseline ecological survey for that report are presented below.

129. Two specific marine site assessments were undertaken: (i) marine assessment adjacent to #1 wharf which includes the project’s area of influence, and (ii) marine assessment of the reef systems west of the #2 ‘new’ wharf through to the end of the SIPA boundary. This assessment site is located outside the project’s area of influence and is included to provide context of the wider area.

130. **Methodology.** Both marine assessments were undertaken on 10 April 2018 using a combination of free diving (snorkeling) and SCUBA diving qualitative and quantitative habitat and resource assessment scientific visual survey methods. Six SCUBA dives (5 – 12 meters) and one free diving marine assessment covering an area of 188 m² was assessed in full (1-12 m water depth) adjacent to the old wharf within the project’s area of influence (Figure 4.9). In addition, a free diving marine assessment covering an area of 1,284 m² was assessed in full (1 – 12 m water depth) along the entire port shoreline running west of the new wharf to the SIPA marine boundary. This area is outside of the area of influence of the proposed refurbishment works of the old wharf. Information associated with these sites is not discussed in the main body of the marine report, rather the data collected from these sites provides a marine ecological baseline for any potential future activities in these areas.

**Figure 4.9: Location of the marine assessment survey sites at Honiara Port**

Note. There are six dive sites (white) and three specific coastal reef systems (red) in relation to the existing Port of Honiara (not to scale).

131. The port boundary follows the natural coastline and is bordered to the north by an extensive intertidal and subtidal fringing reef (1-16 m depth) that extends northwards some 50-80 meters before reaching a sand dominated substrate. The subtidal fringing reef continues along the western side of the port, albeit considerably reduced in width, whilst the eastern side of the port possesses almost no fringing reef (reclaimed for berths), rather it is a subtidal marine area dominated by fine silt and sand. The port is directly connected to the mainland throughout its southern boundaries (Figure 4.10).

**Figure 4.10: Marine survey boundary at Honiara Port**

132. Significant foreshore alteration has taken place along the eastern and western intertidal boundaries of the Port that has resulted in the reclamation of the original shallow water intertidal lagoon back reef and exposed beach areas. The coastline associated with the port’s boundary is protected in the most part by rock and dolos seawall designed to provide all year round protection from storm surge and waves (Plate 4.1 a and b). The western side of the port also includes a number of sunken vessels and old equipment that has been placed along the shoreline, presumably to aid in coastal protection. (Plate 4.1 c).

**Plate 4.1: Port protection - Rock (a) dolos; (b) sea wall; and (c) sunken vessels**
133. The Honiara domestic port is located less than 100 m to the south and east of the international port (refer Figure 4.10) and consists of a number small concrete and wooden berths that extend north of the shoreline. The port is utilized by both domestic passenger and cargo vessels (Plate 4.2 a and b) and is a source of significant marine pollution (garbage, sewage, petrochemical). SIPA does not manage this port.

**Plate 4.2 a and b: Honiara domestic port to the east of International port**

![Honiara domestic port](image)

134. The Mataniko River discharges into the sea approximately 1.0 km east of the port of Honiara. During periods of high rainfall extensive discharge of suspended sediments from Mataniko River result in large sediment plumes that directly affect the marine water quality and clarity and dictates the substrate within the coastal area on the eastern side of the port. Information is not available on the movement of sediments once discharged from the river however it appears from visual benthic assessment in close proximity to the port, that the majority of sediments are deposited directly in front of the river mouth, with only finer sediments transported and deposited in close proximity to the port’s berths. Water discharging from the river is also a source of significant pollution including domestic waste (plastics and other rubbish), sewage and petrochemical products. This discharge has a direct impact on the marine water quality to the east side of the port, especially those pollutants that float, as the prevailing wind and to a lesser degree water current patterns move the debris towards the port.

135. In addition, there are a number of small natural and artificial water discharge points along the shoreline in close proximity to the port which during high rain fall events discharge high levels of sediment and pollution that also have direct impacts on the water quality associated with the port and marine resources residing in these habitats. The largest of these smaller water discharge points is located along the boundary of the Honiara yacht club and Mendana Hotel, approximately 100 m to the west of the port boundary (Plate 4.3 a and b).
Plate 4.3 a and b: natural stream discharging normally (a) and during a high rainfall event (b) into the shoreline 100m west of port boundary

136. **Key findings.** The inshore marine system associated with the area of influence of the proposed project includes a rock revetment wall (dolos and volcanic rocks) located along the shoreline for protection of the port. The revetment wall is located directly on the benthic substrate (8 -12 m) and extends several meters above high water mark. The subtidal benthic substrate extends seaward of the port boundary in a gentle slope to depths of 24 m some 200 m offshore and adjacent to the wharf.

137. The seabed substrate within and adjacent to the old wharf is relatively homogenous throughout the area and is characterized by a bottom layer of coarse sand derived from terrigenous and coral reef origins and a fine silt top layer derived from rivers and stream discharge. The depth of the silt layers average 10 cm throughout the proposed development site.

- Silt prevalence and benthic thickness in general decreases slightly in a northerly direction along the old wharf, however silt is the dominant benthic surface substrate. (Plate 4.4 a and b);
- Suspended sediment and turbidity levels associated with the old wharf is dictated by the prevailing weather conditions (wind and swell) and prevalence of rain events resulting in significant increases in suspended sediment discharged from the Mataniko river and a number of smaller streams either side of the port;
- The periodic high level of suspended sediment coupled with the significant benthic sediment layer (silt) on the sea floor associated with the old wharf has had a detrimental effect on the ability of sessile benthic marine resources to settle and survive in this area. (Plates 4.5 a and b);
- No sessile benthic invertebrate species were recorded at any of the dive and snorkeling assessment site locations within the proposed project site area of influence (dive sites 1-5) although it was noted that the presence of sessile benthic marine life marginally increased at dive site 6 reflecting improved water quality at the seaward end of the old wharf (Plates 4.6 a-d);
- Mobile vertebrates, including finfish recorded very low population and species numbers throughout the area assessed with higher numbers of finfish recorded in the northern section of the old wharf, most of which were herbivorous (Plates 4.7 a and b);

- High levels of rubbish (e.g. plastic and glass bottles) and port related mechanical and infrastructure equipment was located on the substrate throughout the area assessed (Plates 4.8 a - d);

- There are no marine or coastal designated protected areas or areas of significant biodiversity, endangered, threatened, or endemic species or habitats within or nearby the area of influence nor does the area of influence possess any sites of cultural, customary or heritage significance; and

- The benthic substrate associated with the old wharf is highly modified by both anthropogenic (port development and activities) and natural origins (river sediment discharge) and as such the benthic habitat within this area can be considered to have relatively low habitat and ecological value.

Plates 4.4 a and b: Representatives benthic substrate associated with #1 wharf (dive sites 2 and 5)
Plates 4.5 a and b: (a) lack of marine life on the pylons (dive site 2) at #1 wharf; and (b) coral colony at dive site 1

Plates 4.6 a-d: Hard and soft coral growing in close proximity to dive site 6 to north of #1 wharf
Plates 4.7 a and b: Finfish encountered along # 1 wharf

Plates 4.8 a – d: rubbish located during the dive assessment at each dive site
4.2.5 Terrestrial ecology

138. Solomon Islands is characterized by a high level of biodiversity of plants including 3,210 species of vascular plants, although this is believed to be an underestimate. It is likely that there will be up to 4,500 plant species when those that are unrecorded are included. While diversity is high, endemism is low, with no endemic families and only three endemic genera. Endemism of species is not accurately known but is thought to range from ten per cent of fern species to 80% of pandanus species. The islands with the highest rate of endemism are Santa Cruz (Temotu) and Guadalcanal.

139. Flora. The main groups of flora include 340 species of ferns, 277 species of orchids, 33 species of palms, 26 species of other nuts (ngali nut, cut nut and alite nut), 20 species of pandanus, 14 species of Eleocarpacae trees, and 11 species of shrubs.

140. Forest in Solomon Islands covers up to 86% of vegetation communities with low altitude forest accounting for the vast proportion of this. Crop land and bush account for 10% of the vegetation communities.

141. Fauna. The terrestrial fauna of Solomon Islands is extremely diverse, probably with a greater diversity of land animals that any other Pacific island country and has a high level of endemism (UNDP et al., 2002). Fauna includes 223 species of birds (173 residential terrestrial species and 50 other species of shore/sea birds and visitors) including 19 species globally threatened (Appendix D: Globally Threatened Avifauna in the Solomon Islands), 52 mammals, 61 species of reptiles (25 are endemic), and 17 species of frogs.

142. In terms of distribution, there is a relatively high level of island endemism. While Western Province records the largest number of species (41), Choiseul and Guadalcanal Provinces have the highest rate of island endemism with six species being found on only one or two islands. Field observations did not show any significant wildlife species within the subproject areas and the wharf sites are modified environment.

143. Project area. The Port of Honiara is adjacent to the central business district of Honiara where the terrestrial environment is highly modified and disturbed, typical of an urban environment. Given this context and that terrestrial ecological resources will not be affected by the project only a description of marine biological resources is provided.

4.3 Socio-economic Resources

4.3.1 Population and demography

144. Solomon Islands consists of more than 300 islands including Guadalcanal where the capital Honiara is located. The total population estimated for the Solomon Islands for 2018 is 667,044 (National Statistics Office) with a sex ratio of 1.07 males to females, an annual population growth rate of 2.0%, a medium age of 19.9 years, a life expectancy average of 74.2 years (76.9 for females and 71.6 for males) and a density of 22 persons/km². This represents an increase from 17 persons/km² recorded in the 2009 census. The 2018 population estimate for Guadalcanal is 145,000 with an estimated population in Honiara of 86,529 with the largest proportion of citizens aged less than 15 years. The data provided in the Household Income and Expenditure Survey 2012/13 indicated fluctuating population growth rates for Guadalcanal over the past two decades. The population grew rapidly, at 4.3% per year, for the inter-census period 1976-86.
145. For the next period (1986-99) the growth rate had dropped to 1.5% due to the 1998/1999 departure of many of the migrants from other provinces. There was a further large outflow of people in 2000, during the civil conflict, known as the ‘tensions’ (1999-2003). The annual growth rate for the period 1999-2005 was 5.6% and since then an average growth rate of 4.4%

146. Honiara is the centre for social, financial and economic development therefore attracts major infrastructure investments as well as an increase in rural-urban migration to Honiara. Over the years, the impact of urban drift has resulted in uncontrolled settlements within the city and associated rising poverty. This is exacerbated by inadequate and poor provision of basic urban services, and environmental degradation.

147. **Land and settlements.** Land ownership in the Solomon Islands is complex and in general is described as, “land is held by a group or community who are linked by a combination of blood relationship, by residence or by contributing to a village enterprise” (Corrin, 2006). The remaining land—mostly in towns and urban centers—is alienated land being freehold and/or leased from government or private owners. Land ownership in Guadalcanal is matrilineal and inheritance is the main method of land transfer (Corrin, 2006). As such the majority of land throughout the Solomon Islands is refer to as non-registered customary land and is estimated to make up approximately 84 % of all land. The remaining land is either registered alienated land (10%) with the balance being owned by government (4%) and private owners (2%).

148. Land in Honiara is mostly crown land or owned by the Government and some portions privately owned. Most land parcels located out of the city area are privately owned. There are 30 informal settlements located within the town boundary plus six others which have trespassed into customary land. Approximately 35% of the total population of Honiara live in unplanned informal settlements. These settlements lack adequate services such as water and electricity supply.

149. **Education.** Honiara is the main educational and administration center of the country and as such has a range of early childhood, primary and secondary schools as well as technical training centres and tertiary institutions such as the Rural Training Centre, the National University and the USP SI campus. The schools are government, private and church owned institutions, which are accessible to everyone depending on their personal preference and circumstances.

150. The Honiara City Council (HCC) provides 14 primary and secondary schools that are distributed according to the main population catchment areas of Honiara. Commuting to school is difficult such that teachers and students are often late for classes due to traffic-congestion and unreliable public transportation. The student teacher ratio in most schools is more than 40 with schools lacking adequate space and resources such as offices, libraries, classrooms, playing grounds and laboratories.

151. A free education policy of the government since 2009 to relieve parents from the burden of paying school fees and to increase access to basic education for all children, has had little impact since the HCC schools impose enrolment and development fees to students which are often higher than the original school fees.

152. **Health.** Honiara hosts the National Referral Hospital and about nine clinics which are not only accessed by people living within the city boundary but also by people from Guadalcanal and other provinces who need immediate medical attention. There are a number of private clinics operating in the city as well but are expensive and can only be afforded by a small proportion of the city’s population.
153. Overall, there is poor delivery of health services which is linked to inadequate health facilities, lack of resources, poor working environment and the non-provision of staff housing. Malaria, dengue, diarrhea and pneumonia are the most common disease experienced in the city.

4.3.2 Economy and services

154. The economy of the Solomon Islands comprises a mix of subsistence production – on which the majority of the island citizens rely and a monetized sector, which includes the public service and commercial business of which the resource development based enterprises are the largest. In 2016, Solomon Islands was the 108th exporter in the world and exported US$430 million of goods and imported US$450 million resulting in a negative trade balance of 20 million US$.

155. The top 2016 export commodities in order of US dollars exported include: rough wood ($248 million); processed fish ($26.4 million); palm oil ($25.8 million); wood stakes ($23.6 million) and cocoa beans ($12.6 million).

156. In 2016, the estimated national gross domestic product (GDP), including the value of subsistence production, amounted to US$1.2 billion, all most doubling since 2000 (US$57 million) showing positive annual net growth of around 3% over this time period. Gross domestic income in 2016 was US$ 1,880 (WB, 2017), slight down from the reported 2015 figure of US$1,920 (ADB, 2017) with gross domestic investment rate of 17.6 % of GDP and an inflation rate of 1.1 for 2016.

157. Livelihoods and employment. Solomon Islands economy is dominated by subsistence agriculture and fisheries related activities, which support around three-quarters of the total population, including almost the entire rural population. During consultations in March 2019 it was suggested that outgoing (export) products across existing wharfs were small quantities of agricultural / market products, cocoa, taro and ginger and incoming products were primarily household goods, building materials and fuel.

158. Fisheries. The EEZ waters of Solomon Islands support commercial purse seine, long line and pole and line fishing activities that have both local and foreign ownership and operational involvement principally targeting species of tuna for many years. The commercial fishing fleet operates between 12 nautical miles outside of the nation’s islands and outer boundary of the nation’s EEZ.

159. There is no large-scale inshore commercial fishery in the Solomon Islands. However, there is considerable inshore resource exploitation principally for individual and family subsistence and small-scale commercial activities supplying local demand throughout the country and this appears to be the case at most of the wharf communities where there is inshore fishing for local consumption.

160. Forestry. Timber harvesting and export has been the dominant exporting product of the nations for several decades averaging between 20-35% of foreign exchange earnings over this period of time. Where wood is for customary or domestic purposes and not for sale, no license is required. If forest owners would like to sell timber, there are local timber harvesting license and community timber harvesting license available.

161. A community may combine their efforts to cut up to 2,000 m³ per year under a community timber harvesting license. During consultations it was understood that there were no longer any commercial logging concessions in the subproject areas.
162. **Markets and commercial activities.** Guadalcanal’s largest formal food market is the Honiara Central Market, with two smaller and informal markets at Kukum (eastern Honiara) and White River (western Honiara). Fish and seafood products are also sold at these markets in addition to a number of smaller roadside markets located throughout Honiara. These markets receive produce from women from rural Guadalcanal, particularly those from Kongulai, northwest Guadalcanal and also from Savo Island, bring fresh vegetables, root crops, coconuts, fruits and raw meat (wild pig) and fish to sell to the public.

163. There are also betel nut outlets where most residents from Honiara frequently visit to buy betel nuts to resell and also for consumption. The major betel nut outlets in the subproject area are found in Rove, adjacent to the Central Police Station Memorial Park, Karaina, just west of the ‘02’ bus stop at White River and at Savo Market, under the shade trees at Tanaggai. At the Karaina betel nut market, women from Malaita sells their betel nut, fruits, leaf (korokua), lime, cigarettes, tobacco and other fast-moving consumer goods.

164. The most common items for sale are betel nut, sweet potato, banana, coconuts, fruit (including pawpaw, mango and citrus), various green and other vegetables (including pumpkin and capsicum) and nuts, particularly ngali nuts, cut flowers, coconut oil, jewelry, processed foods (especially popcorn and baked or fried flour-based foods), chickens, fish and other seafood.

165. **Transport.** Guadalcanal is served by land, sea and air. The primary international airport (Henderson) receives daily international flights from Australia, Fiji, Vanuatu, Papua New Guinea and Nauru via several airlines. The airport serves both international and domestic flights in separate terminals. The second international airport in Western Province at Munda has recently been upgraded. There are approximately 20 small domestic airports throughout the country. The airport at Marau Sound is the only domestic airport on Guadalcanal outside of Henderson. There are international wharf facilities in Honiara (Point Cruz) and Noro (Western Province) servicing general cargo, bulk fuel and the fishing industry.

166. There is no road that circumnavigates or crosses Guadalcanal. The only road network on the island is the Main Road located on the northern coastal side of the island that runs between Lambi in the west and Aola in the east. The main sections of this road include the East Road (79 km) between Honiara and Aola, and the West Road (69 km) from Honiara to Lambi. Most of the road surface is in poor condition and needs upgrading and repair. It is estimated that there is 320 km of road in North Guadalcanal in various condition.

167. There are approximately 18,000 vehicles in Solomon Islands, of which 90% are on Guadalcanal (three-quarters in Honiara), 8% in Malaita, and 1% in Western Province. Outside of Honiara traffic volumes remain very low and the main form of transport is by small outboard motorboats.

168. **Energy.** Grid-connected electricity is diesel-generated and supplied by a state-owned electricity utility, Solomon Power. Electricity is provided to Honiara and currently installed generation capacity in Honiara is 26 megawatts (MW), with a peak load of 14.3 MW and combined installed capacity in the provincial centers is 4 MW. Through separate power generating plants, Solomon Power provides electricity to eight provincial centers (Auki, Buala, Gizo, Kirakira, Lata, Malu’u, Noro-Munda, and Tulagi).
169. **Water supply.** The SIWA provides water to 77% of 8,981 households in the city (18% of which are located in the informal settlements). Water demand in the city is high and the Solomon Waters are unable to provide adequately for such demand. Illegal water connections have affected water supply within the township, which undermines efforts by the Solomon Waters to supply water more reliably. A Japanese funded project is currently working on improving water supply.

170. **Sanitation.** Available information indicates that some 30% of Honiara city households are connected to fourteen badly maintained sewerage lines whose outlets flow directly into the sea from the central market and King George VI area, polluting the coastal environment and raising health concerns for coastal settlements and ocean-users. Another discharge is at the SIPA area, currently broken and affecting coastal marine life and polluting the Ports coastal surroundings. While many new buildings have septic tanks, the low lying residential areas within the township are likely to face difficulties in areas where water table is high. This remains a serious public health and environmental concern.

171. **Waste management.** The open dump at Ranadi approximately 3km from the city centre and managed by Honiara City Council (HCC), is the main solid waste disposal site for Honiara. The city has problems with proper management of the open dump, open burning of solid wastes, the lack of regular garbage collection and general littering. Moreover, the public dump is likely to run out of space in the near future.

172. Poor garbage collection a lack of public environmental awareness along with no enforcement of statutory controls has resulted in people dumping solid wastes in rivers and shorelines, polluting the freshwater and coastal and marine environments. Efforts are being made by HCC to try and maintain, sustain and improve garbage collection along the feeder road leading to suburbs through the World Bank financed Rapid Employment Project 2 (REP). However, it is clear that waste management services will require additional resources and public-private sector partnership before significant improvements can be realized.

4.3.3 **Cultural and historic sites and resources**

173. Special, sacred or restricted sites, or tambu areas, including elements of the landscape as well as monuments, represent the history, lineage and society of different clans and lines and have local cultural as well as regional historical significance throughout the Solomon Islands. Traditional medicines and resources derived from terrestrial (native and cultivated flora) and to a lesser extent marine resources play a significant role in the traditional and cultural lives of all communities.

174. The National Solomon Islands Museum keeps a National Tambu Site Register, which records several thousand sites. Some provinces also maintain tambu site registers but due to insufficient funds and manpower the recording and registration of all sites is not systematic. The Protection of Wrecks and War Relics Act (1980) provides for protection of cultural heritage associated with the war; prohibits tampering, damaging or removing any part of wreck or war relic unless granted a license.

175. There are no historical sites in the vicinity of the project area and the land has been highly disturbed by urban development. Iron Bottom Sound, west of Honiara City, contains numerous World War II ship and airplane wrecks and is considered a heritage site as it is regarded as scared waters.
5 Consultation and Information Disclosure

5.1 Stakeholder Identification and Engagement

176. Following general good practice and the requirements of the SPS and Access to Information Policy 2018, public consultations were undertaken during the course of the feasibility studies and specifically for development of the IEE and land due diligence reports and resettlement plan preparation (2018 - 2020) to determine community attitudes to the project and elicit information relevant to establishing baseline conditions and understanding potential environmental and social effects.

177. Guided by the communications and consultation plan (CCP), consultations with stakeholders, government agencies, civil society and communities, including women’s groups, chiefs and businesses operators were conducted. These consultations with communities and stakeholders were undertaken during the feasibility studies during 2018, March to August 2019 and again with some stakeholders with particular concerns or issues related to the road component (reported separately) in February and March 2020. The purpose of community consultations are to:

- Foster partnerships with beneficiary and stakeholder communities;
- Share information on the proposed project and its components and activities;
- Communicate with stakeholders that their co-operation (and possible participation) in project activities including surveys, site investigations, planning, feasibility and potentially future design, construction, monitoring, and maintenance is key to achieving a high quality strategy that most benefits their concerns; and
- Develop and inform the site options analysis, to help develop the recommendation of an overall project scope.

5.1.1 Consultations for 2018 studies

178. Four series of stakeholder consultations have been carried out during 2018. The initial consultations were undertaken during the strategy workshop 22-23 March 2018. The strategy workshop was conducted by the TA team and key project stakeholders (SIPA and key government ministries). The workshop included presentation of findings to date and discussions regarding a strategy for next steps. A site visit to the port was also held. Details of the workshop and findings are reported separately.

179. A second mission was held from 04 – 12 April 2018 involving the environmental team comprising international environment specialist, national safeguards specialist and marine ecologist. The purpose of this mission was to conduct the environmental assessment for the proposed project including marine ecological survey and environmental audit of existing facilities.
180. Consultations were undertaken with: (i) SIPA staff including CEO, Engineering Manager, Operations Manager Corporate Services Manager, Commercial Manager, Lands Officer, Port Security Officer, Port Master; (ii) Deputy Director of Solomon Islands Marine Safety Association (SIMSA); (iii) Chief Biosecurity Officer (Ministry of Agriculture and Livestock); and (iv) Director and senior staff of the ECD.

181. Consultation with ECD was expressly to inform ECD of the likely scope of the proposed Honiara Port project and ascertain if this proposed development would trigger any item that would need a detailed assessment under the CSS. The Director ECD indicated that based on the likely project scope described above (Section IV) an ADB approved IEE would suffice to meet the Public Environmental Report requirement for obtaining development consent for the project.

182. A debriefing with SIPA authorities (CEO, Operation Manager, Commercial Manager, Corporate Service Manager, Engineer, and PFSO Officer) was held on the 11 April 2018. The purpose of the meeting was for the marine ecologist to brief SIPA authority on the key findings of the assessment done. It was also an awareness session on the sea and coral status of the area.

5.1.2 Consultations for 2020 study

183. Site visit and initial consultation with SIPA management were carried out by the Project Team’s social safeguards and technical members between January and February 2019. In March 2020 Government restrictions to public consultations resulting from the COVID-19 pandemic affected the planned consultations with key stakeholders.

184. Contact with stakeholders such as domestic copra ship operators who currently use the Copra Wharf were started by the team but had to be suspended and will need to be resume and be completed prior to construction. Also, other private sector stakeholders such as the Solomon Islands Chamber of Commerce need to be consulted to be informed of the project and gather any concerns or recommendations to be considered to feed into the subproject design.

185. In January 2020 members of the team visited offices of SIPA and visited the wharf with SIPA representatives to determine current operating procedures, concerns and aspirations.

186. Future consultations. The CCP will be updated early in implementation. During implementation, MID through the CPIU (supported by the CSC) will ensure that meaningful public consultations, particularly with project affected persons, if any, continue to be undertaken.

187. The contractor will include relevant elements of the CCP and GRM in the CEMP so that any concerns raised during construction can be addressed. Further consultation and disclosure will be undertaken during implementation through:

- The project’s CCP and GRM;
- Disclosure of a summary of the project documents including the preparation and dissemination of a brochure in English and Pidgin, explaining the project, works required and anticipated timing of the works;

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11 Visit to SIPA on 20 January 2020 including on-site inspection of old wharf. SIPA representatives Santos and the TA team.
The contractor’s CEMP outlining how they will comply with the CCP and GRM; and

Setting up a community advisory committee(s) and grievance redress committee(s) with a representation from affected people.

5.2 Information disclosure

188. After government and ADB approvals are obtained information will be uploaded to the ADB website.

189. Under the CSS the ADB approved IEE will be submitted as a PER to MECDM and will be available for public review. The PER summary will be produced as part of the project documents to be available for public the public to view upon request. The full PER Report will be available to the public from MECDM Resource Centre upon request.

190. The affected people will again have an opportunity to express their comments on the project. It is expected that there will be widespread public support for the project in view of the obvious economic benefits associated with refurbishment of the international wharf.

191. Information regarding the approved subproject and the proposed environmental management measures will be posted at suitable locations at the project site as well as using the radios and newspapers.

5.3 Grievance redress mechanism

192. The project’s GRM is scaled to the risks and adverse impacts of the project. It will promptly address and use an understandable and transparent process that is gender responsive, culturally appropriate, and at no costs and without retribution, to the affected persons. This GRM is prepared in assumption that SIPA will have its own Project Management Unit during implementation.

193. The GRM does not impede access to the regular judicial process but provides more straightforward access to complaint resolution. The SIPA via its project management unit (PMU) and its contractor appropriately informs the key stakeholders around the subproject site about the GRM before the commencement of any construction works. Informing the communities will be part of the consultation process where technical design details, costs, and feasibility is to be prepared.

194. The SIPA stakeholders will be informed of the GRM through a public awareness campaign and discussion with the project communities particularly with the business community association, e.g. domestic ship operators and passengers, Chamber of Commerce, leaseholders around the Honiara Port area (and through Community Advisory Committee (CAC), if operational). The process of lodging a concern or complaint and contact details of the construction contractor and SIPA will be posted on a public or community notice boards. The community is encouraged to voice any concerns or complaints, and these are to be duly investigated and reported through to the contractor, SIPA management, and community leaders among others. All grievances, complaints or issues raised will be lodged in a register maintained at the contractor’s site office. These are included in the monthly progress reports from the contractor to SIPA and are subject to inspections by SIPA-PMU and the CSC.
195. A grievance redress committee (e.g., CAC) will be established to (i) record, categorize and prioritize the grievances; (ii) settle the grievances in consultation with complainant(s) and other stakeholders; (iii) inform the aggrieved parties about the solutions; and (vi) forward the unresolved cases to higher authorities.

196. The grievance redress committee would be represented by both government, non-government and civil society members and representatives from the project community, with at least one female member.

197. During implementation, the job manager within SIPA and representative from the SIPA to the contract, will be the grievance focal point, and receive and address project related concerns, via the environment and social safeguards personnel, assisted by the SIPA PMU’s Safeguards/Gender Specialist, as the designated officer. During the construction period, the contractor will be a key participant in the grievance redress process, and the SIPA PMU will need to confirm that the contractor has assigned a GRM coordinator. The SIPA PMU representative and the contractor will fully inform the affected people of their rights regarding compensation for damaged assets, if any. Concerns will be initially resolved by the contractor, SIPA job manager, and SIPA representative to the contract.

198. Any complaint will be recorded and investigated by the SIPA PMU staff working with the project manager, CAC, and the contractor (as appropriate). A complaints register will be maintained and will show the details and nature of the complaint, the complainant's name, the date and actions taken as a result of the investigation. The register will also cross-reference any non-compliance report and/or corrective action report, or other relevant documentation filed in relation to the original complaint.

199. When construction starts, a sign will be erected at the site providing the public with updated project information and summarizing the grievance redress mechanism process including contact person details of the contractor and at SIPA. All corrective actions and complaint responses carried out on site will be reported back to the SIPA by the contractor. SIPA will include the complaints register and report on corrective actions/responses in its semi-annual progress reports to the ADB.

200. Throughout this process, SIPA thru its contractor or relevant staff (job manager) will always be available to hear public complaints and provide advice if the complainant feels that contractor’s responses are not satisfactory. The SIPA PMU will make sure that this cooperation is available.

201. The SIPA shall ensure that all grievances are recorded and captured in periodic reports that will be submitted to ADB. The proposed grievance redress procedures and estimate duration is presented in Table 5.1.
### Table 5.1: Proposed grievance redress mechanism

<table>
<thead>
<tr>
<th>Step</th>
<th>Grievance Redress Process</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Affected Person (AP) / business association takes the grievance to CAC / Contractor / SIPA PMU/ SIPA Chief Port Engineer.</td>
<td>Any time</td>
</tr>
<tr>
<td>2</td>
<td>Job manager at SIPA / PMU, or contractor reviews issue, and in consultation with the AP, CAC, relevant agencies and contractor (if appropriate), agrees to a solution and records the results.</td>
<td>2 weeks</td>
</tr>
<tr>
<td>3</td>
<td>Job manager through SIPA/PMU, reports back to AP/business association / CAC and AP and gets clearance the complaint has been resolved.</td>
<td>1 week</td>
</tr>
<tr>
<td></td>
<td><strong>If unresolved</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AP directly or through a representative /CAC takes the grievance to relevant government authorities for resolution.</td>
<td>Decision within 2 weeks</td>
</tr>
<tr>
<td>5</td>
<td>If not resolved, SIPA/ PMU relevant government authority must take the matter to the relevant national agency (Attorney General’s Office) for decision.</td>
<td>2 weeks</td>
</tr>
<tr>
<td>6</td>
<td>The relevant agency can deliberate for ≤ four weeks and resolve the case.</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td><strong>If unresolved or if at any stage an AP is not satisfied with the progress</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AP or community leader representative can take the matter to appropriate state or national court.</td>
<td>As per judicial system</td>
</tr>
</tbody>
</table>
6 Environmental Impacts and Mitigation Measures

6.1 Review of Potential Environmental Impacts

202. At the commencement of the environmental study a due diligence review was undertaken on all project components. The due diligence entailed:

- Site visits to Honiara Port
- Review of current port activities with information provided by the SIPA staff at Honiara Port
- Professional opinion and experience of international and national environment specialists, marine ecologist, and international and national social safeguards specialists
- Screening and scoping
- Environmental audit of existing port operations and facilities; and
- Preparation of his IEE and environmental management plan (EMP).

203. Findings are summarized below:

- None of the Honiara Port development proposal footprint, or area of influence, falls within or close to any protected areas or culturally sensitive areas.
- Based on site observation the overall project is likely to give rise to negligible or at worst, minor temporary environmental impacts that can be easily mitigated.
- The most significant potential environmental impact will be associated with the piling operations to form a stable foundation for the precast concrete deck for the Port wharf. This will include noise from percussive piling
- Historic Port development has permanently changed the marine environment, no endangered species or critical habitat was encountered during dedicated survey and no new adverse impact on marine ecology is anticipated due to the redevelopment proposed.
6.2 Audit of Existing Facilities

204. Due diligence has been undertaken through a review of the available documentation, interviews with SIPA and related government staff12, and site observations during April 2018 (and a supplementary inspection in January 2020) in order to explore with the facility operator whether the facility is in compliance and/or can be brought into compliance with SPS, and identify any required corrective actions and a time-line for their implementation as a part of international good practice. In preparing the audit the consultants have exercised due diligence and studied where SIPA’s current practices meet ADB SPS requirements and where there are gaps that need to be filled. This section summarizes the results of the audit and identifies the corrective actions to be included in loan agreements to ensure compliance with the SPS. The audit report is attached as Appendix F.

6.2.1 Current status of compliance

205. The current international Port of Honiara comprises two wharves: (i) # 1 wharf “old” international wharf which provides a 110 m quay line. The wharf comprises two structures – a 46m suspended deck on piles constructed circa 1983 and a 74m tubular bulkhead pile wall constructed circa 1988; and (ii) # 2 “new” wharf (also known as the JICA wharf) which provides a 150m quay line that is comprised of a tubular bulkhead pile wall. The wharf was constructed in 2016.

206. Under the provisions of the SOE Act, SIPA is charged with the following duties:

- Provide, maintain and improve in the declared ports such facilities as appears best calculated to serve the public interest
- Maintain, improve and regulate the use of the declared ports to such extent as appears expedient in the public interest
- Provide for the declared ports the approaches thereto and the territorial waters of The Solomon Islands such pilotage services and aids as appears best calculated to serve the public interest.

207. SIPA owns a plot of land comprising approximately 9.2 ha encompassing the whole of Point Cruz including the foreshore occupied by the domestic Port, the boundaries of which are defined by the Honiara Cadastral Index Map Sheets H3 and G3. The landside international port facility occupies 7.9 ha of which 1.8 ha is temporarily leased to MID for materials storage. The remaining (approx. 1.3 ha) of SIPA land adjacent to the international port, comprises the domestic wharves and land leased to commercial operations on a long term basis.

208. The current status of the landside international port limits including key facilities and structures is shown on Figure 6.1 (yellow dashed line). This provides the boundary with respect to the audit of existing international port facilities and operations.

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12 SIPA CEO, Operations Manager, Engineering Manager, Corporate Services Manager, Port Master, ISPS Manager, Land Manager, SIMSA Director, Chief Biosecurity Officer (MAL), Director ECD (MECDM)
209. SIPA obtained Development Consent from ECD on 14 Feb 2014 for the JICA funded New International Wharf which was commissioned in 2016.

### 6.2.2 Audit findings and actions required for compliance

210. The 2018 audit of existing facilities and operations of Honiara International Port concluded that facilities operations and maintenance of the Honiara International Port fell short of internationally recognized good environmental practice in a number of areas. Though it was noted that SIPA management was actively addressing these issues through planning and procurement of new facilities to improve environmental management.

211. The recommended actions for SIPA in 2018 in order to achieve environmental compliance with ADB’s SPS included the following (observations in 2020 are included where appropriate):

- Implement outstanding operation related EMP requirements approved as a condition under the DC (14 Feb 2014) for the new wharf (Completed 2020).

- SIPA to give priority to developing and implementing an environmental management system (EMS) for the operation of Honiara Port that complies with international good practice as well as Environment Act 1998 and Environment Regulations 2008 and Biosecurity Act 2013 and Biosecurity Regulations 2015. As part of this SIPA to designate staff resources to be responsible for overall environmental management of port operations (in progress 2020).
As part of developing the EMS, conduct a risk assessment for introduction and/or spread of invasive and alien species through regular and emergency port operations. Include guidelines and procedures in the EMS following guidance set out in SPREP Guidelines for Invasive Species Management in the Pacific, National Strategy on Aquatic Biosecurity for Solomon Islands 2018-2023 and IUCN Guidelines for Invasive Species Management on Islands 2018;

In parallel with the above, proactively implement environmental safeguards awareness raising for SIPA staff as much as possible utilising ECD’s environmental outreach function and resources (in progress 2020).

Install oil and grease traps in drainage system at workshop and refueling areas (in progress 2020).

Spill kits to be provided in workshop, refueling and maintenance areas along with training of staff in hazardous materials handling and usage of spill kits (Completed 2020)

Petrol drums to be stored in a covered area surrounded by a spill containment bund (Observed to be in compliant condition 2020)

Enforcement of Government regulations in respect to quarantine issues including prevention of ships disposing of waste at Honiara Port until such time as the Port has internationally recognised port waste disposal facilities (In progress 2020)

Port toilet facilities septic tank to be routinely cleaned and sludge disposed of in accordance with Government regulations (Observed to be in reasonable condition 2020)

Mitigate dust nuisance at port through i) regular spraying of water on exposed surfaces during dry weather and ii) refurbish port pavement currently in disrepair (Observed to be in reasonable condition 2020).

Develop an Emergency Response Plan (ERP) specifying procedures in the event of a natural disaster (earthquake, tsunami, cyclone) and include regular training and drills on ERP for port staff (not seen 2020).

Prioritize the formulation of a worker and operational Health and Safety (H&S) Plan for the Port along with organizational arrangements whereby SIPA H&S officers have clearly defined functions as specified in the H&S Plan and receive the necessary training to undertake their functions. Other safety related recommendations include:

- Consideration to be given to the use of a specific access platform with integrated steps that can be positioned adjacent to containers and wheeled to different locations on the quayside area as appropriate. Something similar to passenger loading steps at an airport.
- Consideration to be given to marking out ‘safe’ pedestrian routes in/out and around the terminal.
- Consideration to be given to a large (curved) mirror on the end of the quay that would alert drivers to vehicles coming from the other direction.
- If widening is not feasible, consideration to be given to a 1-way circulation route for equipment coming onto and leaving the new wharf apron. This would use each ramp either for arrival or departure purposes.
212. The above recommended actions to achieve environmental compliance with ADB SPS are included as pre-construction stage actions in the EMP.

6.3 Assessment approach

213. The potential adverse environmental and social impacts for construction and operation phases are described below for the construction and operation phases.

214. The following section provides an assessment of the Project’s likely impacts on physical, biological, socio-economic and physical cultural resources and identifies mitigation measures to ensure potential environment impacts will be avoided or managed/reduced to acceptable levels. Annex E (risk matrix) summarizes the environmental screening for the range of potential environmental impacts that could occur from the preconstruction, construction and operational activities. Where the environmental impacts are deemed to be major (significant) or minor level impacts, mitigation measures are detailed, which are included in the projects EMP and need to be incorporated into the project design document.

215. The assessment of impact follows a risk matrix approach where the likelihood of an environmental, safety or social impact occurring is matched with the consequence (severity) of the impact occurring. The matrix ranks potential risks as low, medium, high or extreme, identifying the need for mitigation, and incorporation into the EMP. The assessment of potential severity of the impacts takes into consideration the presence and vulnerability of sensitive receptors and adopts a precautionary approach.

216. All risks classified as medium or higher are considered significant and require mitigation.

217. The following figure sets out the risk matrix derived for this project. This matrix approach should be adopted by the Contractor when they are developing their own CEMP.

6.4 Impacts during Pre-Construction

218. In addition to the measures required for the design of the wharf, pre-construction activities require the following to be addressed:

- Update of PER (including this IEE) based on detailed design and compliance with conditions of development consent
- Contractor preparation of CEMP for review and clearance before any work commences on site.
- Contractor identification of any construction material sources and application for appropriate permits should this be needed - precast construction is identified for this IEE
- Demolition of existing structures
- Identification of land restrictions at local level
• Social disruption – accommodation of non-native workers (limited to site manager / engineer / surveyor, foreman and skilled plant operators). It is envisaged that semi and unskilled labour will be drawn from Honiara and environs.

219. **Changes in water movement.** Development of the Wharf could potentially change water movements in the area creating new areas of erosion or deposition. However, the wharf design is a piled structure with minimal potential to alter water movements so changes to currents and water movement at this location are low. In terms of the risk matrix. The potential risk is considered to be high but the design reduces the risk to low.

220. **Climate change adaptation.** Climate change adaptation measures have been integrated in the wharf design. Climate change adaptation design measures include:

- Increasing ambient average temperature and temperature ranges;
- Increasing average precipitation and short-term heavy rains;
- Increasing average levels of wind and short-term stronger winds;
- Changes in seismicity.
- Sea level rise, tidal surge
- Earthquake risk

221. An upgrade of the existing wharf at the current location is the preferred option for the new wharf. It is not prone to rain-induced flooding, and due to its location there are usually no large waves. The main hazards at this location are an increase in adverse wave conditions and cyclones.

222. Mitigation included attention in the design to adopt a deck level for the wharf that takes into account MHWT, current and future sea level rise.

223. Potential risk of the project on climate change was assessed to be high but based on considerations in design the risk rating is considered to be low.

224. **Natural hazards – seismicity.** The Solomon Islands are located in a region that is seismically active. However, the new wharf will be designed for earthquake loads. Potential risk to the project on seismic conditions was assessed to be medium and based on the design, risk rating is still considered to be medium.

225. **Mobilization of the contractor.** The mobilization of the contractor and initial establishment of work sites will require the presence of construction workers and subsequent interactions with the local residential (urban and rural) and business communities. Prior to contractor mobilization to the site, based on the project’s communication and consultation plan (CCP), the CPIU and contractor will establish the communications protocol for the project. The relevant elements of the CCP and grievance redress mechanism (GRM) will be reflected in the contractor’s CEMP. The contractor will establish a code of conduct or protocols to govern the behavior of workers and will be agreed with community leaders.

226. Measures to minimize disturbance by construction workers and presence of the works site/area include:

- Code of conduct/protocols agreed with community leaders and disseminated to workers as part of awareness and mobilization training. The code is to ensure that workers’ actions at the work site and in the community are controlled and observed;
• The contractor will identify a member of their staff to be the liaison between the communities and contractor, as well as between the contractor and CPIU. The contractor will facilitate establishment of community advisory committees and regular meetings to provide information to communities;

• Adequate signage and security provided at the work sites and prevention of unauthorized people (including children) entering the work sites;

• Provision of adequate protection to the public close to the work site, including notice of commencement of works, installing safety barriers if required by communities, and signage or marking of the work areas;

• Provision of safe access across the worksite to people and businesses whose access are temporarily affected during road rehabilitation activities; and

• Recruitment of an approved service provider and delivery of the communicable diseases including COVID-19 and STIs/HIV/AIDS awareness and prevention program for contractor’s workers and adjacent communities.

227. Establishment of construction camp and work sites. Utilizing existing and/or the establishment of new construction camp/s, office compound and work sites can create temporary impacts resulting from site clearance – flora, fauna and habitat alteration and/or removal and possible unearthing of archaeological resources (deemed to low due to the highly modified existing road corridor and rural farming area). It is unlikely a devoted construction camp will be required given the availability of accommodation in Honiara, work sites and yards will be sited on appropriate land, identified through consultation with village and landowners/users, as per the CCP. The port is within HCC limits and there are many existing accommodation facilities and opportunities that can be used by the contractor.

228. Sources of construction materials. The source of aggregate/gravels will be determined by the contractor, in accordance with the construction contract and subject to permit approvals. The closest material source to the port is the Tamboko River (Plates 5.1 a and b), located approximately 25 km west of Henderson.

Plates 5.1 a and b: Gravel extraction site at Tamboko River
229. Gravel extraction sites at river systems within the subproject areas maybe logistically more useful, and the permitting process will need to be followed. Materials for graving and concrete sealing (drainage systems) will be crushed to required sizes according the engineering specification. The contractor is expected to extract fill materials from areas already permitted by the DMM (in MMERE) if not available the contractor will be required to apply for a BMP to open a new site/source. Removal of river gravel for construction materials has the potential to interfere with aquatic ecology and hydrological conditions. Depending on the size of the river, rate of recharge, volume of material to be extracted, and where the material is to be obtained from, removal of gravel could affect riverbed and/or channel morphology including river widening and increased flow speeds causing bank instability or erosion.

230. Land-based quarry sites can create dust, stability and health and safety issues. It is most likely that existing Guadalcanal quarry sites, stockpiled materials and crushing yards will be used for the subproject. The contractor will be required to comply with BMP conditions and extraction plan provisions for any new and/or existing source.

231. To mitigate the impacts of any new river extraction or land-based quarries or borrow pits the following will be implemented:

- Any rivers or streams identified as being part of a marine, coastal or terrestrial protected area (including the buffer zone of a protected area), a proposed protected area, or having conservation value, being habitat for rare or endangered aquatic or terrestrial species or birds, comprising part of the intertidal zone, comprising swamp or wetland, or including mangroves, will not be permitted to be used as sources of gravel;
- Any rivers or streams that are used as a fresh water source for villages should only be used as a materials source as gravel extraction when alternate sources are unavailable. In cases where such rivers or streams must be used, alternative water sources, such as drilled or dug wells, upstream of extraction sites and works, must be provided for the villages;
- Access to extraction sites will be negotiated with landowners and users, if an access is purposely built, should the owner not want to keep the access, the contractor will be responsible for reinstating the land to its pre-project condition;
- Limits to the volume of material extracted from any one source will be set considering the ability of the source to regenerate and likely environmental impact as a result of the extraction;
- Use of approved machinery for gravel extraction from rivers such as excavator or backhoe. Dredging or similar operations will not be permitted.
- Extraction activities adjacent to rivers will be managed through installation of a sediment settling pond to avoid a plume of disturbed water dissipating into the river and/or the use of a bund to prevent direct runoff;
- Maximum volumes and rates of extraction will be governed by the extraction plan approved as part of the BMP;
- Material should not be extracted from river bends, and if required, river training be undertaken;
• Any extraction sites and borrow pit areas close to roads will be located at least 20 m outside the right-of-way of roads, extraction from the sides of roads in a way that could undermine the roads will not be permitted;
• Any topsoil excavated from sites and borrow pit areas will be saved and reused in re-vegetating the sites and pits to the satisfaction of the DMM and SIPA;
• Additional extraction sites and/or borrow pits will not be opened without the restoration of those areas no longer in use;
• The excavation and restoration of sites and borrow pit areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the DMM and SIPA. Sign-off to this effect by SIPA will be required before final acceptance and payment under the terms of the contract; and
• Site and burrow pit restoration will follow the completion of works in full compliance with all applicable standards and specifications.

232. The contractor will be required to identify materials sources and for new sources apply for a BMP including preparation of an aggregate extraction plan (AEP), in compliance with the MID’s aggregate extraction guidelines (as set out in the MID’s SPM) which include:

• Process for negotiation and consultation with landowners (including the affected community and customary titleholders etc.);
• Environmental assessment covering the effects of extraction (e.g. sedimentation, ecological disturbances, slope stability) from the site;
• Site safety and community protection;
• Remediation of extraction sites; and
• Based on the above, preparation of extraction and rehabilitation plans.

233. The extraction plan(s) will be prepared by the contractor during the mobilization phase (when quantities and type of materials have been specified) and will identify sources of gravel and aggregate that adheres to the code of practice prepared by MID for gravel abstraction. The AEP is to be submitted to SIPA and the CSC for review prior to submission as part of the BMP application to DMM. The SIPA and CSC will monitor implementation of the extraction plan(s).

234. **Alien and invasive species introduction.** The mobilization of construction machinery/equipment and materials from a source country may result in the accidental introduction of soil-borne weeds, pests and pathogens becoming established on the island and adjacent river/stream and coastal environments. All construction machinery and equipment must be steam cleaned and all organic material must be removed in the source country prior to deployment with an appropriate approved phyto-sanitary certificate issued supported by any other documentation required under Solomon Islands legislation.

235. **Land access.** The subproject is wholly contained within land leased to SIPA for port operations. A separate land due diligence report has been prepared. There is no project-induced resettlement, land acquisition or economic displacement associated with the project, therefore the residual risk is considered to be low.
6.5 Construction Impacts

236. All potential construction impacts and appropriate mitigations are to be managed by the contractor. Construction impacts will be caused by the following activities:

- Mobilization – vehicle movements and stockpiling of materials within SIPA land at Honiara Port;
- Operation of construction plant and vehicles producing dust, noise and vibration;
- Percussive driving of piles to form wharf support columns
- Erosion and sediment control (open ground) and work in shallow marine area;
- Construction waste disposal, pollution for hazardous material and waste water management;
- Stockpiling of construction material such as sand, gravel and cement – likely to be brought to site as bagged material with main elements pre-cast off-site;
- Presence of construction workers;

6.5.1 Construction impacts on physical environment

237. Climate change. The subproject will not create any impacts on rainfall, unexpected groundwater depletion, or carbon emissions, which in turn could affect the risk of, or induce, climate change.

238. Where possible the contractor should maximize use of construction materials and products with recycled or secondary and low carbon content, from renewable sources and use locally sourced materials to minimize distance materials are transported from source to site.

239. Unmitigated and residual risk is considered to be low.

240. Impacts on air quality. The quality of air at Honiara Port is typical of urban Honiara, dominated by vehicle fleet emissions and dust remobilized from vehicle movements. Regular breeze and the open aspect of the site will disperse any polluted air generated from construction work. Dust levels were low, when observed during January 2020 site visits.

241. During the construction phase there will be minor temporary impacts on local air quality through emissions of exhaust from lifting machines used for erecting precast concrete sections, small amounts of mixing concrete but these will be very small emissions and unlikely to impact on local Sulphur Dioxide (SO$_2$) Nitrogen dioxides (NO$_x$) from construction of diesel and petrol fueled equipment including nor Total Suspended Solids (TSS) from dust.

242. The contractor is required to maintain all construction equipment and avoid using machines emitting very dark smoke. Dust generation if encountered, will be minimized by spraying of exposed sites with water to prevent dust generated illnesses. Mitigation measures include:

243. Construction equipment shall be maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring;
• Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke);
• Material stockpiles being located in sheltered areas and covered with tarpaulins or other such suitable covering to prevent material becoming airborne and the inclusion of sediment traps to prevent discharge into the neighbouring environment.
• Damping down of any roads being used for haulage of materials, during the dry season; and
• Periodic qualitative air quality monitoring (by observation of dust plumes rather than testing).

244. Unmitigated and residual risk are considered to be low with good site practices.

245. **Impacts from aggregate extraction.** The main source of aggregate use for this project is in concrete used for precast construction. It is assumed that pre-casting will take place in established off-site facilities (most likely in construction yards in Honiara). The sources of aggregate for use in pre-cast concrete manufacture will be from approved and licensed sources. No site-specific impacts are anticipated.

246. Should the contractor have to source material at site the following mitigation measures would need to be considered in any application for extraction:

• Limits to volume of material extracted from any one source in light of ability of the source to regenerate and likely environmental impact as a result of the extraction.
• Access to gravel extraction sites will be negotiated with land owners and users, in the event that an access is purpose built, should the owner not want to keep the access, the contractor will be responsible for reinstating the land to its pre-project condition;
• Any rivers or streams identified as being part of a protected area (including the buffer zone of a protected area), a proposed protected area, or having conservation value, being habitat for rare or endangered aquatic species or birds, comprising part of the intertidal zone, comprising swamp or wetland, or including mangroves, will not be permitted to be used as sources of gravel;
• Any rivers or streams that are used as a fresh water source for villages should not be used as a materials source as gravel extraction will cause increased sedimentation and turbidity. In cases where such rivers or streams must be used, alternative water sources, such as drilled or dug wells, upstream of extraction sites and works, must be provided for the villages;
• Use of approved machinery for gravel extraction from rivers such as excavator or backhoe. Dredging or similar operations will not be permitted;
• In respect of maximum volumes to be removed from any one source, any river gravel removal for the subproject will be managed in accordance with the aggregate extraction guidelines and conditions of approval for the extraction plan;
Gravel material should not be extracted from river bends, and if required, river training be undertaken;

Any extraction sites and borrow areas close to roads will be located at least 20 m outside the right-of-way of roads, extraction from the sides of roads in a way that could undermine the roads will not be permitted;

Site and pit restoration will follow the completion of works in full compliance with all applicable standards and specifications;

Any topsoil excavated from the top of sites and borrow pit areas will be saved and reused in re-vegetating the sites and pits to the satisfaction of the SIPA;

Additional extraction sites and/or borrow pits will not be opened without the restoration of those areas no longer in use; and

The excavation and restoration of sites and borrow areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the SIPA and CSC. Sign-off to this effect by SIPA will be required before final acceptance and payment under the terms of the contract.

247. The potential unmitigated risk is high but with mitigation in place is considered to be low.

248. **Soils and erosion.** The port works will be carried out on the coastal fringe, with most work in the existing tidal zone. Hydrocarbon leakages and contaminations of soil from solid waste are common problems experienced by contractors. Chemicals must be stored in an area or compound with concrete floor and weatherproof roof and fueling of construction vehicles must be carried out under cover. Spills must be cleaned up as per emergency response plan. Generally, oil/fuel remediation agents, oil pads, oil booms and geo-fabric cloths should be available and ready to use during spillages. The contractor is required to incorporate a liquid and solid waste management approach and an accidental spill or emergency response plan in their EMP.

249. Potential soil impacts and erosion will be mitigated by:

- All required materials will be sourced in strict accordance with government guidelines, project provisions including the aggregate extraction guidelines, and the EMP
- In the event that the contractor causes damage to agricultural land, productive land or gardens, the contractor is solely responsible for repairing the damage and/or paying compensation
- Re-vegetation of the slope areas with fast growing species, or other plants in consultation with the land owners and village chiefs, as quickly as possible after work in the slope areas has been completed
- Random and uncontrolled dumping of construction spoil, or any material, will not be permitted
- Suitable permitted waste disposal sites will be designated in consultation with land owners and village chiefs. Waste disposal sites will not be permitted on the
rivers, or on garden land or in areas used for livelihood production by business and villagers

- Acquisition of all necessary permits or approvals for the location of construction camps, material extraction sites and sources of construction materials as per the aggregate extraction guidelines of MID and government agencies (such as Provincial Government and MECDM) prior to any construction or erection of camps and extraction of material

250. The unmitigated and mitigated risk for impact on soils is considered to be low.

251. **Water quality – spills.** The work will involve work close to and above the marine environment where there is potential for adverse impact from silt runoff and chemical spillages with potential to degrade water quality.

252. The contractor will be required to use sediment control approaches including silt fences around the wharf work areas to contain plumes to prevent disturbed water from entering the wider maritime water body. Booms should be deployed around the working areas to trap any floating debris. Used oils and chemicals will be collected, securely stored and disposed to approved disposal sites and not on the coast or in any waterway.

253. The unmitigated and mitigated risk for impact on water quality is considered to be low.

254. **Water quality – piling and dredging.** The reconstruction of the wharf will require new piles to support the wharf deck and a limited amount of dredging (10,000m$^3$ – equivalent to a 22m x 22m x 22m cube) at the west end of the wharf (existing fishing wharf moorings). The sediments in the vicinity of the wharf where sampled and tested in Second Preparatory Survey Report for Outline Design on the Project Improvement of Honiara Port Facilities in 2013 (JICA 2013). The results are presented in Section 4 of this IEE. In summary the sediments in the vicinity of the wharf reconstruction are mildly contaminated with faecal matter (human waste) and petroleum products (spills from vessels). It was concluded that the water quality was adversely affected by municipal effluent. The concentration of contaminants at this location compared to other sample points suggest that there is limited opportunity for lateral migration due to the action of currents as the area is a sheltered embayment. Therefore, any sediment disturbed during construction is unlikely to move far from the suspension point.

255. The formation of the piles to create the wharf deck will comprise a steel column driven into the seabed. A steel H pile and reinforcement mesh will be placed inside the steel column will be filled with concrete. There will be minimal disturbance of the seabed and disturbance of sediment.

256. The small quantity of dredged material (10,000m$^3$) limits the options for a contractor. It is very unlikely that a custom dredger$^{13}$ will be used due to the small volume and cost of equipment and a system using a floating pontoon / barge with a crane using a grab bucket is the most likely option. For the dredging operations the contractor should minimize resuspension of sediment and take steps to minimize spread of a sediment plume.

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13 e.g. Cutter suction dredger – a purpose-built vessel incorporating a movable cutter head with a centrifugal pump to draw up mud, sand, and silt through a suction tube. It is designed for large scale dredging operations but unlikely to be a viable economic option for this small volume / duration of works
257. The low currents in the embayment will not allow sediment to migrate far from the suspension point and the deployment of a silt curtain around the dredging area will prevent silt migration outside the working area. Closed shell grab dredging rather than open or half open grab techniques are preferred. The silt curtain will be suspended from a floating boom that will trap any floating debris generated during the dredging operations. See Plate 6.1 for typical dredging operation using a floating pontoon mounted crane with closed grab and a silt curtain suspended from a floating boom. In the plate, dredged material is being transferred to a barge for future marine disposal. The contractor should also consider timing work for neap tide\textsuperscript{14} conditions when the tidal range is minimized.

\textbf{Plate 6.1: Dredging operations - crane, clamshell grab, floating boom \& silt curtain}

258. Spoil dumping sites will need to be identified and assessed for suitability by the contractor, in accordance with relevant legislation on disposal of spoil. Options available to the contractor are land or marine disposal. The existing solid waste dump sites at Ranadi will require dredged material to be dewatered before disposal and will require separate disposal of potentially contaminated dewatering product. The Contractor may choose to investigate the option of marine disposal, but this will require obtaining permissions from relevant parties in the Solomon Islands. There is currently no formal marine disposal site in the Solomon Islands. Appropriate permits and the permission of the CSC will need to be obtained by the contractor before any dredging work commences.

259. \textbf{Waste management}. The construction activities and procurement of materials and equipment will generate waste. The contractor will be responsible for ensuring waste is managed as per the projects waste management plan (WMP) included in the CEMP. All waste collected will be disposed of only at a site/s approved by HCC, ECD, local landowners and SIPA.

260. Waste management mitigation measures includes:

- The contractor will prepare a WMP as part of the CEMP. The WMP will seek to firstly avoid waste and secondly to reuse/recycle waste;

\textsuperscript{14} Neap tide - tide of minimal range. Tidal cycles have periods of neap – low tidal range and spring – high tidal range.
• Suitable permitted waste disposal sites will be designated in consultation with landowners, village chiefs and government were required;

• Waste disposal will not be permitted by roadside, streams/channels, garden land or in areas used for livelihood production;

• No wastes will be dumped in waterways or close to the coast;

• At all works sites and office compound, the contractor will ensure safe and clean facilities including sanitation. Work site(s) and office compound will have portable and sanitary latrines respectively; and

• At all times, haulage route/road sections will be kept free of material and rubbish.

261. **Use, storage and transportation of hazardous substances.** Petrochemicals and other hazardous substances will be used and transported during the project. If not handled and stored properly these can cause harm to people and the environment. Mitigation measures include:

• Contractor to prepare a HSMP and ERP as part of the CEMP;

• Locate storage areas for all petrochemical products including bitumen at least 500 m from coastline and 100 m from stream/rivers;

• Fuel and oil stored in secured (lockable), weather proofed area including an impervious flooring and bund/containment wall to contain spillage. The bund shall be 110% of largest volume stored;

• All other chemicals and hazardous substances will be stored in lockable and secure areas in clearly labeled containers;

• Used oil, other toxic (e.g. bitumen) and hazardous materials shall be disposed of in an authorized facility off-site and any spill waste will be disposed at disposal sites approved by HCC and SIPA;

• No smoking or fire of any kind permitted in vicinity of bitumen and kerosene blending tanks. Provide a carbon dioxide fire extinguisher at bitumen tank site for firefighting;

• Road sealing including asphalting and/or concreting activities will be ceased during periods of heavy rainfall;

• Spill kits will be provided at work sites and works yards and staff will be trained in their use and deployment. All spills cleaned as per emergency response plan; and

• Ensure any spills or accidents are reported to SIPA/CSC and police within 24 hours.
6.5.2 Construction impacts on the biological environment

262. **General.** As shown in Plate 6.2, the Honiara Port site is in an existing highly modified urban environment modified for port facilities. Development has removed all traces of natural vegetation features and habitats.

Plate 6.2: Honiara Port – original works (date – unknown)


263. **Impact on terrestrial flora and fauna.** Most of the work will be carried out above water with no direct impact on terrestrial flora and fauna. The natural ecosystem in this area has been highly modified by human activities, with clearance of any existing flora (predominately trees shrubs) within the secure port area. Plant species present within the impact area are either introduced species or ubiquitous native species, which are highly tolerant of disturbances.

264. Fauna is limited to invertebrates that are associated with the flora (trees, shrubs) on the Port boundary and are dominated by insects. No birds or bats were identified roosting and/or nesting within the trees located in the area. There is no flora or fauna affected that has conservation significance nor is it representative of the original vegetative cover.

265. The contractor will be responsible for providing adequate information to workers regarding the protection of fauna and imposing sanctions on workers trapping, killing or wounding birds or other wildlife.

266. All construction machines will be maintained to minimize emission of dark smoke likely to cause nuisance to terrestrial fauna. Impacts to flora and fauna from accidental release of chemicals, oils and fuels are possible. To minimize any spillage, hydrocarbons will be stored in a shed and fueling of construction machines must be carried out from the shed. Spill kits will be available where these operations will occur.

267. Therefore, there will be negligible, if any, loss or impact on valuable flora or fauna.
268. **Impacts on marine flora and fauna.** The subproject will have very minor impacts (if any) on the marine and coastal habitats flora and fauna, due to the highly modified ecosystem at this site and the paucity of sessile benthic invertebrates and vertebrates. In isolation, the project will not induce climate change, including localized increased sea temperatures and as such there will be no risk of coral bleaching associated with the project.

269. Potential impacts from the wharf construction activities possibly impacting coastal and marine habitats, is run-off or sedimentation and the re-suspension and transport of particulates by vessel propulsion units during maneuvering at the maritime construction site. It is considered that the relative effect of short-term increases in sedimentation that may be derived from the scope of works will be both small in volume and localized, due to the intermittent activity and the small amount of sediment that could be released as a result of the construction activity. Thus very minor if at all impacts on the coastal and marine environment and resources are expected.

270. **Impacts on protected areas and sensitive ecosystems.** There is no marine, coastal or terrestrial protected areas within or close to the project's area of influence and as such there will be no impact on the national protected area systems and the flora and fauna that resided within.

271. **Mitigating ecological impacts.** The subproject will create few, if any, adverse impacts on fauna, flora and habitat. Mitigation measures include:

- The subproject AEP will not permit extraction in areas of ecologically importance or areas valuable for resource or habitat conservation. Building permits (with requisite documentation) will be applied for prior to any materials extraction;

- The contractor will be responsible for supplying appropriate and adequate cooking fuel in workers camps to prevent fuel-wood collection. Construction workers will be informed about general environmental protection and the need to avoid unnecessary felling of trees;

- The contractor will be responsible for providing information to workers in respect of other flora and wildlife/fauna (including birds and bats). Contract documents and technical specifications will include clauses expressly prohibiting the poaching of fauna by construction workers and the contractor will be responsible for imposing sanctions on and/or dismissal of, any workers who are caught trapping, killing, poaching, or having poached fauna;

- The contractor will be responsible for providing information to workers about laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees not requiring to be cleared by the project; and

- The contractor will be required to prepare site-specific plans identifying works, timing and measures required to protect coastal and marine habitat. The plans will be reviewed and cleared by the SIPA and CSC prior to works commencing in these areas.
6.5.3 Impacts on socio-economic conditions

272. Public access and traffic. The port is located in the central business district of the country’s capital – Honiara - port upgrading construction activities (equipment and materials haulage) will cause negative impacts through presence of vehicles and equipment and disruptions to traffic and pedestrians using the road. Managing the traffic along the main road (Mendana Avenue) to/from port will be critical given this is the main thoroughfare in Honiara town and central business district. The contractor will need undertake a survey to fully understand peak times and flows and consultations will be required with all stakeholders along Mendana Avenue. Parking and access arrangements in and around the port will need to be carefully planned to ensure that ongoing operations are not impacted too greatly.

273. Pedestrian access through or around the work site(s) will be strictly controlled and managed throughout the duration of the works. During haulage of equipment or materials traffic management and control, especially during peak traffic times, will be required to ensure safe passage of vehicles and pedestrians. Stakeholders and communities will be notified in advance of the schedule and duration of activities and the access and traffic control arrangements.

274. Mitigation of impacts will include:

- Prior to commencement of works, the contractor will prepare, and submit to SIPA for clearance, a traffic management plan (TMP) detailing controls, diversions and management/safety measures for works within the sections as well associated sites, quarry/extraction areas, laydown areas and yards etc;
- In accordance with the project’s CCP, the contractor and SIPA will inform adjacent businesses, commuters, and providers of transport services etc of duration and scope of works and any alternative traffic arrangements;
- Clauses will be included in the contract specifying that i) care must be taken during the construction period to ensure that disruptions to access and traffic are minimized and ii) access to/from business will always be maintained;
- Stakeholders and potentially affected people will be consulted if access to specific areas will be disrupted for any time and temporary access arrangements made;
- Use of signage, spotters, flaggers and safety barriers to control and regulate traffic flow whilst ensuring safety for workers and pedestrians;
- Ensure public safety across and around work site(s) including barriers to prevent entry to high risk areas (e.g. excavations, area with heavy machinery being used) and ensure safe passages are provided through or around work sites;
- At all times, the haulage roads/routes will be kept free of debris, spoil, and any other material; and
- Disposal sites and haul routes will be identified and coordinated with SIPA, local government and community/village officials. This may mean undertaking haulage during specific times of the day to avoid further congesting periods of commuter and school traffic.
275. **Presence of workers.** The mobilization of the contractor and establishment of work sites will require the presence of construction workers and subsequent interactions with the local business and residential communities. Prior to contractor mobilization to the site, the project’s community liaison officer will establish the communications protocol between the project and community as per the project’s CCP and.

276. Measures to minimize disturbance by construction workers and presence of the works site/area include:

- Community protocols and worker code of conduct will be included in the CEMP and contracts;
- The contractor is to ensure that workers’ actions outside work site are controlled and community codes and rules of conduct are observed at all times;
- The contractor will identify one member of their staff to be the liaison between the communities and contractor, as well as between the contractor and SIPA;
- Adequate signage and security provided at the work camp site and prevention of unauthorized people (including children) entering any work area;
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by communities, and signage or marking of the work areas;
- To avoid, or reduce the risk of, other social impacts, the small management population will be accommodated in rented accommodation in Honiara. At all times workers should respect community and land owner’s cultural beliefs and activities and be cognizant of community rules and terms of conduct (especially addressing women and elders), avoiding damage to productive trees and gardens, and access to the coastline, foreshore; and
- Implement communicable diseases awareness and prevention for the contractor’s workers and adjacent communities (as described below).

277. **Worker health and safety.** Construction activities include various hazards and risks including working with heavy equipment and machinery, working on roads/in traffic, working in confined spaces (excavations and culverts), working by waterways and working with particulates and hazardous substances. There are also risks associated with influx of labor such as spread of communicable diseases (including COVID-19, STIs and HIV/AIDS).

278. The contractor will provide: i) health facilities, first aid kits, appropriate safety equipment and procedures for medical evacuation; ii) adequate training and information to workers in relation to all health and safety issues, equipment and training; iii) an approved service provider to conduct a communicable diseases (including COVID-19, STI and HIV/AIDS) awareness and prevention program for workers and local community; and iv) access to safe drinking water (at least 2 L/day per worker), mosquito management, sun/shade management, portable, septic latrines and garbage receptacles at all work sites and office compound.

279. Mitigation measures include:
• The contractor will prepare a health and safety plan (HSP) as part of their CEMP. The HSP is to include key components of the World Bank Group’s EHSG;

• The contractor will appoint a full-time EHSO responsible for implementation and monitoring of the CEMP and in cojunction with the community liaison officer (CLO) to communicate with the SIPA and stakeholders in the subproject area;

• The contractor will provide adequate health care facilities including a health post and first aid facilities at the office compound and mobile first aid kits in vehicles and at work sites;

• The contractor will provide construction workers training on health and safety matters, specific hazards of their work, basic sanitation, hygiene and health care issues and awareness and prevention of communicable diseases (including COVID-19, STIs and HIV/AIDS);

• The communicable diseases prevention plan will identify measures that are aligned with the planning guidance based on traditional infection prevention and industrial hygiene practices and which focuses on the need for employers to implement engineering, administrative, and work practice controls and PPE to avoid and control spread of COVID-19, prepared by WHO 2020 Considerations for public health and social measures in the workplace in the context of COVID-19;¹⁵

• The contractor will be responsible for providing safety equipment and appropriate personal protective equipment (PPE) to workers, including instructions on how and when to use the equipment;

• The contractor will ensure safe and clean facilities include sanitation and drinking water (at least 2 liters/day) is provided to all workers;

• Septic tanks and garbage receptacles will be set up at work sites and office compound/s. The contractors to prevent outbreak of diseases will regularly clean these facilities. Garbage will be dumped only at a site approved by local authorities and CPIU;

• “No smoking zone” signage will be posted throughout work sites and the office compound (e.g. fuel storage areas);

• The contractor will ensure that there is adequate drainage throughout the camp to ensure that disease vectors such as stagnant water bodies do not form;

• Contractor to educate and ensure worker’s actions are controlled codes of conduct are strictly observed (work sites and office compound); and

• The use of wood for fuel will be prohibited to avoid fire hazards; the camps are to be provided with sufficient and proper cooking facilities such as propane gas and burners.

280. **Community health and safety.** The contractor’s HSP will also address community health and safety impacts as follows:

- The contractor will implement relevant elements of the CCP and GRM;
- Before construction commences the contractor will conduct training for all workers on their requirements to engage the local community and ensure national laws are complied with. The contractor will agree a worker code of conduct with village and community leaders which will govern the behavior of workers on and off-site and provide ‘rules’ for work in villages and behavior around women, elderly and children which are to be strictly followed;
- The agreed code of conduct and protocols will be included in the worker’s contracts and will be discussed during awareness raising as well as part of the mobilization process;
- Adequate signage and security will be provided at work sites for prevention of unauthorized people (including children) entering any work site(s) or the office compound;
- The public will be adequately protected near work sites, including advanced notice of commencement of works, installation of safety barriers and fences and signage or marking areas where works will be carried out;
- Provision of safe access across the works site(s) to people whose residential or business access is temporarily affected during road rehabilitation activities;
- Signage and security i.e. prohibition on unauthorized people (especially children) entering site office, construction areas, works yard and camp all are in English and Solomon Island Pidgin;
- Communicable diseases (COVID-19, STI, HIV/AIDS) awareness and prevention program delivered through an approved service provider for workers and communities. First community sessions to be delivered prior to commencement of works or presence of workers in the area;
- Child and/or trafficked labor will be strictly prohibited for any activities associated with the subproject;
- Children will be prohibited from entering the worker’s accommodation, works area/construction zone and prohibited from playing on any equipment or machinery associated with the project;
- The contractor will implement the TMP that will include traffic control and pedestrian safety measures; and
- In consultation with SIPA, the contractor will clearly fence off ‘no go areas’ within work site(s) and erect boundary fences to prevent the public from entering during the construction period (or specific construction activities).

281. The size of the work does not warrant the establishment of a construction camp with worker accommodation as non-resident staff will be limited to a Manager / Engineer, Forman and skilled plant operators. Semi-skilled and unskilled labour will be sourced from the Honiara population. The contractor construction camp will be limited to office accommodation and some material storage though it is likely that this will be located within the existing Port fenced boundary.
282. With these mitigation measures in place, residual impact is considered to be low.

283. **Impacts on community infrastructure.** Works impacts on existing utilities and infrastructure (water, gas, electricity and road infrastructure. Low impact anticipated as works are self-contained and will be carried out within SIPA compound.

284. **Site clearance – cultural and archaeological impacts.** The Honiara Port site is highly disturbed, the subject of historic reclamation (see Plate ES1). It is not anticipated that the development of the wharfs will affect any cultural heritage or archaeological resources. If site clearance, digging or excavation activities un-earth archaeological sites or resources, work shall cease immediately and the authorities (National Museum Tambu Register, Ministry of Culture and MECDM) shall be informed. A chance find procedure will be developed in the contractor’s CEMP.

285. The contractor shall be responsible for complying with the requirements of authorities, and the SIPA/CSC will monitor the same.

286. The unmitigated and mitigated risk for cultural heritage and archeological discovery is considered to be low.

287. **Construction noise – general.** There are no noise standards in Solomon Islands. But any noise generated by construction should be restricted to the hours of 7 am to 5 pm weekdays (Monday – Friday). Permission from SIPA would be required to operate outside of these hours, which may be required for certain activities. Construction noise will be intermittent, quickly attenuates with distance, and depends on the type of operation, location and function of equipment. On this site there will be limited heavy machinery (except the piling rig) other machinery will be the crane for lifting precast decking into position, small batch concrete mixers and generators to power electric hand tools. The following sound power levels of construction equipment are noted:

- Crane barge mounted (diesel) sound power level 112dBA
- Lorry sound power level 112dBA
- Tug boat sound power level 110dBA
- Generator sound power level 108dBA
- Concrete mixer (electric or petrol) sound power level 96dBA.

288. The closest building is over 700m away and a calculation of the residual noise at this building due to noise attenuation has been carried out. A correction factor of 71dB(A) is applicable to an unshielded source, therefore impact from the barge mounted crane at the boundary of the closest property could be 41dB(A), and this will be further reduced as there is shielding from direct line of sight by intermediate buildings.

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16 The information on source noise and distance attenuation has been extracted from the Hong Kong Environmental Protection Department publication “Technical Memorandum on construction Noise other than Percussive piling. Table 3 Sound Power Levels for Powered Mechanical Equipment and Table 5 Correction factors to obtain Predicted Noise Level from Sound Power Levels at Given Distances.
289. The high background noise levels from vehicle traffic and the light industry in the area will effectively make construction noise level from port construction undetectable and in addition, will be limited to daytime 7:00am to 5:00pm (Monday to Friday) The precise hours of work will be determined in agreement with the local community. Particular attention will be made to avoid any impact on any schools during exam periods and on places of worship during times of worship. With this mitigation in place impact is considered to be low.

290. **Construction noise – percussive piling.** Construction of the refurbished wharf at the port requires driving steel “H” piles into the seabed to provide a foundation to the precast concrete decking. The H piles will be driven into the sea bed by a barge mounted drop hammer. The action of pile driving will create a rhythmic, metal on metal, noise. The closest building to the works area are 700m distant to the southeast. A calculation of the residual noise at this building due to noise attenuation has been carried out.\(^\text{17}\)

- Sound power level for a drop hammer driving a steel pile 126dB(A)
- Correction to obtain predicted noise Level at 700m from source 71dB(A)
- Residual noise level at building (without shielding) 55dB(A)

291. A sound power level of 55dB(A) is less than the noise level close to a distributor road i.e. not excessively loud. For example, ear protection is only recommended for noise levels above 85dB(A). The percussive nature of the piling will be noticeable through the immediate area but pile driving will be mitigated by limiting working hours to daytime with the additional restriction of no work in the early morning or evening, at the weekend or public holidays and holy days.

292. The precise hours of work will be determined in agreement with the local community. Particular attention will be made to avoid any impact on schools during exam periods and on places of worship in the village during times of worship. Even with restricted working hours there will be a residual impact and if this is found to be unacceptable to concerned individuals further restriction of working hours may be required i.e. to hours when background noise levels are highest (e.g. morning and evening rush hour). Working hour restrictions shall be relayed to the community so that they can plan activities accordingly.

293. The duration will relatively short, several months and the residual impact is considered to be medium.

294. **Vibration from piling.** The vibration from percussive piling will depend on the underlying geology. The principal danger is damage to property and the Contractor must carry out a precondition survey of potentially affected structures so that in the event of any damage the impact can be agreed, quantified and remedied.

295. Even with restricted working hours there will be an impact on the village which it is uneconomic to mitigate further. The duration will relatively short though could be several months and the residual impact is considered to be medium.

\(^{17}\) The information on source noise and distance attenuation has been extracted from the Hong Kong Environmental Protection Department publication “Technical Memorandum on Noise from Percussive piling. Table 2 Sound Power Levels for percussive piling and Table 4 Correction factors to obtain Predicted Noise Level.
6.6 Operation Phase

296. **Air quality.** Goods are generally containerized rather than “loose loads and therefore no additional impact is anticipated.

297. **Hydrology and water quality.** The wharf is constructed on piles and no impact on hydrology is anticipated. Spills are not an issue for existing operations, and this is not expected to change due to future operation.

298. **Waste management.** Periodic removal of waste accumulated from packaging and litter. This will be addressed in an operational waste management plan to be implemented by SIPA.

299. **Flora and fauna.** No evidence of this being an issue from existing operations and no new impact anticipated.

300. **Biosecurity and risk of introduction and/or spread of invasive and alien species.** Vessels entering the port, inter-island shipping as well as transfer of cargo (material, equipment, food, beverage etc) between the provinces and islands poses threats for introduction or spread of invasive species. As part of developing the EMS for port operations, SIPA (with support as required) will conduct an assessment of the risk of introduction and/or spread of invasive and alien flora and fauna through regular and emergency port operations. Based on the risk assessment, SIPA will include protocols and procedures in the EMS demonstrating how they will follow the requirements identified in SPREP Guidelines for Invasive Species Management, National Strategy on Aquatic Biosecurity for Solomon Islands 2018-2023 and IUCN Guidelines for Invasive Species Management on Islands 2018.

301. **Noise.** Operations no different to existing in an area of high background noise levels. Fixed wharf cranes not proposed existing shipboard cranes will continue to be utilised for loading and unloading cargo across the quay. Relatively low activity, mitigation options include liaison by SIPA with operators on specific areas of concern (e.g. working hours).

6.7 Summary of Potential Environmental and Social Impacts

302. In general, the potential adverse environmental and social impacts associated with the works to carried out on the project are expected to be small, short-term and localized.

303. The majority of the potential adverse impacts will be applicable during the construction period only and will mainly occur within defined Port development areas. The likely adverse environmental impacts during the construction phase will include, but not be limited to the following:

- Noise from piling operations
- Elevated water pollution in the water column due to disturbance of sediments during piling and dredging;
- Noise and vibration disturbances from vehicle movements and operation of construction plant;
- Temporary air pollution related to increased truck traffic during the construction;
• Spillage of fuel (hydrocarbons) and chemicals associated with construction during the construction period;
• Pollution of water resources from accidental spills;
• Use of temporary construction sites (manufacturing areas, storage areas, etc.) – No construction camp providing accommodation are envisaged. The management team (engineers and foremen) will be accommodated in existing, available accommodation rented for the duration of the works and labour will be sourced locally;
• Use of borrow pits (though minimal impact anticipated at site as the piles and deck will be precast off site at operating pre-casting yards in Honiara using licensed quarry supplies.

304. The expected overall positive environmental and social impacts from the proposed project will be long-term and cumulative in nature, ultimately contributing to the increased social and economic benefits of the Solomon Islands.
7 Environmental Management Plan

305. The EMP contains the components crucial to effective environmental management of the project including: i) organizational responsibilities (for various aspects of EMP implementation); ii) consultation and information disclosure (explained in Section 6 and reflected in the EMP); iii) GRM; iv) plan for mitigation of impacts (during pre-construction, construction and operation); and, v) monitoring and reporting.

306. An EMP is developed to achieve the following objectives:

- To reflect the environmental and social issues and impacts identified during project preparation;
- To implement and monitor mitigation measures within the construction areas; and
- To comply with the laws and regulations of the country and with international standards and best practice guidelines.

7.1 Institutional Arrangements

307. **Overview.** Implementation of environmental safeguards including environmental management provisions and requirements for the roads and wharves components is a joint responsibility between the MID-CPIU, CSC, and contractor(s), and for the port component is a joint responsibility between SIPA, CSC and contractor(s). The MOFT will be the executing agency and will have the overall responsibility for ensuring that the project activities comply with the project agreements and covenants. For the roads and wharves components, the CPIU, on behalf of MOFT, will implement the project, and for the ports component a project management unit will be established in SIPA including managing consultants and the contractor, according to the requirements. The CSC will include environmental specialists to support the CPIU and SIPA.

308. The overall organizational structure for environmental management for the LMCP is shown in Figure 7.1.

309. **Ministry of Infrastructure Development.** The MID, through its CPIU, will be the implementing agency for the roads and wharves components and will have responsibility for subproject related activities including inter-ministry coordination. MID retains responsibility for the environmental management and monitoring tasks of the project. MID will exercise its functions through the CPIU and is responsible for the project delivery and day-to-day project management activities. It is expected that the CSC will be appointed for the project implementation, to undertake environmental monitoring. MID will be responsible for ensuring that the contractors do not start construction activities until requisite approvals have been received from MECDM, MID and MMERE, as required by the contract and by law.

310. After the completion of construction, MID will be responsible for operations and ongoing maintenance of all assets.
Figure 7.1: Organizational Structure for Environmental Management

- Government of Solomon Islands
  - Asian Development Bank
  - Ministry of Finance and Treasury (MOFT)
    - Ministry of Infrastructure Development (MID)
      - Solomon Islands Port Authority (supported by CSC)
      - Central Project Management Unit – incl. safeguards + community development specialists (supported by CSC)
        - Contractors – ports, roads, wharves (incl. EHSO + CLO)
          - Stakeholder consultation & grievance redress processes
          - Beneficiary households and affected persons
      - Environment and Conservation & Division (MECDM)
        - Landowners
311. **SIPA.** The SIPA will establish a PMU which will be supported by a CSC, together they will undertake environmental management and oversee inspections and monitoring tasks during the development and delivery of the project. The SIPA and CSC specialists will assist in all aspects of implementation of the environmental assessment and permits as required. The SIPA, supported by the CSC, will:

- Update the IEE as PER as required to meet the requirements of the Environment Act 1988 and prepare the applications for development consent;
- Address the items identified in the environmental audit, including development and implementation of an EMS which will include guidelines and procedures on biosecurity and control and management of introduction and/or spread of invasive and alien species;
- Ensure the updated EMP and any conditions of the development consent are integrated into the subproject’s bid and contract documents;
- Participate and facilitate, as per the project’s CCP, consultations to advise affected communities of the scope and scheduling of the work;
- Depending on the environmental management experience of the contractor, prior to the preparation and submission of the CEMP, provide induction whereby the details of the CEMP are confirmed, and the contractor informs the community of the schedule of works;
- Review the CEMP prepared by the contractor and provide recommendations for revision or strengthening as required. Upon receipt of the CEMP that can be approved, advise the CSC Engineer that approval for commencement of works can be issued;
- Undertake regular site visits to independently inspect and audit the contractor’s compliance with the approved CEMP and the CSC’s monitoring;
- Should non-compliant work or activities be identified, this will be raised to the CSC Engineer who will issue a defect notice or corrective action request. All notices and requests will be recorded and reported; and
- Prepare and submit i) inputs to quarterly progress reports and ii) semi-annual safeguards monitoring reports.

312. **Construction supervision consultant.** The CSC will include environmental specialists to work closely with safeguards officers of the CPIU. The CSC will support the SIPA to deliver the subproject and assist in undertaking all tasks identified above.

313. **The contractors.** The civil works contractors will be responsible for translating the EMP in the bid documents into their construction CEMP that reflects the methodology they will use to deliver the works. The CEMP will include all site specific and sub-plans as required. The contractor will engage a full-time EHSO who will be responsible for implementing, and reporting implementation of, the approved CEMP. The CSC will approve the CEMP, upon advice from the SIPA/CSC before any physical works are undertaken.

314. The environmental management responsibilities of the contractor include:
• Preparing and submitting for review and approval the CEMP. Coordinating with CPIU and CSC for updating the CEMP as/when required;
• Implementing the approved CEMP including addressing and resolving corrective action requests issued by the CSC Engineer;
• Undertake noise measurements and establish the noise baseline for subsequent monitoring;
• Recruiting an approved service provider to deliver the communicable diseases briefings and awareness and prevention program;
• Coordinating with CPIU and CSC in respect of continued community consultation, implementation of the GRM and information disclosure;
• Applying to DMM for BMPs for new materials sources as required and preparing and submitting extraction plans;
• Ensuring that all imported material and equipment is subject to quarantine clearance and receives appropriate phyto-sanitary certificates;
• Participating in joint inspections with CPIU and CSC as required;
• The EHSO will maintain a site diary and GRM register (including actions taken to resolve the issue and close-out dates); and
• Including status of CEMP (including issue and response to corrective action requests), consultation activities and GRM implementation in the monthly reports.

315. The contractor shall appoint a dedicated EHSO and deputy responsible for undertaking health, safety and environmental management tasks as set out in the Contract and lead the monitoring team. The responsibilities of the EHSO and deputy include:

• Ensuring the contractor implements the environmental protection and management specifications set out in the contract and their CEMP;
• Undertaking day-to-day environmental management tasks as required for the Project and weekly environmental audits;
• Maintaining a daily site diary recording all relevant matters concerning environmental management on the site including protections and controls, audits, inspections, and related incidents. Making the site diary available for inspection by the Engineer upon request;
• Participating in joint inspections to be undertaken by SIPA, ADB and other environmental organizations and the Engineer’s environmental team; and
• Preparing and submitting the reports as required by the contract and the EMP.

316. **Environment and Conservation Department.** The ECD, under the requirements of the Environment Act 1998, is required to review the PER and development consent application and assist in monitoring construction activities against development consent conditions. The ECD has been provided with several capacity building and technical assistance programs over the past decade, which have provided extensive policy and legislative improvements, practical training, mentoring and capacity building in all aspects of environmental assessment, monitoring and compliance.
317. This has resulted in considerable improved staff capacity to manage the roles and responsibilities and implement the CSS. Nevertheless, insufficient staff numbers (in the EIA section) and resources hamper capacity for enforcement and monitoring. It is therefore recommended that the CSC provide mentoring and capacity building to the ECD as opportunities arise.

318. **Department of Mines and Minerals.** The DMM is responsible for issuing BMP for the extraction of sand and gravel. The contractors will comply with the Mines and Minerals Act 2008 regarding sourcing materials from either existing or new sites. A potential source of alluvial gravel has been identified at Tamboko River (located approximately 20 km west of Honiara). The sources of construction material can only be finalized when the contractor for each of the contract packages is appointed. A copy of an approved BMP will need to be provided by the contractor and attached to the CEMP.

319. **Summary.** A summary of various parties’ responsibilities for environmental management in the project is provided in Table 7.1.

### Table 7.1: Responsibilities for environmental management

<table>
<thead>
<tr>
<th>Project stage</th>
<th>Responsible agency</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility studies, detailed design review and project approval</td>
<td>CPIU, SIPA</td>
<td>Review designs prepared as part of ongoing project and complete detailed design. Update feasibility study including safeguards due diligence as required.</td>
</tr>
<tr>
<td></td>
<td>ADB</td>
<td>Review all feasibility study documentation (incl. IEE). Prepare documents package for Board review (incl. TOR in PAM and covenants in loan agreement). Board approval of project. Assist government to recruit CSC.</td>
</tr>
<tr>
<td>Pre-construction</td>
<td>CPIU, SIPA, CSC</td>
<td>Include environmental specialist as part of CSC team. Elaborate the stakeholder engagement strategy in the PAM as the CCP. Update IEE as PER and submit development consent applications (need for separate consent applications will need to be discussed with ECD). Address environmental audit findings including development of EMS for port operations. Ensure updated EMP and any conditions of development consent are included in the bid and contract documents. Prior to works commencing ensure the baseline conditions are benchmarked and recorded—including noise—as required by the EMP for subsequent monitoring. Provide inputs to the bid evaluation in respect of contractor’s response to the EMP requirements including the suitability of the EHSO proposed as part of the contractor’s team. Provide induction training to the contractor prior to the preparation and submission of the contractor’s CEMP and as required work with the contractor’s EHSO to identify appropriate construction methodologies and detailed site-specific mitigations. Review and approve the contractor’s CEMP and advise CSC Engineer of approval to trigger “no objection” to commencement of activities/works.</td>
</tr>
<tr>
<td></td>
<td>ADB</td>
<td>Review and clear updated safeguards documents. Provide comments on the CEMP and proposed monitoring checklists. Participate in missions and reviews</td>
</tr>
</tbody>
</table>
### Project stage | Responsible agency | Responsibilities
--- | --- | ---
Contractor | Recruit suitably qualified EHSO. Prior to any works commencing, prepare CEMP including the site-specific plans, work method statements and construction methodologies and GRM. Submit CEMP to CPIU and CSC for review and approval (revising as necessary if required). Identify materials and equipment sources and apply for BMP for new sources and clearance consents and compliance certificates for imported materials and equipment. Provide pre-mobilization induction on CEMP (incl. OHS) to employees. Recruit approved service provider to provide STI/HIV/AIDS awareness and prevention training for workers and community.

Construction | Contractor | Inclusion of EHSO as part of core team. Provide ongoing training, awareness and “tool box” sessions for workers. Implementation of CEMP. Implementation of CCP and GRM as pertains to construction. Reporting of CEMP and GRM implementation in monthly reports. Implementation of corrective actions as requested by Engineer.

CPIU, CSC | Supervise, monitor and report on contractor’s implementation of CEMP and all other contractual obligations. Enforce contractual requirements. Audit construction phase through environmental inspections and review monitoring reports and data. Submission of quarterly progress reports and semi-annual monitoring reports. Work with contractor EHSO for provision of awareness/training to workers and information transfer to contractor as required.

ADB | Undertake regular review missions. Review monitoring reports. Disclose project information as required.

ECD | Ensure compliance with government requirements. Review complicated issues, if any, arising from the project. Participate in monitoring.

Operation | MOFT/MID | Provide budget to undertake maintenance activities and operation stage environmental monitoring as required by EMP.

Maintenance contractor | Undertake environmental monitoring and prepare bi-annual reports. Prepare maintenance reports to adaptively manage environmental risks related to operations (per EMP).

### 7.2 Environmental Monitoring and Reporting

320. Environmental monitoring is an integral component of an environmental impact assessment to, i) combat uncertainties pertaining to unanticipated impacts; ii) ensure mitigation measures are working; and iii) reassure the public on the progress of the development. Progressive monitoring must accompany various stages of the subproject activities (pre-construction, construction and operational phase).

321. The environmental monitoring plan is based on the potential impacts, significance of the impacts and mitigation approaches identified during the environmental assessment.
322. The plan comprises parameters to be monitored, frequency of monitoring, responsible authorities and cost estimates. The contractor will be required to prepare a detailed environmental monitoring plan based on the EMP and as set out in the contract documents.

323. Quarterly progress reports will be issued by the CSC to MOFT, MID, SIPA and ADB. These will report on all aspects of the project, including those documented in the contractor’s monthly reports and environmental monitoring reports prepared by the CSC and contractor.

324. The monitoring and reporting required under the project includes:

- Review of the contractor’s monitoring plan as part of their CEMP, based on contract documents and grant approval when requirements are met;
- Contractor’s monthly reports including status of implementation of the approved CEMP (completed checklists) and corrective action requests;
- CSC and CPIU inspection and audit reports reflecting on compliance of the contractor with the approved CEMP;
- Preparation of quarterly progress reports by CSC and CPIU for submission to MID, MOFT and ADB;
- Preparation of semi-annual safeguards monitoring reports rolling up the information contained in the reports listed above.

325. The contractor will produce monthly reports and these must include information on environmental performance. Reporting will include but not be limited to:

- Status of the CEMP;
- Status of any other contractor prepared environmental documents
- Status of environmental permits (e.g. asphalt plant, borrow areas if appropriate)
- Recording any physical environmental monitoring results (e.g. air, noise, water quality, vibration)
- Results of contractor and joint contractor / CSC site audits
- Grievance redress mechanism
- Interaction with the public – public consultations and complaints
- Training of site staff in environmental matters

326. In order to introduce reasoned analysis of incidents identified on-site it is proposed that three levels of incident reporting are available: (i) observation - no discernible environmental impact on the site; (ii) opportunity for Improvement - minor impact that is reversible with minor intervention; and (iii) non-conformity - major incident requiring significant resources to rectify. In carrying out site inspections the ESHO will record any environmental incidents under three levels of severity as shown in Table 7.2.
Table 7.2: Reporting environmental Incidents on site – three levels of incident

<table>
<thead>
<tr>
<th>Non Compliance</th>
<th>What it means on site</th>
<th>Reported by</th>
<th>In site reporting as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I: A non-compliance situation not consistent with the requirements of the EMP, but not believed to represent an immediate or severe social or environmental risk.</td>
<td>An unplanned and undesirable event is observed where there was no damage to the environment but there could have been.</td>
<td>Everyone on site.</td>
<td>Observation</td>
</tr>
<tr>
<td>Repeated Level I concerns may become Level II concerns if left unattended.</td>
<td></td>
<td>Responsibility of the Environmental Officer to educate the workforce</td>
<td></td>
</tr>
<tr>
<td>Level II: A non-compliance situation that has not yet resulted in clearly defined damage or irreversible impact but which potential significance requires expeditious corrective action and site specific attention to prevent severe effects.</td>
<td>e.g. where containers aren’t properly sealed but are on a hard standing or within a bund so any spill would be contained.</td>
<td>The teams responsible for carrying out the regular site audits.</td>
<td>Opportunity for Improvement</td>
</tr>
<tr>
<td>Repeated Level II concerns may become Level III concerns if left unattended.</td>
<td></td>
<td>Includes Supervising consultants environmental officer, Contractors Environmental Officer, MOTC, etc.</td>
<td></td>
</tr>
<tr>
<td>Level III: A critical non-compliance situation, typically including observed significant social or environmental damage or a reasonable expectation of very severe impending damage.</td>
<td>Where a situation exists, or with potential to create a situation, where there is damage to the environment.</td>
<td>Intentional disregard of specific prohibitions is also classed as a Level III concern.</td>
<td>Non-conformity</td>
</tr>
<tr>
<td></td>
<td>e.g. where containers aren’t properly sealed and they aren’t within a bund or hard standing and close to a sensitive area like a river or stream</td>
<td></td>
<td></td>
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</tbody>
</table>

327. When an incident is identified the observer assigns it as an observation, opportunity for improvement or a non-conformity. Only a non-conformity requires the issue of a corrective / preventative action request generated by the Engineer (on advice from the environmental specialist). Observations and opportunities for improvement are relayed verbally to the supervisor at site, recorded on the site audit sheet and summarized in monthly reporting.
7.3 Environmental Management Plan

328. The contractor will prepare their site-specific CEMP that will be developed from the EMP presented in this IEE. The CEMP is the contractor’s opportunity to address the environmental concerns identified in the EIA (and its EMP) and their own experience and site practices to state clearly how environmental issues will be addressed. From the CEMP a series of checklists will be derived by the contractor with CSC input for use in auditing the contractor’s environmental performance and offering early identification of any deteriorating environmental standards.

329. Table 7.3 presents the EMP for the subproject and identifies feasible and cost-effective measures to be taken to reduce potentially significant adverse environmental impacts identified in the EIA to acceptable levels. The tables reflect the various stages of the project cycle: pre-design, design, construction and operations and maintenance. The last set of tables describe environmental monitoring activities needed at the pre-design, construction and operations stages.

330. This EMP is focused on the construction and operation of upgraded / re-provisioned facilities at the port of Honiara and associated works. The contractor will be responsible for preparing a comprehensive CEMP based on this EMP to match their working methods and approach (including timing of certain activities). The contractor must have an approved CEMP in place before any work commences on-site (including mobilization). The CEMP will be submitted to the CSC and ADB who will review and submit to SIPA (and MID if required) for final review and approval.

331. The process of CEMP development is illustrated in Figure 7.2.
Figure 7.2: How a Contractor CEMP evolves from the EIA and EMP

- Environmental Impact Assessment (EIA)
- Environmental Management Plan (EMP)
- Site Specific Environmental Management Plan (SEMP)

Mitigation measures → Monitoring requirements

Produced by Construction Contractor within 30 days of Award
No work onsite until approved by Contract Holder (MoT)

- Method statements and Risk Assessment (Risk / Consequence)
- Topic Management Plans
  - Road work Management Plan
  - Tunnel work Management Plan
  - Bridge work Management Plan
  - Traffic Management Plan
  - Camp Management Plan
  - Waste Management Plan
  - Noise Management Plan
  - Air(Dust) Management Plan
  - Access Road Management Plan
  - Borrow / Disposal Management Plan

- Site Management Plans
**Solomon Islands: Land and Maritime Connectivity Project**  
**Honiara Port Component – Initial Environmental Examination**

**Table 7.3: Environmental Management and Monitoring Plan**

<table>
<thead>
<tr>
<th>Environmental Issue/Project activity</th>
<th>Mitigation and/or Enhancement Measures</th>
<th>Monitoring Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td><strong>DESIGN / PRE-CONSTRUCTION</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Project disclosure and approvals under CSS | 1. Make the application for development consent including updating the IEE and EMP based on the detailed design ensuring that the updated IEE/EMP complies with ECD requirements (PER)  
2. Obtain development consent prior to commencement of construction works;  
3. Ensure that the updated EMP, development consent conditions and all other environmental mitigation measures are incorporated into the bidding documents and contract. This shall include the framework for all plans/subplans to be covered in the contractor's construction environmental management plan (CEMP);  
4. Implement plan for grievance redress mechanism as described in the IEE | 1 – 4 SIPA-PMU, CSC | 1 & 2: Immediate.  
3 & 4: During tender preparation and evaluation | 1-4 included in SIPA, CSC staffing | Environmental approval (development consent) for the project obtained from ECD. Complete check of items 1 to 4. | Prior to commencement of civil works. | SIPA-PMU, CSC | IES/NSS cost included in CSC budget. |
| Environmental capacity development | 1. CSC to provide awareness raising and basic training to SIPA staff in internationally recognized environmental management and health and safety good practices  
2. Conduct contractor / workers' orientation on EMP/CEMP provisions. | 1: CSC  
2: Contractor | Initiate during procurement period and continue throughout project construction | 1: IES cost included as part of CSC services contract  
2: Included in contract cost | 1:IES TOR, CSC progress reports to ADB  
2: Inclusion in tender documents and check during construction. | Prior to start of site works and throughout construction phase. | CSC | As above. |
| Environmentally responsible procurement | 1. Updated EMP and development consent conditions included in tender/contract documents to ensure mitigation measures are budgeted and to prepare contractor for environmental responsibilities.  
2. Specify in tender document that contractor shall engage appropriately qualified and experienced staff to: (i) prepare CEMP and take responsibility for the environmental management and safety issues including biosecurity risk assessment and inclusion of plan to control and prevent introduction of invasive species as part of CEMP; (ii) monitor | 1, 2 CSC  
3 - 7 contractor  
8, 9 CSC | 1 & 2: Bid preparation  
3 - 9: Before start of civil works | 1-2 Included in bid cost  
3-7 in contract  
8-9 in CSC | 1 & 2: Inclusion in bid docs  
3 - 7: Check compliance  
8-9 evaluation and CEMP approvals | Bid preparation stage.  
Before start of site works | CSC IES | IES included in CSC staffing.  
Contractor's environmental staff included in contract; Cost included in budget of construction contract for designated environmental coordinator responsible for |
<table>
<thead>
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<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>the effectiveness; and (iii) review mitigation measures as project proceeds.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Contractor recruit qualified and experienced staff to oversee preparation and implementation of CEMP (incl. all sub-plans)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Contractor will provide: (i) health facilities, first aid kits, appropriate safety equipment and procedures for medical evacuation; (ii) adequate training and information to workers in relation to all health and safety issues, equipment and training; (iii) an approved service provider to conduct a communicable diseases (COVID-19, STI and HIV/AIDS) awareness and prevention program for workers and local community; and (iv) access to safe drinking water, mosquito management, sun/shade management, portable, septic latrines and garbage receptacles at all work sites and office compound.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The contractor will prepare a health and safety plan (HSP) as part of their CEMP. The HSP is to include key components of the World Bank Environmental, Health and Safety Guidelines (EHSG).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The contractor will appoint a full-time environment, health and safety officer (EHSO) responsible for implementation of the CEMP and to liaise with the CPIU and residences/businesses in the subproject area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Contractor to submit CEMP based on contractual EMP and CEMP framework (i.e., site clearance, site drainage, health and safety, waste and materials management, traffic, noise and dust management etc.). CEMP will demonstrate the manner (location, responsibilities, methodology, schedule/timeframe, budget, etc.) in which the contractor will implement the mitigation measures</td>
<td></td>
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</tbody>
</table>

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</thead>
<tbody>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>8. Support tender evaluation with respect to contractors’ environmental management capability and proposed EMP provisions; 9. Review and approval of contractor’s CEMP prior to commencement of any physical work under the civil works contract.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disclosure of Communications and Consultation Plan and GRM and establishment of procedures</td>
<td>1: Project documents disclosed to public and communities in an appropriate form and manner and accessible place 2: Inclusion of appropriate measures from Communications and Consultation Plan (CCP) and GRM in tender documents</td>
<td>SIPA/CSC</td>
</tr>
<tr>
<td>Workers and public safety</td>
<td>Prepare a HSP covering workers and public safety to identify interfaces between the works and the public, formulate measures to ensure safety of workers and the public, and prevent accidents due to the construction works.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Grievance redress mechanism established</td>
<td>Establishment and implementation of GRM confirmed by SIPA/CSC</td>
<td>SIPA/CSC</td>
</tr>
<tr>
<td>Raise awareness of contractor on environmental management matters</td>
<td>Induction safeguards training for contractor</td>
<td>CSC/IES</td>
</tr>
<tr>
<td>Audit of Honiara Port (ADB SPS 2009) - corrective actions required</td>
<td>1. Implement outstanding operation related EMP requirements approved as a condition under the DC (14 Feb 2014) for the new wharf. 2. SIPA to give priority to developing and implementing an environmental management system (EMS) for the operation of Honiara Port that complies with international good practice as well as Environment Act, Environment Regulations and Biosecurity Act and Biosecurity Regulations. EMS to include risk assessment and measures to control and prevent introduction and spread of invasive species. As part of this SIPA to designate staff resources to be responsible for overall environmental management of port operations 3. In parallel with the above, proactively implement environmental safeguards awareness raising for SIPA staff as much as possible.</td>
<td>SIPA (with support from CSC as required)</td>
</tr>
<tr>
<td>Environmental Issue/Project activity</td>
<td>Mitigation and/or Enhancement Measures</td>
<td>Monitoring Plan</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>possible utilising ECD’s environmental outreach function and resources.</td>
<td>4. Install oil and grease traps in drainage system at workshop and refueling areas.</td>
<td>5. Spill kits to be provided in workshop, refueling and maintenance areas along with training of staff in hazardous materials handling and usage of spill kits</td>
</tr>
</tbody>
</table>
## Environmental Issue/Project activity

### Mitigation and/or Enhancement Measures

<table>
<thead>
<tr>
<th>Measures and Actions</th>
<th>Responsible to Implement</th>
<th>Timing to Implement</th>
<th>Cost</th>
<th>Parameter to monitor</th>
<th>Frequency &amp; Verification</th>
<th>Responsible to Monitor</th>
<th>Cost</th>
</tr>
</thead>
</table>
| - Consideration to be given to marking out ‘safe’ pedestrian routes in/out and around the terminal.  
- Consideration to be given to a large (curved) mirror on the end of the quay that would alert drivers to vehicles coming from the other direction.  
- If widening is not feasible, consideration to be given to a 1-way circulation route for equipment coming onto and leaving the No 2 berth apron. This would use each ramp either for arrival or departure purposes. | Contractor | Throughout construction phase | Cost included in contract | Check implementation | Twice a month as part of routine construction monitoring | CSC (IES/NSS) | Included in Contract |

### Monitoring Plan

<table>
<thead>
<tr>
<th>Parameter to monitor</th>
<th>Frequency &amp; Verification</th>
<th>Responsible to Monitor</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

## CONSTRUCTION STAGE

### Physical Impacts

### Water Quality Impact due to wharf demolition and refurbishment

1. Implement effective construction site drainage to minimise direct runoff from the works area into the marine environment.  
2. Effective construction supervision to ensure above measures implemented

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Throughout construction phase</th>
<th>Cost included in contract</th>
<th>Check implementation</th>
<th>CSC (IES/NSS)</th>
<th>Included in Contract</th>
</tr>
</thead>
</table>

### Water Quality Impact due to dredging

1. Implement effective dredge site mitigation to minimise resuspension of silt and spread into surrounding areas during dredging operations. Mitigation can include but is not limited to (i) work within a silt curtain suspended from a floating boom (boom will trap any floating debris; (ii) use closed shell grabs; (iii) work during neap tidal cycle)  
2. Effective construction supervision to ensure above measures implemented

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Throughout construction phase</th>
<th>Cost included in contract</th>
<th>Check implementation</th>
<th>CSC (IES/NSS)</th>
<th>Included in Contract</th>
</tr>
</thead>
</table>

### Materials Management

1. Prepare a Materials Management Plan (MMP) one month before construction commences for approval by CSC to cover all aspects of materials management including as a minimum: a) required materials, potential sources and estimated quantities available; b) measures to minimise the use of non-renewable resources; c) obtaining necessary quarry permits and management of quarry impacts d) Methods of transportation including working with local traffic authorities to determine a suitable route from the quarry to the port that minimises impacts on Honiara traffic e) arranging for the

<p>| 1: Contractor to prepare MMP, CSC to assist and approve 2 Contractor | 1: One month before start of site works 2: Throughout construction phase | Cost included in contracts | Check implementation and MMP provisions | 1: Before construction 2 Implementation of MMP provisions: Weekly | CSC (IES/NSS) | As above |</p>
<table>
<thead>
<tr>
<th>Environmental Issue/Project activity</th>
<th>Mitigation and/or Enhancement Measures</th>
<th>Monitoring Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>safe disposal of demolition waste including program for reuse of demolition waste within SIPA boundary</td>
<td>1. Contractor to implement MMP provisions.</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 - 6: Contractor</td>
</tr>
<tr>
<td>Waste Management</td>
<td>1. Prepare and implement Waste Management Plan (WMP) as part of CEMP to cover all aspects of solid and liquid waste disposal and accidental spills including items listed below. 2. Segregation of wastes shall be observed. 3. Recyclables shall be recovered and sold to recyclers. 4. Residual wastes shall be disposed of at Honiara Municipal dump. 5 Construction offices and facilities shall be provided with garbage bins 6. Burning of construction and domestic wastes shall be prohibited.</td>
<td>1: Contractor to prepare WMP, CSC IES to assist and approve</td>
</tr>
<tr>
<td></td>
<td>2 - 9: Throughout construction phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of hazardous substances and hazardous waste disposal</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>1. Hydrocarbon, toxic material will be stored in adequately protected sites consistent with international best practices and national regulations and codes of practice to prevent soil and water contamination. 2. All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations. 3. Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with international best practice and national regulations and codes of practice 4. Ensure all storage containers are in good condition with proper labeling. 5. Regularly check containers for leakage and undertake necessary repair or replacement. 6. Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of drains and soil (temporary works area); 7. Used oil and other toxic and hazardous materials shall be disposed of at Honiara public dump</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Issue/Project activity</td>
<td>Mitigation and/or Enhancement Measures</td>
<td>Monitoring Plan</td>
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<td>-------------------------------------</td>
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<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>dump designated area in accordance with their requirements. 8. Ensure availability of spill cleanup materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored. 9. Spillage, if any, will be immediately cleared with utmost caution to leave no traces.</td>
<td><strong>Contractor</strong></td>
<td><strong>At vessel entry and unloading</strong></td>
</tr>
<tr>
<td><strong>Biological Impacts</strong></td>
<td><strong>Import of material, plant, food and beverage etc</strong></td>
<td>Implementation of invasive species control and management protocols and measures as required by risk assessment</td>
</tr>
<tr>
<td></td>
<td><strong>Temporary increase in suspended sediment affecting marine habitat</strong></td>
<td>1. Deployment of silt curtains around the old wharf during demolition and refurbishment activities to reduce the dispersion of suspended sediment</td>
</tr>
<tr>
<td><strong>Socioeconomic Impacts</strong></td>
<td><strong>Operation of contractor camp / Site offices</strong></td>
<td>1. Induction of workers on requirements of the project’s CCP and GRM protocols established for any contact between local communities and contractor/workers. 2. Implementation of a communicable disease awareness and prevention program targeting risk of spread of STIs and HIV. 3. Put up notice boards regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restrictions. 4. Contractor’s facilities to be fenced and sign-posted and unauthorized access or entry by public will be prohibited. 5. Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided onsite.</td>
</tr>
<tr>
<td>Environmental Issue/Project activity</td>
<td>Mitigation and/or Enhancement Measures</td>
<td>Monitoring Plan</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Parameter to monitor</td>
</tr>
<tr>
<td></td>
<td>Responsible to Implement</td>
<td>Timing to Implement</td>
</tr>
<tr>
<td>6. Separate toilets shall be provided for male and female workers.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>7. For unskilled activities and labour, as many local people (including women) as possible will be recruited and trained.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>8. Standing and open water (including puddles, ponds, drains etc.) within the camp or office/yard shall not be permitted to reduce possible disease vectors.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>9. Wastewater effluent from contractors’ workshops (if any) will be passed through gravel/sand beds and all oil/grease contaminants will be removed before discharging it into drainage areas. Oil and grease residues shall be stored in drums awaiting disposal in line with an agreed WMP.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>10. The contractor’s facilities area will be cleaned up to the satisfaction of SIPA PMU and local community after use</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>Dust and noise nuisances</td>
<td>1 During dry periods access roads within the construction site and at the site entrance to be sprayed with water to suppress dust.</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>2. Trucks transporting fill material are covered.</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>3. Construction equipment and vehicles to be maintained to a good standard and provided with muffler silencers.</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>4. Plant engine idling is minimised</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>5. Monitor and investigate complaints; propose alternative mitigation measures.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>1 Contractor to prepare a HEALTH AND SAFETY PLAN (HSP) instructing workers in health and safety matters. Plan to be approved in writing by CSC one month prior to starting works. Contractor to implement HSP provisions.</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>2. Before construction commences the contractor will conduct of training for all workers on environmental, safety and environmental hygiene. The contractor will instruct workers in health and safety matters as required by good engineering practice and WB EHS Guidelines.</td>
<td>Contractor</td>
</tr>
</tbody>
</table>
### Environmental Issue/Project activity

<table>
<thead>
<tr>
<th>Environmental Issue/Project activity</th>
<th>Mitigation and/or Enhancement Measures</th>
<th>Monitoring Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measures and Actions</td>
<td>Responsible to Implement</td>
</tr>
<tr>
<td>3. Regular meetings will be conducted to maintain awareness levels of health and safety issues and requirements. Workers shall be provided (before they start work) with appropriate PPE. 4. Provision of potable water supply in all work locations. 5. The office/yard will be equipped with first aid facilities including first aid kits in construction vehicles. 6. The camp office/yard will be securely fenced, and warning signs erected. Unauthorized people shall not be permitted within the camp and work sites/yards.</td>
<td>Contractor</td>
<td>At all times throughout construction phase</td>
</tr>
<tr>
<td><strong>Community Health and Safety</strong></td>
<td>1. Communication to the public through public/community consultation as per the provisions of the CCP including notice boards and meetings etc. regarding the scope and schedule of construction, as well as certain construction activities that could cause disruptions or access restrictions around the port area; 2. Barriers (e.g. fence) and signboards shall be installed around the temporary works area to deter access to or through the site. 3. Provision of warning signs at the periphery of the site warning the public not to enter; and 4. Strict imposition of speed limits along access through residential areas and where other sensitive receptors such as schools, hospitals, and other populated areas are located.</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Physical cultural resources</strong></td>
<td>Contractor, as part of CEMP, include a chance finds protocol including stop and start work triggers as agreed with ECD.</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>OPERATION PHASE</strong></td>
<td>1. Compliance with all relevant national environmental codes of practice and environmental laws 2. Compliance with UN-IMO obligations</td>
<td>1. SIPA 2. MIDI</td>
</tr>
</tbody>
</table>

May 2020
<table>
<thead>
<tr>
<th>Environmental Issue/Project activity</th>
<th>Mitigation and/or Enhancement Measures</th>
<th>Monitoring Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel visits, cargo and passengers transfer specimens - spread or introduction of invasive or alien species</td>
<td>▪ Work with BSI, MOFMR and others as required to establish baseline;</td>
<td>MID, MOFMR</td>
</tr>
<tr>
<td>■ Implement EMS procedures for control, management of invasive and alien species form operations;</td>
<td>Vessel entry, cargo offloading, vessels traveling from Honiara to other islands</td>
<td>Included in operating budget</td>
</tr>
<tr>
<td>■ Ensure that all vessels entering, equipment, material and plant offloaded at Honiara and transferred between Honiara and the islands subject to procedures under the Biosecurity Act and EMS;</td>
<td></td>
<td>Type and distribution of invasive and alien flora and fauna;</td>
</tr>
<tr>
<td>■ Report on implementation of measures to follow guidelines set out in National Strategy on Aquatic Biosecurity for Solomon Islands 2018-2023 and IUCN Guidelines for Invasive Species management on Islands 2018.</td>
<td></td>
<td>Comparison with baseline; Records of control/eradication programs</td>
</tr>
</tbody>
</table>

2. MID annual recurring budget

- Type and distribution of invasive and alien flora and fauna;
- Comparison with baseline;
- Records of control/eradication programs

- SIPA, BSI, MOFMR, MECDM
- Included in operating budget
8 Conclusions and Recommendations

8.1 Conclusions

332. This IEE has been prepared for the Honiara Port Project and has examined the implementation and development of an option to rehabilitate the deteriorating #1 wharf to maintain port throughput. The IEE envisages that all the potential adverse and beneficial social and environmental impacts of the proposed final design option will be prevented and/or mitigated adequately, and the positive impacts strengthened in the result of implementation of mitigation and enhancement measures identified in the EMP.

333. The positive socio-economic and environmental effects of the project outweigh the likely environmental and social risks associated with its implementation. Implementation of the project will: improve efficiency of port operations; expand commercial opportunities for the Solomon Islands; provide reliable and safe travelling for the local community; and contribute to improved social and economic welfare of the local population, both men and women.

334. Based on site inspections it has been concluded that project components do not encroach upon ecologically sensitive areas. They are located within the boundaries / footprint of the existing Wharf and the existing marine environment is degraded.

335. Potential environmental impacts identified in relation to design, location, construction and operation of the wharf have been developed to reduce all negative impacts to acceptable levels.

336. Overall the proposed project is unlikely to cause any adverse environmental impacts. This is due to the following findings:

- The port development will be upgraded within the existing development area of SIPA and existing port footprint.
- There are no sites of cultural or heritage significance within the area of influence of the port.
- There are no ecologically sensitive sites or protected areas falling within the influence of the port.
- The port development will incorporate safety elements.
- Construction and operation of the project is likely to give rise to nil, negligible or at worst, minor temporary environmental impacts that can be easily mitigated to acceptable levels.

337. An EMP has been prepared for the project. The EMP is included as part of this IEE and includes (i) mitigation measures for potential environmental impacts during implementation, (ii) environmental monitoring program, and (iii) the responsible entities for mitigation, monitoring, and reporting.
338. Mitigation will be assured by a program of environmental monitoring to be conducted during the construction stages. The environmental monitoring program will ensure that all mitigation measures proposed in the EMP are implemented, and will determine whether the environment is protected as intended. Any requirements for remedial action will be reported to the ADB.

339. Project stakeholders were consulted during preparation of the IEE and invited to express any environmental and social concerns they had regarding the project. No significant environmental and social concerns were raised and all stakeholders consulted strongly support the project and are looking forward to the benefits of the improved Port. The IEE will be made available at public locations and will be disclosed to a wider audience via the ADB website. The consultation process will be continued during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

340. Environmental and social benefits of the investment components and long-term project objectives far outweigh the minor and temporary inconveniences that will arise during project implementation. Provided the EMPs are properly implemented there will be no unacceptable impacts arising from the project.

341. This IEE including EMP are considered sufficient to meet the environmental assessment requirements of ADB and CSS.
References


ADB, 2017. Basic Statistics 2017 Solomon Islands. – Economic Research and Regional Department – Development Economic and Indicator Division


SIG Ministry of Infrastructure Development (2015), Transport Sector Development Project (TSDP), Feasibility Study for Naro Hill-Lambi Road Project, Guadalcanal Province. Climate Change Risk and Adaptation Assessment


Appendix A: Relevant Intentional / Regional Treaties & Agreements

The following table summarizes the International and Regional Treaties and Agreements that the Solomon Islands are a Party which are relevant to this project.

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Purpose/Aim</th>
<th>Solomon Island Agency Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International and Regional Agreements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollution Protocol for Dumping at sea.</td>
<td>Ratified 10/9/98</td>
<td>Prevention of pollution of the South Pacific region by dumping</td>
<td>MFMR and ECD</td>
</tr>
<tr>
<td>Pollution Protocol for Emergencies.</td>
<td>Ratified 10/9/98</td>
<td>Cooperation in combating pollution emergencies in the South Pacific region.</td>
<td>MFMR and ECD</td>
</tr>
<tr>
<td>Natural Resources and Environment of South Pacific Region (South Pacific Regional Environment Program - SPREP Convention).</td>
<td>Ratified 10/9/98</td>
<td>Protection of natural resources and environment of the South Pacific Region in terms of management and development of the marine and coastal environment in the South Pacific Region.</td>
<td>ECD</td>
</tr>
<tr>
<td>Waigani Convention on Hazardous and Radioactive Wastes (1995).</td>
<td>Ratified 7/10/98</td>
<td>Bans the importation of hazardous and radioactive wastes into Forum Island countries and to control the trans-boundary movement and management of hazardous wastes within the South Pacific region.</td>
<td>ECD</td>
</tr>
<tr>
<td><strong>Chemicals, Wastes and Pollution</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liability for Oil Pollution Damage</td>
<td>Ratified</td>
<td>342. Strict liability of ship owner for pollution damage to a coastal state within a certain amount.</td>
<td>MFMR</td>
</tr>
<tr>
<td>Marine Pollution Convention (London)</td>
<td>Ratified</td>
<td>343. Prevention of marine pollution by dumping of wastes and other matter.</td>
<td>ECD and Foreign Affairs</td>
</tr>
<tr>
<td>Desertification (UN Convention to Combat Desertification)</td>
<td>Acceded 16/4/99</td>
<td>344. Agreement to combat desertification and mitigate the effects of drought in countries experiencing drought or desertification.</td>
<td>Agriculture Division</td>
</tr>
<tr>
<td>POP’s Convention (Stockholm)</td>
<td>Acceded 28/7/04</td>
<td>345. Protection of human health and environment from persistent organic pollutants.</td>
<td>ECD and EHD</td>
</tr>
<tr>
<td><strong>Biodiversity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CITES</td>
<td>Ratification underway</td>
<td>346. Regulations and restriction of trade in wild animals and plants through a certification system of imports and exports.</td>
<td>ECD</td>
</tr>
<tr>
<td>World Heritage Convention</td>
<td>Ratified 10/6/92</td>
<td>347. Protection of sites of Outstanding Universal Values. Solomon Islands currently has East Rennelle Island as a World Heritage site.</td>
<td>ECD and National Museum</td>
</tr>
<tr>
<td>UN Convention on Biological Diversity</td>
<td>Acceded 3/10/95</td>
<td>348. Conserve biological diversity through the sustainable use of its components and the</td>
<td>ECD</td>
</tr>
<tr>
<td>Name</td>
<td>Status</td>
<td>Purpose/Aim</td>
<td>Solomon Island Agency Responsible</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Cartagena Protocol on Biosafety</td>
<td>Acceded 26/10/04</td>
<td>Protection of human health and the environment from possible adverse effects of the products of modern biotechnology, especially living modified organisms while maximizing its benefits.</td>
<td>ECD</td>
</tr>
</tbody>
</table>

**Climate Change**

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Purpose/Aim</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal Protocol</td>
<td>Acceded 17/6/93</td>
<td>Allows phase out of substances that deplete the ozone layer according to a fixed implementation schedule.</td>
<td>ECD and Energy Division</td>
</tr>
<tr>
<td>Ozone Layer Convention</td>
<td>Acceded 17/6/93</td>
<td>Protection of the ozone layer through intergovernmental cooperation on research, systematic observation of the ozone layer and monitoring of chlorofluorocarbons production.</td>
<td>ECD and Energy Division</td>
</tr>
<tr>
<td>Climate Change (UN Framework Convention on Climate Change)</td>
<td>Ratified 28/12/94</td>
<td>Sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change.</td>
<td>Climate Change Division</td>
</tr>
<tr>
<td>Kyoto Protocol</td>
<td>Ratified 13/3/03</td>
<td>Reduce greenhouse gases especially CO2 for the 39 industrial/developed countries by an average of 5.2% by 2012.</td>
<td>Meteorology Division</td>
</tr>
</tbody>
</table>

MFMR = Ministry of Fisheries and Marine Resources  
MECDM = Ministry of Environment, Climate Change, Disaster Management and Meteorology.  
ECD = Environment and Conservation Division - MECDM  
EHD = Environmental Health Division - MECDM
Appendix B: List of Marine Protected Areas within the Solomon Islands

<table>
<thead>
<tr>
<th>MPA Site Names</th>
<th>International Designation</th>
<th>Designation Status</th>
<th>Date of Designation</th>
<th>Total Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnavon Islands</td>
<td>Marine Conservation Area</td>
<td>Designated</td>
<td>1995</td>
<td>82.70</td>
</tr>
<tr>
<td>Barasipo</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>3.533</td>
</tr>
<tr>
<td>Baraulu/Bule Lavata</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2002</td>
<td>1.032</td>
</tr>
<tr>
<td>Barivuto</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>1.622</td>
</tr>
<tr>
<td>Buni</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>1.428</td>
</tr>
<tr>
<td>Dundee</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>1.046</td>
</tr>
<tr>
<td>Ha’apai</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>1.231</td>
</tr>
<tr>
<td>Iriri Pasapasa</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>0.421</td>
</tr>
<tr>
<td>Kekehe</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2004</td>
<td>2.721</td>
</tr>
<tr>
<td>Kida</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>0.725</td>
</tr>
<tr>
<td>Kinamara</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>1.363</td>
</tr>
<tr>
<td>Kindu</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>0.764</td>
</tr>
<tr>
<td>Koqu Rua</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2005</td>
<td>0.359</td>
</tr>
<tr>
<td>Kozou</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2002</td>
<td>0.452</td>
</tr>
<tr>
<td>Lodu Hokata</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2005</td>
<td>0.335</td>
</tr>
<tr>
<td>Nazareti</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>2.120</td>
</tr>
<tr>
<td>Niumala</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2005</td>
<td>3.114</td>
</tr>
<tr>
<td>Nusa Hope Mangrove</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2005</td>
<td>0.884</td>
</tr>
<tr>
<td>Nusa Hope/ Heloro</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2002</td>
<td>1.138</td>
</tr>
<tr>
<td>Nusa Roviana</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>2.017</td>
</tr>
<tr>
<td>Olive</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>1.567</td>
</tr>
<tr>
<td>Saika</td>
<td>Marine Protected Area</td>
<td>Informally designated</td>
<td>2003</td>
<td>1.602</td>
</tr>
</tbody>
</table>
## Appendix C: List of Terrestrial Protected Areas within the Solomon Islands

<table>
<thead>
<tr>
<th>Province</th>
<th>Protected Area</th>
<th>Size</th>
<th>Flora Biodiversity</th>
<th>Fauna Biodiversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalcanal</td>
<td>Lauvi Lake</td>
<td>200 ha</td>
<td>▪ Floating meadows include three species of Cyperaceae. Extensive areas of pandanus, beach side dominated with fu’u Barringtonia asiatica. Other species are also common in the community e.g. Hibiscus tiliae. Thus, there are also many other species growing around the areas (Less, 1990).</td>
<td>Outstanding habitat for crocodiles. Wetland birds and the Australian dabchick which was a new record for the Solomon Islands. About 40 bird sp. are found, 9 are endemic to the Solomon islands(Less, 1990).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ 6 species (sp) of pioneer trees located on gravel beds of braided river sites e.g. salu; Casuarina equisetifolia. On slightly higher ground, 5 sp. of trees are common e.g. Akwa. Evident at the ultra-basics are mudi; (Dillenia crennata). Common in montane forest are trees of non-flowering plant family, Podocarpaceae including 3 sp and 5 sp of the Myrtle family. The four epiphytic rhododendrons that are unique to Solomon islands are all found on peaks of the proposed protected area and the endemic mountain shrub, Vaccinium (Less, 1990)</td>
<td>Habitat for many animals including four bird species endemic to Gaudalcanal and the Gaudalcanal endemic giant rat (<em>Uromys imperator</em>). 1990 mammal survey of Mt Makarakomburu found a new sp. of bat along with nine other bat sp, four frog and eight reptile sp. Thirteen bird sp. were recorded including rare Gaudalcanal honeysrater <em>Gaudalcanaria inexpectata</em>. Mt Popomanaseu is only place in the Solomon Islands where terrestrial mollusc have generated endemic montane species. Restricted to these mountains include arboreal Placostyllus selleersi and undescribed sp. Helixarion and Trochomorpha. Birds of the Itina River proposal area recorded 44 bird sp., 13 are known to be endemic sp. in the Solomon islands (Less, 1990).</td>
</tr>
<tr>
<td>Itina</td>
<td>Popomanaseu</td>
<td>30,000 ha</td>
<td>▪ 5 principle forest types. Lowland forest, small island and barrier island forest, mangrove forest, montane forest and heaths.</td>
<td>▪ 52 sp. of land and fresh water birds and 9 species are endemic to the lagoon. 10 species of Sea and shorebirds.</td>
</tr>
<tr>
<td>Western</td>
<td>Marovo Lagoon</td>
<td>70,000 ha</td>
<td>▪ 12 principle species of forest trees and moss covered montane forest caps (Less, 1990)</td>
<td>Richest avifauna with 80 species recoded. 2 species are confined to montane forest and are unique to the island. (Less, 1990).</td>
</tr>
<tr>
<td>Kolombangara</td>
<td>All forest above 460m (70,000 ha is the island)</td>
<td></td>
<td>▪ Common Montane forest trees species are Casuarina papuana, lower altitude forest predominance of Camnosperma</td>
<td>Support unique white eye species Zosterops rendova. Crocodiles are evident in lakes and lagoon. Two species of frogs have been recorded from Rendova (Less, 1990).</td>
</tr>
<tr>
<td>Rendova</td>
<td>The island 40,000 ha</td>
<td></td>
<td>▪ 12 principle species of forest trees and moss covered montane forest caps (Less, 1990)</td>
<td></td>
</tr>
<tr>
<td>Province</td>
<td>Protected Area</td>
<td>Size</td>
<td>Flora Biodiversity</td>
<td>Fauna Biodiversity</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>revipetiolatum, Others include mosses, palms, pomelita pinnata, pterocarpus indicus. (Less, 1990).</td>
<td></td>
</tr>
<tr>
<td>Choiseul</td>
<td>Mt. Maetambe</td>
<td>22,500 ha</td>
<td>▪ Dominate tree species akwa and Vasa. These two trees and Lelaee are characteristics of valley bottoms, on ridge crest Eugenia sp., buni and kaumau Calophyllum sp. are common. (Less, 1990).</td>
<td>Seven sp. of frogs, one endemic sp., two rare butterfly sp. Presence of three giant rats, two of which are new record, 26 bird species with 6 are endemic (Less, 1990).</td>
</tr>
<tr>
<td>South Choiseul</td>
<td></td>
<td>30,000 ha</td>
<td>▪ Different forest composition from Ysabel and Guadacanal growing on ultra-basic rock. Forest is species poor with an open canopy and straggling emergent trees over dense undergrowth of pandanus, gingers, ferns and climbers. Mangrove forest found Ologholata in the north of the proposed reserve (Less, 1990).</td>
<td>Crocodiles are evident. Has significant nesting beach for turtles. Forest growing on ultra-basic rock noticeably has low bird numbers. 35 bird sp., 11 are endemic (Less, 1990).</td>
</tr>
<tr>
<td></td>
<td>Mt Televodo</td>
<td>?</td>
<td>▪ The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).</td>
<td>The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).</td>
</tr>
<tr>
<td>Isabel</td>
<td>North western</td>
<td>120,000 ha</td>
<td>▪ Peninsula dominated with kekele (Campnosperma brevipetiolata) indicating exposed to prevailing high winds and cyclones. Akwa, vasa, andoa, lu uzi are also found on ridges that run through the peninsula. Where slopes are fa alo, bamboo, gingers and Macaranga sp. Akwa is common in lowland forest. Smaller trees include Agaia spp, ai asila (Neoscorchthinia forbesii), laelae, Myristica sp, palms and pandanus. Patches of beach forest containing 5 species of trees (Less, 1990).</td>
<td>Crocodiles were evident. It contains 65% of nesting sites of green and hawksbill turtles. Sea eagles, Brahminy kite, osprey and terns are also evident. Migratory birds use the islands and tidal flats as resting and feeding area during November to January e.g., whimbrel Numenius phaeopus (Less, 1990).</td>
</tr>
<tr>
<td></td>
<td>Isabel</td>
<td></td>
<td>▪ Supports montane forest with ailumu Dacrydium</td>
<td>▪ Meeks Iory Charmomosyna meeki, white rumped swiftlet</td>
</tr>
<tr>
<td>Province</td>
<td>Protected Area</td>
<td>Size</td>
<td>Flora Biodiversity</td>
<td>Fauna Biodiversity</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
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<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Casuarina swamp</td>
<td></td>
<td>2,500 ha</td>
<td>▪ Dominated with hardy malasalu Casuarina papuana and Dacrydium xanthodrum.</td>
<td>▪ Is designed for the forest.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ On swapy grounds Calophyllum vexans, bou Fagrea gracilipes and gwarogwaro</td>
<td></td>
</tr>
<tr>
<td>Makira</td>
<td>Central – Bauro highlands</td>
<td>350,000 ha</td>
<td>▪ Akwa dominate lowland forest and lower hill slopes. 8 sp of trees are also common in this zone e.g. Rosswood. Above the zone where akwa is predominant 6 sp of trees are common e.g. abalolo. Common small trees are Myritica sp. and aisubu Pimeliiodendron amboinicum. ▪ Above 700 m 5 sp. of trees are common e.g. aitootoo (surukakahu) Weinmannia blumei, Cyathea tree ferns and palms are also common. At highest altitude montane forest is found with 8 different spp of trees. Forest floor is covered with moss (Less, 1990).</td>
<td>▪ Several of Makira’s endemic sp are restricted to the mossy cloud forest of the highest ridges eg Keea (Makira mountain tail), waisure (Makira ground trash), ghoghoharighi (shade warbler) and the dusky fantail are found in these forest and nowhere else in the world. 49 Birds recorded, 5 endemic to Solomon and 5 endemic to Makira (Less, 1990).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ A tall mixed swamp forest featuring data Terminalia brassii and nufa Eugenia tierneyana on wet land edges. In the wetted parts of the swamps pandanus, bamboo and ferns form a complete cover one to three meters high (Less, 1990).</td>
<td>▪ No information provided.</td>
</tr>
<tr>
<td>Western wetlands</td>
<td></td>
<td>2,500 ha</td>
<td>▪ Common in the lowland forests are 4 sp. of trees e.g akwa, rosswood and vasa. On lower riverine terraces 3 sp. are also common e.g., lamilami, liki and akwa (Less, 1990).</td>
<td>57 bird sp are recorded, 9 endemic to Solomon islands, 13 endemic to Malaita (Less, 1990).</td>
</tr>
<tr>
<td>Malaita</td>
<td>Central Highlands</td>
<td>12,500 ha</td>
<td>▪ Large figs and 11 tree sp e.g. akwa are common at the end of the maramasike</td>
<td>▪ Excellent habitat for crocodiles. About 60 bird sp. are recorded, 7 endemic to Solomon islands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Excellent habitat for crocodiles. About 60 bird sp. are recorded, 7 endemic to Solomon islands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maramasike Ar’are</td>
<td>150,000 ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Province</td>
<td>Protected Area</td>
<td>Size</td>
<td>Flora Biodiversity</td>
<td>Fauna Biodiversity</td>
</tr>
<tr>
<td>----------</td>
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<td>--------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>passage. The hill forest behind both Maramasike and Are'are commonly features 7 of the species mention above together with 5 other sp e.g. Cryptocarya sp. (Less, 1990).</td>
<td>and 10 endemic to Malaita (Less, 1990).</td>
</tr>
<tr>
<td>Temotu</td>
<td>Kauir Reserve</td>
<td>200 ha</td>
<td>▪ Kauri Agathis macrophylla in the Solomon islands is found only in Temotu Province (Less, 1990).</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix D: Globally Threatened Avifauna in the Solomon Islands

<table>
<thead>
<tr>
<th>Avifauna Common Name</th>
<th>Avifauna Species Name</th>
<th>IUCN Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becks Petrel</td>
<td><em>Pseudobulweria becki</em></td>
<td>CR</td>
</tr>
<tr>
<td>Makira Moorhen</td>
<td><em>Gallinula silvestris</em></td>
<td>CR</td>
</tr>
<tr>
<td>Santa Cruz Ground dove</td>
<td><em>Gallicolumba sanctaecrucis</em></td>
<td>EN</td>
</tr>
<tr>
<td>Santa Cruz Shrikebill</td>
<td><em>Clytorhynchus sanctaecrucis</em></td>
<td>EN</td>
</tr>
<tr>
<td>Splendid White eye</td>
<td><em>Zosterops liteirostris</em></td>
<td>EN</td>
</tr>
<tr>
<td>White-eyed Starling</td>
<td><em>Aplonis brunneicapillus</em></td>
<td>EN</td>
</tr>
<tr>
<td>Heinroth’s Shearwater</td>
<td><em>Puffinus heinrothi</em></td>
<td>VU</td>
</tr>
<tr>
<td>Sanford’s Sea eagle</td>
<td><em>Haliaeetus sanfordi</em></td>
<td>VU</td>
</tr>
<tr>
<td>Imitator Sparrow hawk</td>
<td><em>Accipiter imitator</em></td>
<td>VU</td>
</tr>
<tr>
<td>Bristle-thighed Curlew</td>
<td><em>Numenius tahitiensis</em></td>
<td>VU</td>
</tr>
<tr>
<td>Yellow-legged Pigeon</td>
<td><em>Columba palidiceps</em></td>
<td>VU</td>
</tr>
<tr>
<td>Chestnut-bellied Imperial pigeon</td>
<td><em>Ducula brenchleyi</em></td>
<td>VU</td>
</tr>
<tr>
<td>Palm Lorikeet</td>
<td><em>Charmosyna palmarum</em></td>
<td>VU</td>
</tr>
<tr>
<td>Fearful Owl</td>
<td><em>Nesasio solomonensis</em></td>
<td>VU</td>
</tr>
<tr>
<td>Black Faced Pitta</td>
<td><em>Pitta anerythra</em></td>
<td>VU</td>
</tr>
<tr>
<td>Malaita Fantail</td>
<td><em>Rhipidura malaitae</em></td>
<td>VU</td>
</tr>
<tr>
<td>Sombre Leaf Warbler</td>
<td><em>Phylloscopus amoenus</em></td>
<td>VU</td>
</tr>
<tr>
<td>Ranonga White Eye</td>
<td><em>Zosterops splendidus</em></td>
<td>VU</td>
</tr>
<tr>
<td>Guadalcanal Thrush</td>
<td><em>Zoothera turipavae</em></td>
<td>VU</td>
</tr>
</tbody>
</table>

Source: Birdlife international www.bridlife.org
## Appendix E: Environmental Risk Matrices

### E.1 Design Phase

<table>
<thead>
<tr>
<th>Risk Matrix REF</th>
<th>EIA REF (para)</th>
<th>RISK</th>
<th>RISK SEVERITY</th>
<th>RISK LIKELIHOOD</th>
<th>RISK RATING</th>
<th>OPTIONS AND APPROACHES</th>
<th>POST-MITIGATION</th>
<th>ACCEPTABLE TO PROCEED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMD1</td>
<td>6.5.1.1</td>
<td>Change in water movements due to wharf design: new areas of erosion / deposition</td>
<td>Major</td>
<td>Possible</td>
<td>High</td>
<td>The wharf design is on a piled structure with minimal potential to disturb water movements. Currents / water movement at this location low.</td>
<td>Minor</td>
<td>Improbable</td>
</tr>
<tr>
<td>RMD2</td>
<td>6.5.1.2</td>
<td>Climate Change - Adaptation and Resilience of Project - material climate change related risks to the project</td>
<td>Major</td>
<td>Probable</td>
<td>High</td>
<td>Climate Resilience Built into the design of the project</td>
<td>Minor</td>
<td>Improbable</td>
</tr>
<tr>
<td>RMD3</td>
<td>6.5.1.3</td>
<td>Natural Hazards - Seismic Conditions - located in region that is seismically active</td>
<td>Major</td>
<td>Improbable</td>
<td>Medium</td>
<td>Wharf designed in accordance with relevant Seismic Codes</td>
<td>Moderate</td>
<td>Improbable</td>
</tr>
<tr>
<td>RMD4</td>
<td>6.5.1.4</td>
<td>Socio-economic Impacts - Resettlement, Land Acquisition and Economic Displacement - No project-induced resettlement</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>No land acquisition required. No Land Acquisition and Resettlement Plan needed</td>
<td>Minor</td>
<td>Improbable</td>
</tr>
</tbody>
</table>

**Design Phase**

Honiara Port - “Old” Wharf (Wharf #2) Rehabilitation

Demolition of existing degraded wharf with a new Wharf comprising precast deck on percussive driven piles

Physical

Closest residential (sensitive) development > 800 M to South and Southwest. Immediate area low density commercial light industrial and storage
## E.2 Construction Phase

<table>
<thead>
<tr>
<th>RMC</th>
<th>6.6.1.1</th>
<th>Climate Change GHG Emissions (Construction)</th>
<th>Minor</th>
<th>Possible</th>
<th>Low</th>
<th>Maximise use of construction materials and products with recycled or secondary and low carbon content, from renewable sources. Use locally-sourced materials to minimise distance materials are transported from source to site.</th>
<th>Minor</th>
<th>Improbable</th>
<th>LOW</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMC2</td>
<td>6.6.1.2</td>
<td>Impacts on historic-cultural and archaeological monuments - Highly modified site. No archaeological or cultural resources expected to be encountered during implementation</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Highly modified site. No sites identified during DD. Contractor develops chance find procedure</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC3</td>
<td>6.6.1.3</td>
<td>General Construction Noise - Surrounding area is light commercial / industrial with high levels of background noise. Construction noise limited to powered mechanical equipment lifting precast units and hand tools</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Well-maintained equipment, working hours, quiet plant, physical screening. Liaison with local community</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>YES</td>
</tr>
<tr>
<td>RMC4</td>
<td>6.6.1.4</td>
<td>Construction Noise - Piling. The new wharf structure will be formed on steel “I” beams percutively driven into the seabed</td>
<td>Major</td>
<td>Probable</td>
<td>High</td>
<td>Only daytime work. No work in early morning evening or at weekends (or religious days). Liaison with schools to confirm examination times. May require limit to working hours</td>
<td>Minor</td>
<td>Improbable</td>
<td>Medium</td>
<td>YES</td>
</tr>
<tr>
<td>RMC5</td>
<td>6.6.1.5</td>
<td>Construction Vibration - Close to the wharf during piling</td>
<td>Major</td>
<td>Probable</td>
<td>High</td>
<td>Liaison with community / schools to confirm suitable times for piling. Contractor to conduct a pre-condition survey</td>
<td>Minor</td>
<td>Improbable</td>
<td>Medium</td>
<td>YES</td>
</tr>
<tr>
<td>RMC6</td>
<td>6.6.1.6</td>
<td>Air Quality Dust - anticipated to be minor since structural sections will be precast. Minor impacts from concrete batching</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Dust-suppression measures and well maintained equipment</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC7</td>
<td>6.6.1.7</td>
<td>Aggregate Extraction - flooding, impact on river stream sources, impact on water abstraction</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Not an issue for project. Aggregate requirements are for concrete that will be precast sourced from licenced, existing quarry operations</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC8</td>
<td>6.6.1.8</td>
<td>Degradation of landscapes and soil erosion. No issue highly modified site</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Site is already developed no change in visual envelope</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC9</td>
<td>6.6.1.9</td>
<td>Hydrology and Water Quality - Badly managed use and disposal, potential for depletion or pollution of resource</td>
<td>Minor</td>
<td>Possible</td>
<td>Low</td>
<td>The Contractor will prepare a Waste Water Management Plan</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC10</td>
<td>6.6.1.10</td>
<td>Water Quality due to piling and dredging. The sediments in the vicinity of the wharf are known to be contaminated</td>
<td>Major</td>
<td>Improbable</td>
<td>Medium</td>
<td>Construction of the pile will be inside a steel tube driven into the seabed. Minimal disturbance anticipated. Dredging of 10,000 m³ of sediment carried out within silt curtan with closed grabs. Minimal resuspension anticipated.</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMC11</td>
<td>6.6.2.2 Terrestrial Flora and Fauna - Impacts on biodiversity low due to the wharf being developed on an existing site that has been highly modified</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Work is in highly modified environment, no native flora and fauna encountered</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>RMC12</td>
<td>6.6.2.3 Marine Flora and Fauna - Impacts on biodiversity low due to the wharf being developed on an existing site that has been highly modified</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Work is in heavily modified and degraded environment, no critical habitat issues</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>RMC13</td>
<td>6.6.3.3 Worker Health and Safety and Influx - 1) No accommodation / canteen on site (2) No &quot;influx&quot; of construction workers (local semi and unskilled labour available)</td>
<td>Moderate</td>
<td>POSSIBLE</td>
<td>Medium</td>
<td>Contractors will be required to develop and implement labour management plans including Worker Code of Conduct</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>RMC14</td>
<td>6.6.3.4 Socio-economic Impacts (1) - Workplace and Community Health and Safety - Construction activities are inherently hazardous</td>
<td>Major</td>
<td>POSSIBLE</td>
<td>High</td>
<td>Contractor Management Plans. All works are within the existing Port fenced security area. Appoint site HSE officer</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>RMC15</td>
<td>6.6.3.5 Socio-economic Impacts (2) - Works impact on existing utilities and infrastructure.</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>The works area is within the Port security boundary, utility consumption low and contained on-site</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>RMC16</td>
<td>6.6.3.6 Socio-economic impacts (3) - Other Impacts - anticipated to have a number of positive impacts on population and economic development providing job opportunities for local men and women</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>Contractor develops Stakeholder Engagement Plan and identifies a Community Liaison Officer on site. Grievance redress mechanism in place</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
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</table>
## E.3 Operation Phase

<table>
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<tr>
<th>RMO</th>
<th>6.7.1.1</th>
<th>Operation Phase Wharf Noise impacting on adjacent community - Operations no different to existing in an area of high background noise levels</th>
<th>Minor</th>
<th>POSSIBLE</th>
<th>Low</th>
<th>Relatively low activity, mitigation options include liaison with operators on specific areas of concern (e.g. excessive noise)</th>
<th>Minor</th>
<th>Improbable</th>
<th>LOW</th>
<th>YES</th>
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<tr>
<td>RMO2</td>
<td>6.7.1.2</td>
<td>Operation Phase Wharf Operation Air Quality - Goods are generally containerised rather than “loose loads”.</td>
<td>Minor</td>
<td>POSSIBLE</td>
<td>Low</td>
<td>Mitigation options include liaison with operators on specific areas of concern (e.g. excessive dust if non bagged trading increases)</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMO3</td>
<td>6.7.1.3</td>
<td>Operation Phase Hydrology and Water Quality - Spills to Marine waters</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>No evidence of this being an issue from existing operations and no new impact anticipated.</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMO5</td>
<td>6.7.1.5</td>
<td>Operation Phase impacts on flora and fauna: Highly modified urban / industrial site. No rare or endangered flora and fauna on-site</td>
<td>Minor</td>
<td>Improbable</td>
<td>Low</td>
<td>No evidence of this being an issue from existing operations and no new impact anticipated.</td>
<td>Minor</td>
<td>Improbable</td>
<td>LOW</td>
<td>YES</td>
</tr>
<tr>
<td>RMO6</td>
<td>n/a</td>
<td>Other Socio-economic impacts - Livelihood - The impacts on population and employment are anticipated to be generally positive, providing improved access to jobs and services</td>
<td>Major</td>
<td>POSSIBLE</td>
<td>High (Positive)</td>
<td>The wharf improvement is anticipated to result in a significant positive effect on local employment and livelihood</td>
<td>Major</td>
<td>POSSIBLE</td>
<td>High (Positive)</td>
<td>YES</td>
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Appendix F: Environmental Audit of Honiara Port (April 2018)

A. INTRODUCTION

1. The feasibility study for the Honiara Port Development Project includes an initial environmental examination (IEE) for the project and due diligence review (DDR) report documenting the audit of existing port operations. The scope of the project has yet to be confirmed but likely to involve one of the following two alternative scenarios i) repairs to the old international wharf or ii) reconstruction of the old international wharf. Confirmation of the scope of the project and completion of the feasibility study cannot be carried out until the seismic investigation (which includes geotechnical investigation) is completed.

2. Environmental impacts of the project based on an assumed project description have been assessed in the IEE in line with ADB’s Safeguards Policy Statement (SPS). The facilities and operations of Honiara International Port are confined to the footprint of the port boundary as shown on Figure 1. The area of influence covered in this DDR focuses on the environment in the existing facility in which the project will operate and whether or not the facility's environmental management is generally consistent with ADB’s safeguard objectives and requirements as defined in SPS. The DDR also identifies any mitigation measures that are needed (corrective actions) to bring the facility's environmental management in to line with ADB’s safeguard objectives and requirements.

3. Through due diligence, review, and supervision ADB ensures that borrowers comply with the SPS requirements during project preparation and implementation. The process outlined in the SPS notes that, over time, ADB’s safeguards may require updating of existing operations to enhance environmental effectiveness, respond to changing needs, and reflect evolving best practices. Due diligence has been undertaken through a review of the available documentation, interviews with staff of SIPA and a site visit during April 2018 in order to explore with the facility’s owner and operator (SIPA) whether the facility is in compliance and/or can be brought into compliance with SPS, and if so to agree on required corrective actions and a time-line for their implementation as a part of international good practice.

4. In preparing the DDR the consultants have exercised due diligence and studied where SIPA’s current practices meet ADB SPS requirements and where there are gaps that need to be filled. This DDR report summarizes the results of that study and identification of how any gaps can be addressed so that any future loan procedures can proceed with confidence that the requirements of SPS will be complied with19.

19 ADB recognizes the World Bank Group’s Environmental Health and Safety (EHS) Guidelines as the benchmark for international good practice. In the case of port projects, the EHS Guidelines for Ports, Harbours, and Terminals (2017) is the key technical reference document.
B. CURRENT STATUS OF ENVIRONMENTAL COMPLIANCE

5. The current international Port of Honiara comprises two wharves
   - Old International Wharf – this wharf provides a 120 m quay line. The wharf comprises 2 structures – a 46 m suspended deck on piles constructed circa 1983 and a 74 m tubular bulkhead pile wall constructed circa 1988.
   - New International Wharf – also known as the JICA (Japan International Cooperation Agency) wharf, this wharf provides a 150 m quay line that is comprised of a tubular bulkhead pile wall. The wharf was recently constructed in 2016.

6. The administration and management of the port of Honiara is handled by the Solomon Islands Port Authority. SIPA was established in 1956 as a statutory corporation under the Ports Act (1956). The Ports Act was last updated in 1996 where SIPA is now a wholly-owned Solomon Islands government authority and is subjected to the State Owned Enterprises (SOE) Act of 2007. SIPA reports to the Minister of Infrastructure Development (MID) and is responsible for the operation of the ports of Honiara and Noro.

7. Under the provisions of the SOE Act, SIPA is charged with the following duties:
   - Provide, maintain and improve in the declared ports such facilities as appears best calculated to serve the public interest
   - Maintain, improve and regulate the use of the declared ports to such extent as appears expedient in the public interest
   - Provide for the declared ports the approaches thereto and the territorial waters of The Solomon Islands such pilotage services and aids as appears best calculated to serve the public interest.

8. SIPA owns a plot of land comprising approximately 9.2 ha encompassing the whole of Point Cruz including the foreshore occupied by the domestic Port, the boundaries of which are defined by the Honiara Cadastral Index Map Sheets H3 and G3. The landside international port facility occupies 7.9 ha of which 1.8 ha is temporarily leased to MID for materials storage. The remaining (approx. 1.3 ha) SIPA land adjacent to the international port, comprises the domestic wharves and land leased to commercial operations on a long term basis.

9. The current status of the landside international port limits including key facilities and structures is shown on Figure 1 (yellow dashed line). This provides the boundary with respect to the audit of existing international port facilities and operations.
10. The Environment Act (EAct) 1998 is the basic environmental law of Solomon Islands and is administered by the Environment and Conservation Division (ECD) of the Ministry for Environment, Climate Change, Disaster Management and Meteorology (MECDM). The EAct requires development consent (DC) to be obtained from ECD prior to development. The Act also governs pollution control and waste discharge. The EAct post-dates the Ports Act 1996 under which SIPA operates and there is no provision in the EAct that requires SIPA to obtain retrospective DC for its developments prior to the EAct coming into force. Any SIPA development proposed after the EAct came into force is required to obtain DC.

11. SIPA obtained Development Consent from ECD on 14 Feb 2014 for the JICA funded New International Wharf which was commissioned in 2016.

C. REVIEW OF OPERATIONAL IMPACTS

12. Through site inspection, interviews with SIPA and related government staff (CEO, Operations Manager, Engineering Manager, Corporate Services Manager, Port Master, ISPS Manager, Land Manager, SIMSA Director, Chief Biosecurity Officer etc.), and review of available...
documentation it is apparent that the activities and operations of the Honiara Port fall short of compliance with SPS requirements in a number of areas.

13. Key facilities and operations examined by the consultant during the audit process included: (i) wastewater management provisions (port sewage, storm water, and ship wastewater), (ii) air emissions from port operations (iii) solid waste management provisions including ship to shore waste management and quarantine facilities (iv) hazardous materials storage and oil management (v) noise and vibration (vi) occupational health and safety (vii) community health and safety (port marine safety, port security).

14. An audit checklist of SPS environmental requirements in respect of Honiara Port facilities and operations is presented in Table 1
### Relevant SPS Environmental Requirement (SPS Appendix 1 Reference)

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<td><strong>Environmental Assessment (D.1)</strong>&lt;br&gt; EIA not undertaken during planning and development of Port of Honiara (1956-1998) at which time there was no national requirement for EIA or Development Consent (DC).&lt;br&gt;&lt;br&gt;An Environmental Impact Statement (EIS) was prepared and submitted by SIPA to ECD as part of the DC application for the JICA funded Project for improvement of Honiara Port Facilities 2013 (new international wharf) as required under the Solomon Islands Country Safeguard System (CSS), in particular the Environment Act 1998, Environment Regulations (2008) and associated Environmental Impact Assessment Guidelines 2010. DC for the new international wharf was obtained on 14/02/2014.</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>Environmental Planning &amp; Management (D.2)</strong>&lt;br&gt; A detailed EMP was prepared as part of the approved EIS undertaken for the DC obtained for the new international wharf in compliance with the CSS. Condition No. 8 of the DC requires that “the holder shall conduct the approved operations under the consent in a manner that complies with the conditions of the consent, the Environmental Management Plan, the Act and subsidiary legislation under the Act.” The EMP specifies a range of environmental mitigation measures that are to be implemented during the operational period of the new wharf. However, observations made during this study indicate that a number of the operation related EMP requirements have not been fully implemented. (These are identified in the sections below).</td>
<td>Operation related EMP requirements approved as a condition under the DC for the new wharf to be properly implemented by SIPA. &lt;br&gt;These are addressed in the IEE.</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>Information Disclosure (D.3)</strong>&lt;br&gt; SIPA maintains a website <a href="http://www.sipa.com.sb/">http://www.sipa.com.sb/</a> where information relating to Honiara Port operations are publicly available this includes information on mission and goals, facilities, vessels arrivals, port charges and news, etc. During project preparation and planning including preparation of the EIS for the New Wharf, project information was shared with key stakeholders in a series of stakeholder consultations in accordance with the CSS.</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>Consultation &amp; Participation (D.4)</strong>&lt;br&gt; Key Honiara Port stakeholders including people and organizations who have an impact on, or who are impacted by Honiara port developments were consulted during the planning and implementation of the new wharf project as reported in the EIS and in accordance with the CSS. Key port stakeholders who participated</td>
<td>Nil</td>
<td>Nil</td>
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### Relevant SPS Environmental Requirement (SPS Appendix 1 Reference)

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<td>in stakeholder consultation workshops included: representatives of government departments, NGOs, international partners (ADB, WB MFAT, DFAT) fisheries association and shipping association.</td>
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### Grievance Redress Mechanism (D.5)

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<td>No formal GRM in place.</td>
<td>GRM established and documented in IEE</td>
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### Monitoring and Reporting (D.6)

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<td>Discussion with Director of ECD indicated that ECD does not undertake environmental compliance monitoring of port activities in respect of compliance with the Environment Act and Regulations or DC for the New Wharf. This is primarily to lack of institutional resources and equipment.</td>
<td>The IEE recommends that SIPA give priority to developing and implementing an environmental management system (EMS) that complies with international good practice.</td>
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<tr>
<td>However, it was noted by the SIPA Engineering Manager that during construction of the New Wharf 2014-2016 the approved construction EMP was implemented and reported on by the contractor. SIPA staff and ECD undertook periodic monitoring of implementation of the EMP during construction.</td>
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<tr>
<td>SIPA Corporate Services Director advised that SIPA does not undertake environmental monitoring and reporting of Port operational activities. SIPA does not have an environmental management system (EMS) for the Port of Honiara and there is no designated environmental function/role within the organization. Whilst there are no immediate plans in place to develop an EMS for SIPA the CSD has indicated that such a plan is desirable.</td>
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### Unanticipated Environmental Impacts during project implementation (D7)

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<td>No procedure in place within SIPA to address unanticipated operational impacts (See also D.6 and D.9). There is no environmental safeguards function or capacity within SIPA’s current organization and operational requirements to address environmental issues. However, as part of any new infrastructure development at the wharf such as the recently completed new international wharf, environmental assessment including implementation of the associated EMP in accordance with the current CSS is undertaken by SIPA’s design consultants and contractors.</td>
<td>See D.6 and D.9. It is recommended that environmental safeguards awareness raising among SIPA staff be undertaken (by ECD) and that SIPA consider designating a staff member to be responsible for overall environmental management of port operations to ensure compliance with DC, Environment Act and subsidiary legislation under the Act. At the same</td>
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<tr>
<td>Biodiversity Conservation and Sustainable Resource Management (D.8)</td>
<td>Potential impacts of port operations on marine biodiversity are not regularly addressed by SIPA. However, a comprehensive marine ecological assessment around Point Cruz was undertaken as part of the EIS for the new international wharf in 2013. The assessment included consultation with ECD and NGOs and review of various reports on marine biodiversity. The assessment concluded that “Honiara Port is not an area which especially needs environment and social consideration” due to i) no endangered or protected species identified, ii) low coral coverage of benthic substrate (&lt;10%), iii) the views expressed during consultations with ECD and NGOs and iv) the fact that reports describing the marine biodiversity around Guadalcanal do not describe the marine ecology of Honiara Port. There are also no national parks, world heritage sites and marine protected areas around Honiara Port.</td>
<td>time it is recommended that SIPA give priority to developing and implementing an environmental management system (EMS) that complies with international good practice.</td>
<td>Nil</td>
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| Pollution Prevention & Abatement (D.9) | Site observations, review of documents and discussions with operational staff indicate that whilst management of domestic solid waste and storage of hazardous materials (fumigation chemicals) at the international port is consistent with good practice a number of other pollution prevention and abatement issues were identified that fall short of good practice. These include:  
  • No containment provisions for potential oil and diesel spills in maintenance workshop and refueling area. However, SIPA CEO advised that a new containerised diesel tank has been ordered for the port to replace existing underground tank mid-2018. New containerised diesel tank includes spill containment bunds compliant with international good practice. New tank will greatly reduce risk and occurrence of diesel spills during refueling activities.  
  • No oil and grease traps in drainage system such that potential oil spills associated with handling of | • It is recommended that installation of oil and grease traps in drainage system at workshop and refueling areas be included as part of wharf refurbishment works.  
• Spill kits to be provided in workshop, refueling and maintenance areas along with training of staff in hazardous materials handling and usage of spill kits | |
### Relevant SPS Environmental Requirement

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<td>hydrocarbons would flow into the storm water drainage system discharging directly into the harbour.</td>
<td>• Petrol drums to be stored in a covered area surrounded by a spill containment bund</td>
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<td>• no oil spill kits provided at workshop and maintenance area</td>
<td>• Enforcement of Government regulations in respect to quarantine issues including prevention of ships disposing of waste at Honiara Port until such time as the Port has internationally recognised port waste disposal facilities</td>
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<td>• limited or nil training of staff in hazardous materials management</td>
<td>• Port septic tank to be routinely cleaned with sludge disposed of in accordance with Government regulations</td>
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<td>• no documented standard operating procedures (SOPs) evident for handling hazardous materials (chemicals and hydrocarbons)</td>
<td>• Refurbishment of all areas of port pavement currently in disrepair to be included in wharf refurbishment works. In the meantime, regular spraying of water on exposed surfaces during dry weather to suppress dust during port operations is required.</td>
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<td>• petrol drums stored in open area</td>
<td>• An Emergency Response Plan specifying procedures in the event of a natural disaster (earthquake, tsunami, cyclone) should be developed by SIPA and include regular training and drills for port staff.</td>
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<td>• no provision at port for incineration of quarantined waste. SIPA CEO noted that a state of the art incineration system has been procured for Honiara Port and due for delivery mid-2018. This will be used for disposal of quarantined waste arising at the Port.</td>
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<td>• ship to shore kitchen waste and uncleared quarantined goods are currently taken to Ministry of Agriculture and Livestock (MAL) Quarantine disposal site adjacent to Honiara municipal landfill at Renadi and incinerated in an open pit. This is inadequate to mitigate biosecurity risks.</td>
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<td>• Whilst international ships are not permitted to offload domestic waste and oil at Honiara Port due to the fact that the port does not have an approved international port waste reception facility, this is not controlled or enforced. Anecdotal evidence suggests significant quantities of ships waste including waste oil, mechanical equipment, domestic and kitchen waste are disposed of at the MAL quarantine disposal area. The quarantine disposal area is unable to deal with the quantity of waste disposed at the facility. Key issue is lack of control and enforcement of government regulations at the port in respect to quarantine issues and ship to shore waste management.</td>
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<td>• inadequate septic system for port toilet facilities resulting in essentially direct discharge of port sewage to harbour (septic tank never cleaned)</td>
<td>• ==According to Director of SIMSA, SIMSA is now programmed to become an Authority (at the beginning of 2019), which will release the resources they==</td>
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<td>• old wharf area and port pavement in disrepair resulting in high dust levels during port operations.</td>
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<td>• no procedures/plan for Emergency Response developed for Port. In event of oil spills in harbour, SIPA has an</td>
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<td>arrangement with SPOil (adjacent to domestic port) which is an internationally accredited hydrocarbon storage facility fully equipped with facilities and capability to deal with a marine oil spill event. According to Port Master there is currently no enforceable regulation to prevent discharge of ballast water in Honiara Port. However, it is noted that container ships generally abide by international good practice and only discharge ballast water outside the 12-mile limit. The Solomon Islands is a member of the International Maritime Organization (IMO) and a party to the international convention for the prevention of pollution from ships (MARPOL) Annexes I, II, III, IV and V (but not VI). Under the Maritime Safety Administration (Marine Pollution) Regulation 2010, the key international conventions relating to prevention of maritime pollution have been included and are therefore enforceable even though Solomon Islands has not signed, ratified or acceded to them.</td>
<td>need to be able to carry out all their mandatory regulatory functions.</td>
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20 Application of international marine pollution conventions

4 (1) For the purposes of these Regulations the following are the international marine pollution conventions to which these Regulations apply:

(a) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) as amended by the Protocol of 1996 relating thereto (London Convention);
(b) Convention for the Prevention of Pollution from Vessels (1973) as amended by the Protocol of 1978 relating thereto (MARPOL 73/78);
(c) Convention on Civil Liability for Oil Pollution Damage, 1992 (CLC 92);
(d) Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS Convention);
(e) Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention);
(f) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 (FUND 92);
(g) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (1969) and the Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances Other than Oil, 1973 (INTERVENTION Convention);
(h) Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (HNS Protocol);
(i) Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Convention);
Solomon Islands Maritime Safety Association (SIMSA) is responsible for implementing the Marine Pollution Regulation, but despite annual requests for personnel, SIMSA has never managed to establish the positions within the SIMSA Organization, or, if the positions were established, the Government imposed a ban on recruitment. Consequently, there is a huge gap in Solomon Islands regulation of marine pollution.

Solomon Islands Maritime Safety Association (SIMSA) is responsible for implementing the Marine Pollution Regulation, but despite annual requests for personnel, SIMSA has never managed to establish the positions within the SIMSA Organization, or, if the positions were established, the Government imposed a ban on recruitment. Consequently, there is a huge gap in Solomon Islands regulation of marine pollution.

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<tr>
<td>Occupational and Community Health and Safety (D.10)</td>
<td>Solomon Islands Maritime Safety Association (SIMSA) is responsible for implementing the Marine Pollution Regulation, but despite annual requests for personnel, SIMSA has never managed to establish the positions within the SIMSA Organization, or, if the positions were established, the Government imposed a ban on recruitment. Consequently, there is a huge gap in Solomon Islands regulation of marine pollution.</td>
<td>Recommended that SIMSA give priority to establishing a Health and Safety (H&amp;S) Plan for the Port along with organizational arrangements whereby SIMA H&amp;S officers have clearly defined functions as specified in the H&amp;S Plan and receive the necessary training to undertake their functions.</td>
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<td>Honiara Port complies with international operational and security standards and has certified compliance with the International Security and Ports Safety (ISPS) Code under the International Convention for Safety of Life at Sea (SOLAS) Convention. The Honiara Port Facility Security Officer (PFSO) implements the ISPS code. In terms of occupational and community health and safety at the Port of Honiara the Manager Corporate Services noted that SIPA has no formalised Health and Safety Plan or department/division. However, there are two designated health and safety officers within SIPA's Corporate Services Department responsible for health and safety of staff at the port on a daily basis. It would appear that the functions of the health and safety officers are not clearly defined and documented and therefore it is unclear as to the precise nature of their duties. It is understood from the Port Operations Manager that</td>
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(i) Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (Anti-fouling Convention);
(k) Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, 1990 (SPREP Convention) and its Protocol for the Prevention of Pollution of the South Pacific by Dumping (SPREP Dumping Protocol) and Protocol concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region (SPREP Pollution Emergencies Protocol);
(l) International Convention on Ballast Water (not yet included but needs to be included in the Regulation in the future);
newly recruited staff undergo a standard induction process which covers aspects of health and safety. However, the absence of a clearly defined health and safety plan indicates that occupational health and safety of workers at the port of Honiara falls short of international good practice.

The Honiara Port Productivity Assessment Mission Report 15 Feb 2018 made the following observations relating to safe working practices around the terminal: (proposed corrective actions are identified in the corresponding column)

- Stevedoring ground staff assisting with the securing of the spreader (or chains) onto the container(s) to be lifted often climb onto the containers using an aluminium ladder that isn’t always secured, and when the last container is to be lifted, personnel cannot easily avoid being under the spreader or chains as they are lowered above the container, since they have no other place of refuge at height.
- There are no signed or marked walking routes around the terminal. Ship’s crew were observed to make their way across operational areas from time to time.
- Yard equipment coming onto the quay apron of No 2 berth from the connecting ramp(s) is unable to see what equipment may be operating (moving) on the quayside as it arrives. At the southern end, the container stacks at the rear of the quay were noted to restrict sight lines for vehicles and equipment, increasing the risk of incident and collision.
- The access road connecting the quay to the main yard would benefit from being wider to improve passing clearances for equipment carrying containers.

- Consideration should be given to the use of a specific access platform with integrated steps that can be positioned adjacent to containers and wheeled to different locations on the quayside area as appropriate. Something similar to passenger loading steps at an airport.
- Consideration should be given to marking out ‘safe’ pedestrian routes in/out and around the terminal.
- Consideration should be given to a large (curved) mirror on the end of the quay that would alert drivers to vehicles coming from the other direction.
- If widening is not feasible, consideration could be given to a 1-way circulation route for equipment coming onto and leaving the No 2 berth apron. This would use each ramp either for arrival or departure purposes.

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**Physical Cultural Resources (D.11)**

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<td>newly recruited staff undergo a standard induction process which covers aspects of health and safety. However, the absence of a clearly defined health and safety plan indicates that occupational health and safety of workers at the port of Honiara falls short of international good practice.</td>
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<td>The Honiara Port Productivity Assessment Mission Report 15 Feb 2018 made the following observations relating to safe working practices around the terminal: (proposed corrective actions are identified in the corresponding column)</td>
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<td>• Stevedoring ground staff assisting with the securing of the spreader (or chains) onto the container(s) to be lifted often climb onto the containers using an aluminium ladder that isn’t always secured, and when the last container is to be lifted, personnel cannot easily avoid being under the spreader or chains as they are lowered above the container, since they have no other place of refuge at height.</td>
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<td>• There are no signed or marked walking routes around the terminal. Ship’s crew were observed to make their way across operational areas from time to time.</td>
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<td>• Yard equipment coming onto the quay apron of No 2 berth from the connecting ramp(s) is unable to see what equipment may be operating (moving) on the quayside as it arrives. At the southern end, the container stacks at the rear of the quay were noted to restrict sight lines for vehicles and equipment, increasing the risk of incident and collision.</td>
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<td>• The access road connecting the quay to the main yard would benefit from being wider to improve passing clearances for equipment carrying containers.</td>
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<td>No issues / noncompliance identified</td>
<td>Nil</td>
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May 2020
15. As identified above the facilities operations and maintenance of the Honiara International Port are considered to fall short of internationally recognized good environmental practice in a number of areas. However, it is noted that SIPA management is actively addressing some of these issues through planning and procurement of new facilities.

D. ACTIONS REQUIRED FOR HONIARA PORT TO COMPLY WITH SPS

16. The recommended actions for SIPA in order to achieve environmental compliance with SPS are to:

- Implement outstanding operation related EMP requirements approved as a condition under the DC (14 Feb 2014) for the new wharf.
- SIPA to give priority to developing and implementing an environmental management system (EMS) for the operation of Honiara Port that complies with international good practice as well as EAct and Environmental Regulations. As part of this SIPA to designate staff resources to be responsible for overall environmental management of port operations.
- In parallel with the above, proactively implement environmental safeguards awareness raising for SIPA staff as much as possible utilising ECD’s environmental outreach function and resources.
- Install oil and grease traps in drainage system at workshop and refueling areas.
- Spill kits to be provided in workshop, refueling and maintenance areas along with training of staff in hazardous materials handling and usage of spill kits.
- Petrol drums to be stored in a covered area surrounded by a spill containment bund.
- Enforcement of Government regulations in respect to quarantine issues including prevention of ships disposing of waste at Honiara Port until such time as the Port has internationally recognised port waste disposal facilities.
- Port toilet facilities septic tank to be routinely cleaned and sludge disposed of in accordance with Government regulations.
- Mitigate dust nuisance at port through i) regular spraying of water on exposed surfaces during dry weather and ii) refurbish port pavement currently in disrepair.
- Develop an Emergency Response Plan (ERP) specifying procedures in the event of a natural disaster (earthquake, tsunami, cyclone) and include regular training and drills on ERP for port staff.
- Prioritize the formulation of a worker and operational Health and Safety (H&S) Plan for the Port along with organizational arrangements whereby SIPA H&S officers have clearly defined functions as specified in the H&S Plan and receive the necessary training to undertake their functions. Other safety related recommendations include:
  - Consideration to be given to the use of a specific access platform with integrated steps that can be positioned adjacent to containers and wheeled to different locations on the quayside area as appropriate. Something similar to passenger loading steps at an airport.
  - Consideration to be given to marking out ‘safe’ pedestrian routes in/out and around the terminal.
17. The IEE and associated EMP provide additional recommendations to ensure the proposed wharf refurbishment works under the Honiara Port Development Project comply with the ADB’s SPS with respect to all phases of project implementation (pre-construction, construction and operation).

E. CONCLUSIONS AND RECOMMENDATIONS

18. The audit of existing facilities and operations of Honiara International Port concludes that facilities operations and maintenance of the Honiara International Port falls short of internationally recognized good environmental practice in a number of areas. That being said, it is noted that SIPA management is actively addressing some of these issues through planning and procurement of new facilities to improve environmental management.

19. The audit of existing facilities has identified a list of recommended actions to be addressed in order that existing operations comply with ADB’s SPS. These actions are included in the EMP section of the IEE.